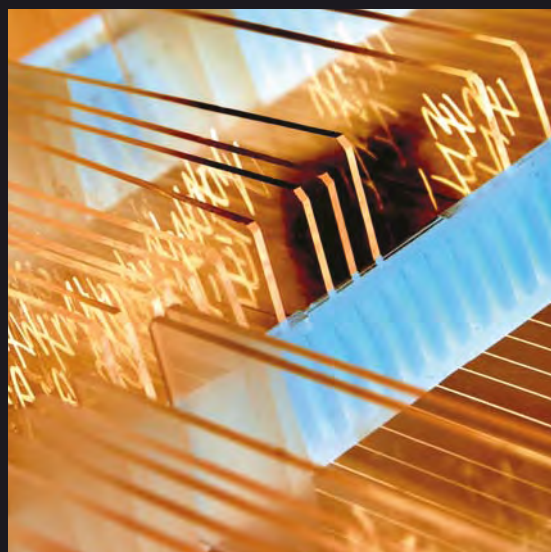
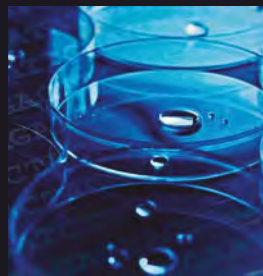
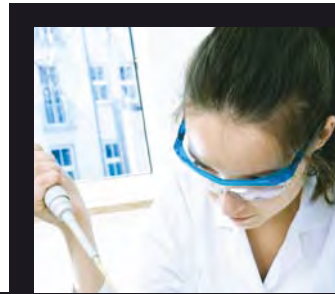


Electron Microscopy Sciences

Catalog XVII

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Dear Valued Customer,

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LatticeAx Wafer Cleaving Systems, page 432



Datacolor CHROMACAL™ Color Calibration System, page 160



LYNX II Tissue Processor, page 987

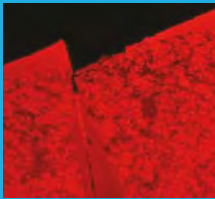


CryoJane Workstation, page 600



On behalf of myself and the entire team at Electron Microscopy Sciences, let me say that it is our honor and privilege to provide you with this catalog — the most comprehensive source of products for all fields of microscopy and general laboratory research available. As we come upon our 45th year in the industry, we truly believe the effort we put into producing a printed catalog in addition to our other endeavors (website, bulletins, emails, post cards) proves to be a valuable resource for you, our customer, who deserves the very best.

A lot has happened since we last released a comprehensive catalog. New technological achievements are here (Datacolor ChromaCal color calibration system, EMS Cryo-Sem Preparation System, Graphene — the strongest material ever measured, LatticeAx cleaving systems, Nightsea fluorescence viewing systems and the EMS Freeze Substitution Kit to name a few). The way we communicate using new media continues to evolve as well (EMS is now on Facebook, Twitter, and YouTube). Although all these changes have taken place, one thing remains the same — our commitment to manufacturing and distributing the highest quality chemicals, supplies, equipment and accessories available to the Microscopy and Histology community today. In fact, our team is working harder than ever to provide you with friendly service, competitive pricing, accurate technical support and swift delivery.



We know a lot of our customers look forward to this catalog to learn about exciting new products on the market. We carefully select these products, offering only those that meet our high standards before we present them to you.

Highlights of this catalog include two new sections: Cleaving (pages 432-444) and Antigen Retrieval (pages 612-616); the addition of over 1500 new thicknesses for Formvar and carbon support film grids (pages 116-133); and products available exclusively from Electron Microscopy Sciences: Datacolor CHROMACAL™ (page 160-163); Nightsea (page 880-883); LatticeAx (page 432-435); Lynx II Tissue Processor (pages

987-989); Cryo Workstation (pages 600-601); FIRM (page 32, 37, 473); EMS-UAR (page 68), and much more.

For those new to our catalog, you will find the products organized in sections to enhance your experience. There are entire sections devoted to particular fields, such as Histology or Materials Sciences, to help researchers quickly narrow their focus on products and equipment appropriate for their

needs. We hope you will discover exciting products that will benefit your research. Keep in mind, this is not merely a list of available products, it's an educational resource. You will find research citations and technical data alongside our products so you can learn how to take full advantage of the products you receive from us. There is an index of this information located on pages 1148-1150 for your convenience. There is also a completely updated listing of our Technical Data Sheets on page 1151. We invite you to visit our website as another resource for this information as well as for Material Safety Data Sheets which we keep up to date as a courtesy to our customers who find them invaluable. We are pleased to be of service and hope you will join our mailing list so we may continue to send you additional updates throughout the year.



It is with great pleasure we continue to offer to you our outstanding selection of Chemicals for Electron Microscopy, Light Microscopy and Histology; the industry-leading line of Aurion ImmunoGold Reagents; the highest quality, most precise sectioning and incomparable durability DiATOME Diamond Knives line, our superb line of EMS Sputter and Carbon Coaters, world-renowned Technovit® embedding resins, and the list goes on. Most of these lines have been enhanced with new options, so it's worth taking a look.

We hope that this catalog exceeds your expectations and we look forward to working with you. Please contact our customer service

and technical departments if we can help discuss any of these products with you in further detail regarding your particular application. Your comments and suggestions are always welcome. It's how we continue to grow. We achieve success if you do.

Stacie Kirsch and the EMS Team

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**Electron
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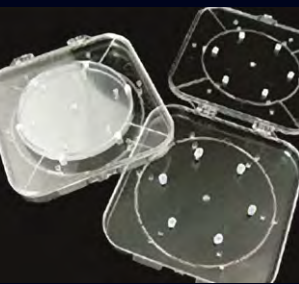
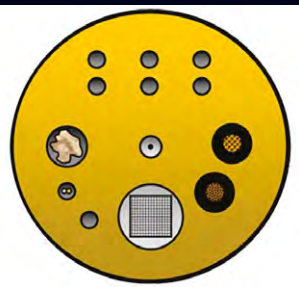
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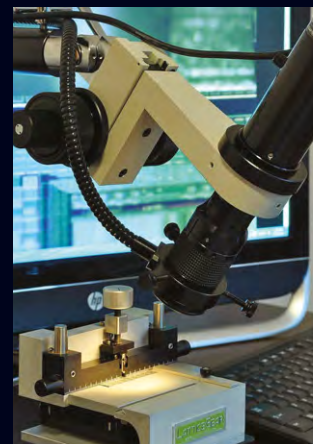
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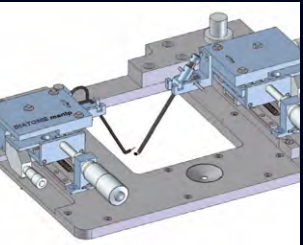
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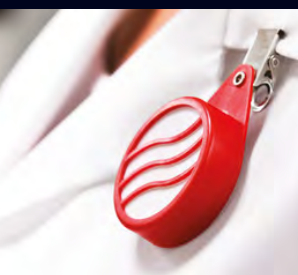
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ABOUT OUR CHEMICALS...

- Storage conditions of EACH chemical are noted in the box left of the catalog number. CODE: RT = Room Temperature
- For increased shelf life of room temperature stored chemicals, see equipment section for our complete line of Desiccator Cabinets. All chemicals must be kept away from direct sunlight.
- All specific gravities, unless otherwise specified are measured at water = 1
- All of the EMS stains are certified.
- For a chart of uses and applications of our Dyes & Stains, see pages 466-467
- EM Grade = ACS Reagent

➤ 4-Acetamido-4'-Isothiocyanato-2, 2'-Stilbenedisulfonic Acid Disodium Salt Hydrate

(Disodium 4 acetamido-4'-isothiocyanato-stilben-2, 2'-disulfonate; SITS)

$C_{17}H_{12}N_2O_7S_3Na_2$ F.W. 498.50 CAS #1023-76-8

SITS has been used as a vital stain, as a label for immunostaining, and as a neuronal tracer. SITS is also a non-penetrating fluorescent marker for erythrocyte membranes which acts as a potent inhibitor of anion transport. For more information related to the preparation and characterization of SITS, please refer to: Jakobsen, P. and Horobin, Richard W. (1989). Stain Technology, Vol.64, No.6 pg.301-313.

RT	10030	SITS, Disodium Salt	250mg
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➤ Acetate Buffer

See Buffer Section page 26 >>>>

RT	11480		225 ml
RT	11482		500 ml

➤ Acetic Acid, Glacial, Reagent A.C.S

$C_2H_4O_2$ F.W. 60.05 CAS 64-19-7

Assay min 99.7%

RT	10040	Acetic Acid, Glacial	500 ml
RT	10041	Acetic Acid, Glacial	2.5 L

➤ Acetic Acid, Aqueous Solution

Prepared from acetic acid glacial with de-ionized water

RT	10042-02	Acetic Acid, 0.2% (v/v) Solution	500 ml
RT	10042-05	Acetic Acid, 0.5% (v/v) Solution	500 ml
RT	10042-10	Acetic Acid, 1.0% (v/v) Solution	500 ml
RT	10042-50	Acetic Acid, 5.0% (v/v) Solution	500 ml

➤ Acetone, Reagent, A.C.S.

CH_3COCH_3 F.W. 58.08 CAS #67-64-1

A.C.S. Specifications:

AssayMin. 99.5%
 Aldehyde (as HCHO)0.002%
 Density (G/ml) at 25°CMax. 0.7857
 Titratable Acid0.0003 meq/g.
 Titratable Base0.0006 meq/g.
 Isopropyl Alcohol0.05%
 Methanol (CH₃OH)0.05%
 Residue after Evaporation0.001%
 Solubility in waterTo Pass test
 Substances Reducing PermanganateTo Pass Test
 Water0.5%

RT	10000		1qt. (946ml)
RT	10010		4x1qt.
RT	10012		250ml
RT	10014		4x250ml

➤ Acetone, Glass Distilled

CAS #67-64-1 U.V. Absorption - 1cm cell vs. H₂O

**ULTRA
PURE!**

λ (nm)	400	350	340	330
A	0.01	0.02	0.10	1.0

RT	10015		100ml
RT	10016		4x 100ml

➤ Acetone: Alcohol

See Histology Section, page 446 >>>>

➤ Acetonitrile, Reagent, A.C.S.

CH_3CN FW 41.05 CAS #75-05-8

A non-carcinogenic substitute for Propylene Oxide, used in tissue processing for TEM. Good for infiltration with EMBED-812 or other Epon-812 substitutes. Tarnowski, B.I. et al, EMSA proceedings, Detroit, MI page 38 (1984)

RT	10020		450ml
RT	10021		4x450ml

TECHNICAL TIP

Acetonitrile Is A Better And Safer Dehydrating Solvent For Transmission Electron Microscopy.

Propylene Oxide and Ethanol are commonly used dehydrating solvents for processing tissues for electron microscopy. But both solvents, however, have some undesirable properties: they are highly flammable, volatile, toxic and potentially carcinogenic. Acetonitrile is a direct substitute for ethanol and propylene oxide; furthermore, it is safer to use and requires shorter dehydration times. It is freely miscible with water, alcohol, acetone and epoxy resin and it does not interfere with epoxy polymerization. Harold H. Edwards, Yu-Yan Yeh, Betty I. Tarnowsky, and Gregory R. Schonbaum. (1992). Acetonitrile as a Substitute for Ethanol/ Propylene Oxide in Tissue Processing for Transmission Electron Microscopy: Comparison of Fine Structure and Lipid Solubility in Mouse Liver, Kidney, and Intestine. Microsc. Res. and Technique Vol 21, pg.39-50

➤ Acid Alcohols

An acidified alcohol solution for the differentiation of regressive stains.

RT	26071-01	Acid Alcohol, 0.5% HCl in 70% Alcohol	1 L
RT	26071-04	Acid Alcohol, 0.5% HCl in 70% Alcohol	4x1 L
RT	26072-01	Acid Alcohol, 1% HCl in 70% Alcohol	1 L
RT	26072-04	Acid Alcohol, 1% HCl in 70% Alcohol	4x1 L
RT	26073-01	Acid Alcohol, 1% HCl in 95% Alcohol	1 L
RT	26073-04	Acid Alcohol, 1% HCl in 95% Alcohol	4x1 L

➤ Acid Fuchsin, Certified, C.N. #DcR-8

(Rubin S, Fuchsin S, Fuchsin Acid, Acid Magenta, Acid Violet 19)

$C_{20}H_{17}N_3Na_2O_9S_3$ F.W. 585.54 CAS #3244-88-0

Solubility: 0.053% Water; 1.21% Alcohol

RT	10035		25 g
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➤ Acridine Orange

(Basic Orange 14)

$C_{17}H_{19}N_3HCl \cdot ZnCl_2$ F.W. 369.94 CAS #10127-02-3

Ultrastructural probes on DNA templates within human bone marrow and lymph node cells. Frenster, J., Adv. Cell Mol. Biol., 3, 1(1974) Used to detect changes in DNA template activity within cells. Frenster, J. Cell Nucl., 1, 565 (1974) Fluorescent dye for cytochemistry. J. Histochem. Cytochem., 31, 737 (1983) J. Lab. Med., 15 (3), 180, (1984)

RT	10050		25g
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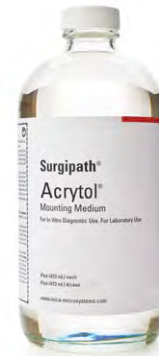
ADHESIVES AND MOUNTANTS

➤ Acrytol Mounting Media

Acrytol is a rapid-drying mounting medium which enables slides to be screened immediately. It has a low viscosity, allowing the medium to flow easily. It also prevents air bubbles from becoming trapped.

Acrytol contains an antioxidant to inhibit stain fading and prevent the formulation of annual rings. A thin coating of Acrytol is all that is needed to adhere a coverglass to a microscope slide.

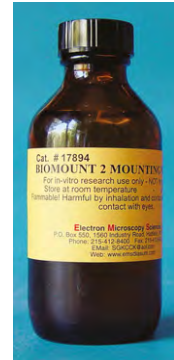
It is soluble in xylene, toluene and most xylene substitutes.



RT 13518 Acrytol Mounting Medium Pint

➤ Biobond; Tissue Section Adhesive

Having prepared the tissue specimen for immunolabeling it is then imperative to perform the incubations with a protocol designed to maximize the specific signal and minimize the background. Some incubation conditions may cause the tissue sections to be removed from the glass slide. Typical tissue section adhesives such as poly-L-lysine, Elmer's glue, chrome alum, etc... are not suitable for use with immunogold labeling because of the increased background caused by the attraction of gold particles to the adhesive on the slide. Furthermore, the surface of glass slides is uneven and it is activated by the silicon tetrahedral structure. It, therefore, provides active sites for absorption of proteins or reactions with chemicals and reagents. Thus, it is important to minimize this possibility by coating the surface with a material that is of low reactivity towards reagents. BIOBOND produces a very strong adhesion between the glass slide and the tissue section for subsequent incubations, as well as a protective layer to minimize the interaction between the charged glass surface with the reagents. BIOBOND is suitable for all kinds of tissue specimens including but not limited to paraffin wax, resin sections, cell smears, cytopins and cryostat sections. BIOBOND is supplied in a 20ml vial, which is sufficient to coat at least 1000 slides.



0-5°C 71304 Biobond 20 ml

➤ Aron Alpha®-Ethyl Ultra Speed Adhesive (Quickbond)

Aron Alpha®, type 200 is a one component, room temperature curing structural adhesive composed mainly of alpha cyanoacrylate monomer in a liquid state. When this monomer is applied in a single thin coating to the bonding surface of the material, it instantly solidifies through polymerization to produce an extra high strength, colorless bond with virtually no shrinkage. Aron Alpha bonds almost any non-porous material except fluorocarbons. Solvents such as gasoline, propane, oil, alcohol or benzene do not affect resinified Aron Alpha. The adhesive itself contains no solvents. The Aron Alpha bond has a high tensile strength but a relatively lower shear strength. Aron Alpha is not a gap filler. Good surface contact is essential. Meets MIL-A-46050 C. Ideal for the bonding of tissues to a tissue-slicer, tissue block or to a blank block etc.



Physical Properties of Type 200

Before use (Liquid state)	After use (Bonded state)
Refractive Index, N20°C/D .....1.4363	Solubility Paramete .....10.72
Viscosity @25°C (Brookfield).....2	Softening Temp.
Specific Gravity, 20°C/4°C .....1.050	(Viscat State), (°F) .....293
Boiling Point, 5mmHg, °F .....140-144	Melting Point (°F).....392 - 406
Melting Point (°F).....-130	Specific Gravity, 20°C / 4°C .....1.2483
Flash Point (°F) .....181	Refractive Index, N20°C/D .....1.4870
Solubility.....acetone, MEK, benzene, toluene, ethylacetate, nitromethane	Electric resistance .....10 11-13
	Solubility .....acetone, nitromethane

RT 72588 Quick Bond – Aron Alpha 200 5x2g/bx

CoreDish™

Multiple Biopsy Containers Half Prefilled with 10% Formalin

We are proud to offer a multi-compartment container in the shape of a dish and half prefilled with 10% Neutral buffered Formalin, for holding and transporting biopsies. It is supplied with a leak-proof closure with O-ring ensuring total protection of contents. It conforms to OSHA directives.

For more information, see page 42. >>>>>



ADHESIVES AND MOUNTANTS**➤ Biomeda™ Substitutes****➤ Fluoro-Gel (A Direct Substitute for BioMeda™ Gel-Mount)**

Fluoro-Gel is a water based mounting medium designed for the permanent mounting of fluorescent stained tissues, which may either be damaged or soluble in organic solvents, such as xylene or toluene. This unique formula prevents rapid photo-bleaching of FITC, Texas Red, AMCA, Cy2, Cy3, Cy5, Alexa Fluoro 488, Alexa Fluoro 594, Green Fluorescent Protein (GFP), Tetramethylrhodamine, Redox, Phycoerythrin (RP-E), Phycocyanin (PC), and Allophycocyanin (APC). The fluorescence is retained during prolonged storage at 4°C in the dark.

Application: Immunofluorescence, confocal microscope.

For our original formula:

0-5°C	17985-10	Fluoro-Gel, (with Tris Buffer)	20 ml
0-5°C	17985-11	Fluoro-Gel, (with Tris Buffer)	100 ml

For a more stable pH:

0-5°C	17985-30	Fluoro-Gel, (with TES Buffer)	20 ml
0-5°C	17985-31	Fluoro-Gel, (with TES Buffer)	100 ml
0-5°C	17985-40	Fluoro-Gel, (with PIPE Buffer)	20 ml
0-5°C	17985-41	Fluoro-Gel, (with PIPE Buffer)	100 ml

➤ Fluoro-Gel II Mounting Medium

Fluoro-Gel II is similar to Fluoro-Gel, but Fluoro-Gel II contains DAPI (4, 6-diamino-2-phenylindole), which is a counter stain for DNA. This product is to be used in in situ hybridization techniques or other methods where fluorescence of DNA staining is required. DAPI excites at 360 nm and emits at 460 nm, producing blue fluorescence. RNA is also stained with DAPI.

Application: Immunofluorescence, confocal microscopy.

0-5°C	17985-50	Fluoro-Gel II	20 ml
0-5°C	17985-51	Fluoro-Gel II	100 ml

➤ Fluoro-Gel III Mounting Medium

Fluoro-Gel III Mounting Medium is similar to Fluoro-Gel, however, Fluoro-Gel III with the addition of PI (Propidium Iodide) which is a counterstain for DNA, makes this a unique mounting medium, which prevents rapid photobleaching of FITC, Texas Red, AMCA, Cy2, Cy3, Cy5, Alexa Fluoro 488, Alexa Fluoro 594, Green Fluorescent protein (GFP), Tetramethylrhodamine, Redox, Phycoerythrin (RP-E), Phycocyanin (PC), and Allophycocyanin (APC). The fluorescence is retained during prolonged storage at 4°C in the dark. This medium does not contain Phnylenediamine, which destroys immunofluorescence of Cy dyes, RP-E, PC, and APC. This product is to be used in in situ hybridization techniques or other method where fluorescence of DNA staining is required. PI excites at 535 nm, emits at 615 nm, producing a red fluorescence. RNA is also stained with PI.

Application: Immunofluorescence, confocal microscope

0-5°C	17985-60	Fluoro-Gel III	20 ml
0-5°C	17985-61	Fluoro-Gel III	100 ml

**➤ Fluoro Gel with DABCO™**

Fluoro Gel with antifading agent 1, 4-Diazobicyclo-(2,2,2-octane (DABCO™) is an aqueous mounting medium for preserving fluorescence of tissue and cell smears. This unique formula prevents rapid photobleaching of FITC, Texas Red, AMCA, Alexa fluoro 488, Alexa fluoro 594, Cy dyes, tetramethyl rhodamine, and Redox. The fluorescence is retained during prolonged storage at 4°C in the dark. Refractive Index: 1.366 +/- 0.002

Application: Immunofluorescence, confocal microscopy.

Reagent: Ready to use mounting medium with anti-fading agent

Storage: 2-8°C is recommended

2-8°C	17985-01	Fluoro Gel with DABCO	20 ml
2-8°C	17985-02	Fluoro Gel with DABCO	100 ml
2-8°C	17985-03	Fluoro Gel with DABCO	250 ml
2-8°C	17985-04	Fluoro Gel with DABCO	1000 ml

➤ Fluoro-Gel with Anti-Fading Mounting Medium

Fluoro-Gel Mounting Medium with a strong anti-fading agent 1,4-phenylenediamine is an aqueous mounting medium for preserving fluorescence of tissue and cell smears. This unique formula preserves rapid photobleaching of FITC, Texas Red, AMCA, Cy2, Cy3, Cy5, Alexa Fluoro 388, Alexa Fluoro 594 tetramethyl rhodamine, and Redox. The fluorescence is retained during prolong storage at 4°C in the dark. This medium contains Phnylenediamine and is not suitable for immunofluorescence of Cy dyes, Phycoerythrin (R-PR) phycocyanin (PC), and allophycocyanin (APC). Refractive index: 1.366 +/- 0.002

Application: Immuno-fluorescence, confocal microscopy.

Reagent: Prepared from TRIS buffer. Ready-to-use mounting medium with dark coffee color, this is normal, and does not interfere with immuno-fluorescence

Storage: 2 – 8°C is recommended. Protect from light. DO NOT FREEZE.

	Cat. #	Description	Qty
2-8°C	17983-20	Fluoro-Gel with Anti-Fading Agent	20 ml
2-8°C	17983-100	Fluoro-Gel with Anti-Fading Agent	100 ml

➤ In-Situ Mount (A Direct Substitute for BioMeda™ Situ Mount)

In-Situ mounting medium is a unique mounting medium designed for permanent preservation of tissue sections and cell smear with alkaline phosphatase chromogens like NBT/BCIP and red stain.

Application: Mounting tissues and cell smears.

0-5°C	17988-30	In-Situ Mount	30 ml
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*The names *BioMeda Gel Mount*, *Crystal Mount*, *Clarion*, *Situ Mount* are all owned by BioMeda Corporation

ADHESIVES AND MOUNTANTS

➤ Biomeda™ Substitutes (continued)

➤ Clear-Mount (A Direct Substitute for BioMeda™ Crystal Mount)

Clear-Mount is a water based mounting medium designed for the permanent mounting of hydrated tissues, which may be damaged by organic solvents. Such samples include cell smears, with peroxidase and alkaline phosphatase chromogens.

This mounting medium preserves Fast Red, Aminoethylcarbazole (AEC), NBT/BCIP, INT/BCIP chromogens and is also compatible with counter-stain such as Hematoxylin and Nuclear Fast Red. It is also suitable for chromogens like DAB and DAB with Nickel and Cobalt. It is not compatible with H & E staining.

Application: Mounting of Immunohisto slides.

For our original formula:

For a more stable pH:

0-5°C	17985-12	Clear-Mount, (with Tris Buffer)	30 ml	0-5°C	17985-16	Clear-Mount, (with PIPE Buffer)	30 ml
0-5°C	17985-15	Clear-Mount, (with Tris Buffer)	250 ml	0-5°C	17985-17	Clear-Mount, (with PIPE Buffer)	100 ml

➤ Limonene-Mount (A Direct Substitute for BioMeda™ Clarion Mount)

This mounting medium is made with limonene, a natural product from orange peels. It preserves tissues and cell smears that can be dehydrated with organic solvents in immunohistochemistry, e.g. DAB and DAB with nickel or cobalt. Our Limonene-Mount also works well with alkaline phosphatase chromogens, and organic solvent resistant Supper Fast Red. It is also a good choice for mounting H & E stained slides.

Application: Mounting tissues and cell smears.

0-5°C	17987-01	Limonene-Mount	100 ml
0-5°C	17987-06	Limonene-Mount	6x100 ml/bx
0-5°C	17987-25	Limonene-Mount	250 ml

➤ EMS-Mount

EMS-Mount is a non-permanent, low viscosity aqueous mounting medium designed for mounting of tissue sections and cell smears with peroxidase and alkaline phosphatase chromogens that cannot be dehydrated with organic solvents. This mounting medium preserves Fast red, Aminoethylcarbazole (AEC), BCIP/NBT, BCIP/INT chromogens and is also compatible with counterstain like Hematoxylin and Nuclear fast red (NFR). It is also suitable for chromogens like DAB and DAB with nickel and cobalt. (It is not compatible with H and E staining). Refractive Index: 1.372 +/- 0.002

Application: Mounting of chromogens that cannot be dehydrated with organic solvents.

Reagent: Ready to use mounting medium

Storage: 2-8°C is recommended

2-8°C	17985-05	EMS-Mount	30 ml
2-8°C	17985-06	EMS-Mount	100 ml
2-8°C	17985-07	EMS-Mount	250 ml
2-8°C	17985-08	EMS-Mount	1000 ml

➤ EMS Shield Mount

EMS Shield Mount is an aqueous non-permanent, low viscosity mounting medium for immunofluorescence. This unique formula prevents rapid photobleaching of FITC, Texas Red, AMCA, Cy2, Cy3, Cy5, Alexa fluoro 488, Alexa fluoro 594, Green fluorescent protein (GFP), tetramethyl rhodamine and Redox. The fluorescence is retained during storage at 4°C in the dark. This medium does not contain phenylenediamine, which destroys immunofluorescence of Cy dyes. Refractive Index : 1.380 +/- 0.002

Application: Immunofluorescence, confocal microscopy.

Reagent: Ready to use mounting medium for Immunofluorescence.

Storage: 2-8°C is recommended

2-8°C	17985-09	EMS Shield Mount	30 ml
2-8°C	17985-100	EMS Shield Mount	100 ml

➤ EMS Shield Mount with Anti Fading

EMS Shield Mount with antifading agent 1, 4-Diazobicyclo-(2,2,2-octane (DABCO™) is an aqueous non-permanent, low viscosity mounting medium for immunofluorescence. This unique formula prevents rapid photobleaching of FITC, Texas Red, AMCA, Cy2, Cy3, Cy5, Alexa fluoro 488, Alexa fluoro 594, Green fluorescent protein (GFP), tetramethyl rhodamine and Redox. The fluorescence is retained during storage at 4°C in the dark. This medium does not contain phenylenediamine, which destroys immunofluorescence of Cy dyes. Refractive Index: 1.382 +/- 0.002

Application: Immunofluorescence, confocal microscopy.

Reagent: Ready to use mounting medium for Immunofluorescence.

Storage: 2-8°C is recommended

2-8°C	17985-150	EMS Shield Mount with DABCO™	30 ml
2-8°C	17985-200	EMS Shield Mount with DABCO™	100 ml



➤ Biomount™

Some mounting media oxidize rapidly upon exposure to air, forming carboxyl groups. This can be more pronounced when sections have been cleared in a solution containing aldehyde. It is sometimes observed that the immunogold/silver signal fades after a few weeks, or even in a shorter time, from sections that have been mounted with these media under cover slips. The silver is still present, but has formed translucent silver carboxylate salts. Visibility can be retrieved by removing the cover slip and washing in xylene and then immersing the slide in photographic developer, but this is a tedious procedure. BIOMOUNT is a specially formulated mounting medium that reduces fading of immunogold/silver signals in sections on glass slides. It is suitable for resins as well as wax embedded sections of tissue.

RT	17894	BioMount	100ml
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TECHNICAL TIP

Temperature Conversion

Degree Fahrenheit =
(1.8 x Degree Celsius) + 32

Degree Celsius =
0.555 (Degree Fahrenheit - 32)

ADHESIVES AND MOUNTANTS

➤ Certified Conductive Adhesives

EMS introduces a new reliable line of conductive adhesives which are certified by the Bureau Veritas Quality International. **Quality Standards:** ISO 9001; EN29001; ANSI/ASQC Q91

➤ Silver Conductive 18DB70X

Silver Conductive Coating 18DB70X is a direct substitute for Silver Conductive Fluid 416, which is no longer available. This material was specially formulated for use in geographic areas that demand the use of low VOC (Volatile Organic Compounds) products. It provides low ohms at very thin dry film thickness on almost any surface, and exhibits excellent long term shielding and grounding properties.

Typical Properties:

■ **As supplied (Liquid)**

PigmentSilver
 BinderAcrylic
 Solids content by weight50.8% ± 5%
 Density13.9 lb/gal (1.67kg/l)

■ **As applied:**

VOC0.5 lb/gal (59.6g/l)
 DiluentAcetone (1:1 ratio by volume)

Drying time

5 minutes air dry to touch/10 minutes to handle then 5 minutes at 180°–225°F (82° – 107°C) or air cure for 24 hrs.

■ **When dried:**

Service temperature300°F (150°C)
 Sheet resistance0.015 ohms/sq. in./mil (25µm)
 Attenuation.....75 dB

RT 12684-15 Silver Conductive Coating 15 g

➤ Silver Conductive Adhesive Paste 478SS

Our adhesive 478SS is a conductive, silver-based polymer which is used for thick film coatings where liquid silver is not an option. Once cured, it offers a very high Tg (glass transition temperature) 153°F (67°C) to prevent blocking, and offers superior adhesion to polyester film. Adhesive 478SS can be cured at 200°F (93°C) within 15 minutes. Higher temperatures will reduce the time needed to achieve a final cure.

■ **Typical Properties (as supplied):**

PigmentSilver
 BinderPolyester
 ColorSilver
 DiluentCarbitol Acetate
 ConsistencyPaste (13,000-28,000 cps)
 Solid content.....72.5-75.5%
 Flash point230°F (110°C)
 Shelf life6 months under original seal

■ **Typical Properties (as cured):**

ColorSilver
 Sheet Resistance ..<0.025 ohm/square inch @1 mil

RT 12685-15 Silver Conductive Adhesive 478SS 15g

RT 12685-25 Silver Adhesive 478SS Thinner 25ml



➤ Silver Conductive Adhesive 503

A High Temperature Conductive Paint

Silver paint 503 is a flexible, high temperature conductive material designed for a wide variety of uses, and adheres to most substrates.

Advantages:

- Withstands ambient temperatures of over 500°F (260°C)
- Remains flexible over temperature range of -40°F to 500°F
- Highly conductive – good adhesion to substrates
- Dries at room temperature
- Ready to use – easy to apply

■ **Typical Properties (as supplied):**

PigmentSpecially Treated Silver 56%
 Binder.....Fluoroelastomer
 CarrierMethyl Isobutyl Ketone (MIBK)
 ColorSilver - Consistency: fluid
 Density.....14.6 lbs/gal (1.75kg/L)
 Solid content by volume18%
 Weight solids62%
 Viscosity.....1700cps

Shelf life for this product is two years under original seal. Store in cool place

■ **Typical Properties (as cured):**

Color.....Silver
 Service temperature525°F (275°C)
 Sheet resistance0.05 ohms/sq. in./1 mil dry film

Drying

Air dry coated part approximately 10 minutes (depending on humidity) before carrying out resistance checks. Air dry to touch in 30 seconds and it is ready for use in 2 minutes.

RT 12686-15 Silver Conductive Adhesive 503 15g

➤ Carbon Conductive Adhesive 502

A High Temperature Conductive Paint

Conductive Adhesive 502 is a combination of specially processed carbon particles in a fluoroelastomer resin system designed to provide high resistance values. In its cured form, it exhibits both high and low temperature flexibility and moisture resistance.

Advantages:

- Withstands ambient temperatures of over 500°F (260°C)
- Remains flexible over temperature range of -40°F to over 500°F (260°C)
- Cures at room temperature
- Good adhesion to a variety of substrate
- Excellent oxidation resistance
- Ready to use - easy to apply

■ **Typical Properties (as supplied)**

PigmentSpecially Processed Carbon
 Binder.....Fluoroelastomer
 DiluentMethylEthylKetone (MEK)
 ColorBlack
 ConsistencyFluid
 Density7.2lbs/gal (0.87 kg/l)
 Solid content by weight13%
 Viscosity600 ± 200 mPas
 (Brookfield RVT @ 20rpm)
 Flash point.....23°F (-5°C)

Shelf life for this product is one year under original seal. Store in cool place

■ **Typical Properties (as cured)**

ColorBlack
 Maximum service
 Temperature:525°F (275°C)
 Sheet resistance.....130 ± 100 ohms/sq.in./1 mil dry film

Drying

Air drying of the product is adequate for most applications. To assure complete solvent loss, the coating can be baked for 15 minutes at 302°F (150°C)

RT 12684-30 Carbon Conductive Paint 502 30 g

continued >>>>

ADHESIVES AND MOUNTANTS

➤ Certified Conductive Adhesives (cont.)

➤ Graphite Conductive Adhesive 154

Adhesive 154 is an easy-to-apply resistance coating designed to provide high lubricity, conductivity, and excellent release properties to many non-conductive substrates, including most plastics. It is made from a dispersion of colloidal graphite in an isopropanol base which quickly air-dries, forms a uniform thin film adherent layer. Air dries to touch in 5 minutes and is ready for use in 30 minutes. After air drying, bake for 5 minutes at 167°F (75°C) to achieve optimum coating qualities in a shorter curing cycle.

■ Typical Properties (as supplied)

PigmentGraphite
 ColorBlack
 BinderCellulosic resin
 CarrierIsopropanol
 Diluent.....Isopropanol or equivalent
 ConsistencyLiquid
 Weight solids20%
 Volume solids.....14%
 Flash point52°F (11°C)
 Shelf life6 months under original seal

■ Typical Properties (as cured)

ColorMatte black
 Service temp.150°F (65°C)
 Sheet resistance1.2 K ohms/sq inch
@ 1 mil dry film

RT 12691-30 Graphite Conductive Adhesive 154 30g

➤ Graphite Conductive Adhesive 112

Adhesive 112 is an air drying graphite coating of unusually high conductivity. It provides excellent static bleed properties and acts as a protective energy absorbing layer. It also offers good shielding performance (30-50 db over 50-450 MHz) at a coating thickness of 2 mils. It is water based and useful in solvent prohibited applications.

To use: Air dry until all water has flashed off. Air dries to touch in 20 minutes, to handle in 25 minutes. It will continue to harden for 24 hours. It can be forced dried at temperatures up to 160°F (71°C).

■ Typical Properties (as supplied)

PigmentGraphite
 BinderAcrylic
 DiluentNone
 ColorBlack
 Solid content34%
 Shelf life6 months under original seal

■ Typical Properties (as cured)

ColorBlack
 Service temp.350°F (190.8°C)
 Sheet resistance:20 ohms/square inch
@ 1 mil dry film

RT 12693-30 Graphite Conductive Adhesive 112 30g

➤ Colloidal Compounds and Conductive Adhesives

➤ A) Silver Adhesives

Liquid; Colloidal Silver: 1-Methoxy-2-propanol base. Fast drying. Average grain size less than 1 µm and Silver content is 60%. Sheet resistance is 0.02 ohm per square inch @ 1 mil thickness. Comes with a brush attached to the cap. Service temperature is 30 minutes at 200°C.

RT 12630 Silver Liquid 15g

RT 12641 Colloidal Silver Extender 25ml

Paste; Colloidal Silver: Clear Lacquer base. Thick base — ideal for non-flowing requirements. Easily applied with micro-spatula or wooden toothpick. Particle size ranging from 0.4–1 µm. 80% are less than 1 µm. Cure in 16–20 hours at room temperature or 30 minutes at 125–150°C

RT 12640 Silver Paste 25g

RT 12641 Colloidal Silver Extender 25ml

Wooden Picks, See Specimen Prep. page 366 >>>>

➤ B) Graphite Adhesives

Water Base: Flat surface texture. The average flake size is 1µm. Service temperature: 200°C.

RT 12650 Graphite, Water base 50g

Isopropanol base: Flat surface texture. The average flake size is 1µm. Service temperature is 65°C.

RT 12660 Graphite, Isopropanol base 30g

RT 12661 Graphite Extender 30ml

➤ C) CCC Carbon Adhesive

An electrically Carbon Conductive Cement for specimen mounting in all SEM work. After drying of the cement, immediate investigation of conductive specimens is possible. Non-conductive specimens need only to be coated with carbon or metal. Thinner is available if the cement viscosity is too thick.



RT 12664 CCC Adhesive 30g

RT 12665 CCC Thinner 30ml



➤ D) Leit-C-Plast

A special adhesive with very high electrical conductivity and permanent plasticity for the preparation of big specimens in SEM work.

RT 12667 Leit-C-Plast 15g



➤ E) Tempfix Adhesive

A thermoplastic adhesive for mounting powder specimens and small particles for SEM. It does not contain any solvents and it is stable in high vacuum. It is not sticky at room temperature but becomes adhesive at 40°C and melts at 120°C. Tempfix may also be used as an embedding medium.

RT 12668 Tempfix Adhesive Set each

TECHNICAL TIP

Mounting Powders, Granules, And Fibers

The thermoplastic adhesive, Tempfix (EMS Cat.# 12668), is an excellent smooth embedding medium for stabilizing powders, granules and fibers. Tempfix becomes sticky at 40°C and melts at 120°C. To use: spread a thin layer over a sample support disc and allow to cool. The sample is then sprinkled on the hard surface and the temperature is raised to 40°C for 30-60 seconds and allowed to cool again to room temperature. Excess particles are then removed by gentle brushing or compressed air. At room temperature Tempfix has a smooth featureless surface that allows specimens to be imaged and clearly distinguished from the support media. Silvio Marchese-Ragona, Renee Jobe, Aleda Jacobs. "AFM Preparation Techniques for Bulk and Powder Samples". EMSA Bulletin 22:3 Nov., 1992.

continued >>>>

ADHESIVES AND MOUNTANTS

► Colloidal Compounds and Conductive Adhesives (cont.)

► F) EMS Conductive Epoxy Gold- Paste

EMS one part Epoxy Gold Paste is a gold-filled conductive bonding, exhibiting high electrical conductivity and bond strength. This Gold Paste is used in preference to silver-epoxy or other silver preparations to avoid silver migration problems, or when a higher signal is required.

This Gold Paste is well suited to all SEM work, and it bonds well to alumina ceramic substrate, phenolic circuit boards, and transistor headers. It is also useful in a variety of applications in solid state and hybrid circuits including attachment, bonding semiconductor devices, heat sinks, capacitor chips

Properties of Epoxy Gold-Paste:

Composition: 88% Gold System: One-part epoxy

Viscosity: 175,000 cps

Pot Life (25°C): 6 months

Cure: 15 hrs. @150°C, or 1 hr. @ 150°C

plus 2 hrs. @200°C

Elec. Resist (Ohm-cm): 4×10^4

Bond Shear Strength: 1000 psi

Outgassing (postcure): 0.70% 1000 hrs @125°C

Thinner: Butyl carbitol acetate or butyl cellosolve acetate

Serv. Temp. Range: -65°C to +200°C

RT	12640-01	Gold Epoxy Paste	2 g
RT	12685-26	Gold Thinner (Butyl Carbitol Acetate)	25 ml

► G) EMS Conductive Gold-Paste

This EMS Conductive Gold-Paste is a one part adhesive. Fast drying – dries at room temperature. Maximum service temperature is 65°C. This adhesive is not for permanent use, useful for testing and temporary work where a high signal is required from the adhesive.

Gold content is ~75%, including sphere sizes < 2 µm, and flake size <10 µm, in organic binders and a solvent. Keep refrigerated for good shelf life.

Sheet resistance is 0.02 to 0.05 ohm-cm @ 1 mil thickness.

RT	12642	EMS Conductive Gold-Paste	2 gm
RT	12643	Conductive Gold-Paste Extender	25ml

► Electrically/Thermally Conductive Adhesives (ETC/TC)

We offer a broad line of electrically and thermally conductive materials, which provide solutions to a variety of electrical, electronic, and thermal design problems throughout the laboratories and industries.

PROPERTIES	ELECTRICALLY/THERMALLY CONDUCTIVE				THERMALLY CONDUCTIVE		
	525	556	597A	598FS	568	805	860
Product Number	525	556	597A	598FS	568	805	860
Filler	Silver	Silver	Silver	Nickel	Aluminum	Aluminum	Aluminum Nitride
Mix Ratio by Weight: Resin : Hardener	NA	1:1	NA	NA	1:1	100:12	1:1
Mixes	1.85	2.8	2.3/2.1	2.87/1.5	.85	1.66	1.9
Specific Gravity, g/cc @ 25°C							
Mixes Viscosity, @25°C, cps	Paste	Paste	Paste/Paste	Paste/480	Paste	85,000	Paste
Pot Life, 100g mass @25°C, hrs.	N/A	1	N/A	N/A	4.0	≤1.0	4.0
Recommended Cure, hr/°F	2/300	24/RT	2/RT +2/200	2RT +2/200	2/200	2/100 +2/200	2/200
Alternative Cure, hr/°F	6/250	4/170 or 2/210	-	-	24-48/RT	24-48/RT	24-48/RT
Temperature Resistance, °F (°C)	340 (171)	340 (171)	1200 (649)	1000 (538)	400 (204)	572 (300)	400 (204)
CTE, in/in/°F x 10 ⁶ (°C)	29.0 (52.2)	13.9 (25.0)	9.6 (17.3)	6.5 (11.7)	33.0 (60.0)	25.0 (45.0)	18.7 (33.3)
Thermal Conductivity, Btu-in/hr-ft ² -°F	62.2	65.0	63.1	17.9	9.0	12.5	8.5
Tensile Shear Strength, psi *	2,500	1,500	-	-	1,400	1,200	1,375
Volume Resistivity, ohm-cm	0.01	0.0052	0.0002	0.005	1.0x10 ⁵	1.0x10 ¹⁴	1.0x10 ¹⁴
Dielectric Strength, volts/mil	-	-	-	-	80	50	250
Chemical Resistance	Excellent	Excellent	Excellent	Excellent	Excellent	Good	Excellent
Color	Silver	Silver	Silver	Dark Gray	Grey	Grey	Grey

* Tested according to ASTM D1002-94. This is a standard test method for determining the shear strength of a single lap-joint metal coupons in tension loading.

Application Notes: Surface Preparation: All surfaces must be free of oil, dirt, corrosives, oxides, paint or other foreign matter.

Mixing: Two-component products should be mixed thoroughly to a uniform consistency. Preheat high viscosity epoxies to approximately 125°F to facilitate pouring and mixing.

Application: In most cases, the adhesive should be applied to both surfaces maintaining a glue line of less than 10 mils (25.4µm). After assembling the parts, pressure should be applied to the assembly to prevent warpage and reduce air entrapment. Refer to curing guidelines in above property chart.

RT	50380-525	ETC Bond 525—Electrically conductive, silver filled, one-part epoxy paste. Good chemical resistance and mechanical strength to 340°F.	5g
RT	50380-556	ETC Bond 556—Electrically conductive. Silver filled, 1:1 Epoxy paste. Good corrosion resistance and mechanical strength to 340°F.	5g
RT	50380-597	ETC Bond 597A—Electrically and thermally conductive. Silver filled. One part system. Inorganic system for bonding applications up to 1200°F.	5g
RT	50380-598	ETC Bond 598FS—Electrically and thermally conductive. Nickel filled. One part system. Low viscosity. For applications up to 1000°F.	50g
RT	50380-568	TC Bond 568—Thermally conductive. Aluminum filled, 1:1 epoxy paste. Excellent mechanical strength to 400°F. Packed	2 x 25g
RT	50380-805	TC Bond 805—Thermally conductive. Aluminum filled. Two part epoxy paste. Low shrink rate. Excellent mechanical strength to 570°F.	2 x 25g
RT	50380-860	TC Bond 860—Thermally conductive. Aluminum nitride filled. 1:1 epoxy paste. Excellent mechanical & thermal properties to 400°F.	2 x 25g

ADHESIVES AND MOUNTANTS

➤ EPO-TEK – Epoxy Conductive Adhesive

➤ EPO-TEK® EE129-4

Epo-Tek® EE129-4 is a room temperature cure, silver-filled epoxy, designed for making electrical connection in SEM mounting sample, circuit assembly, semiconductor, LCD applications.

Epo-Tek® EE129-4 comes with two parts: A & B and mixing ratio is 1:1. Shelf life is one year at room temperature

Works well with surface like Au, Ag-Pd, Cu, brass, Kovar, stainless steel, as well as ceramic, PCB, solder masks, most plastic and glasses

- Low temperature cures capable from 23°C to 80°C.
- Suggested for cryogenic cooling applications
- Works well in SEM, microscopy applications
- Works well in aerospace hybrid circuits and ITO electrodes in LCD packaging and assembly
- Reasonable pot life of 3 hours, allows for preparation.
- Smooth thixotropic paste allows for many way of application

Maximum Bond Line Cure Schedules:

100°C.....	15 minutes	23°C.....	24 hours
80°C.....	1 hour	Pot Life.....	3 hours
70°C.....	2 hours		

Typical Properties (to be used as a guide only, not a specification)

Physical Properties:	
Color:	Part A – silver; Part B – silver
Consistency:	Smooth, thixotropic – 4000 cPs
Viscosity (@ 100 RPM / 23°C):	2,000 – 4000 cPs
Thixotropic Index:	4.6
Glass Transition Temp (Tg):	≥ 45°C (Dynamic cure 20 – 200°C / ISO 25 Min; Ramp -10 – 200°C @20°C/Min)
Coefficient of Thermal Expansion (CTE):	Below Tg: 30 x 10 ⁻⁶ in/in/°C Above Tg: 227 x 10 ⁻⁶ in/in/°C
Shore D Hardness:	63
Lap Shear Strength @ 23°C:	1,110 psi
Die Shear Strength @ 23°C:	≥ 5 kg / 1,700 psi
Weight Loss:	@200°C: 0.18%; @250°C: 0.54%; @300°C: 2.06%
Degradation Temp (TGA):	303°C
Operating Temp:	Continuous: -55°C to 150°C Intermittent: -55°C to 250°C
Storage Modulus @ 23°C:	156, 318 psi
Ion:	Cl ⁻ 223 ppm; Na ⁺ 26 ppm NH ₄ ⁺ 22 ppm; K ⁺ 12 ppm
Particle Size:	≤ 45 microns
Electrical Properties:	
Volume Resistivity @ 23°C:	≤ 0.0003 Ohm-cm
Volume Resistivity @ 23°C (23°C/24 hour cure):	0.01 Ohm-cm
Thermal Properties	
Thermal Conductivity:	1.60 W/mK

➤ EPO-TEK® H20E

Epo-Tek® H20E is a two component, 100% solid silver-filled epoxy system, silver-resin paste and liquid hardener, mixing ratio is 1:1.

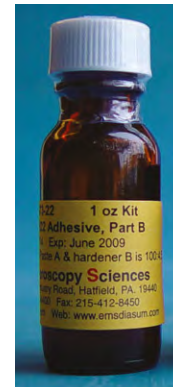
- Epo-Tek H22E features high thermal conductivity, and is very well suited for extensive high temperature applications (300 – 400°C)
- Epo-Tek H20E is also a conductive adhesive of choice for old or new applications.
- Its applications include: chip bonding and electronic bonding as well as SEM mounting.
- H20E contains no solvents and will not outgas.
- When cured, H20E is resistant to solvents, resin and moisture
- Long Pot life (2½ days)
- Shelf life is one year when store at 23°C

Maximum Bond Line Cure Schedules:

175°C.....	15 minutes	120°C.....	2 hours
150°C.....	1 hour	80°C.....	24 hours

Typical Properties (to be used as a guide only, not a specification)

Physical Properties:	
Color:	Part A – silver; Part B – silver
Consistency:	Smooth, thixotropic
Viscosity (@ 100 RPM / 23°C):	2,200 – 3,200 cPs
Thixotropic Index:	3.69
Glass Transition Temp (Tg):	≥ 80°C (Dynamic cure 20 – 200°C / ISO 25 Min; Ramp -10 – 200°C @20°C/Min)
Coefficient of Thermal Expansion (CTE):	Below Tg: 31 x 10 ⁻⁶ in/in/°C Above Tg: 158 x 10 ⁻⁶ in/in/°C
Shore D Hardness:	75
Lap Shear Strength @ 23°C:	1,475 psi
Die Shear Strength @ 23°C:	≥ 5 kg / 1,700 psi
Weight Loss:	@200°C: 0.59%; @250°C: 1.09%; @300°C: 1.67%
Degradation Temp (TGA):	425°C
Operating Temp:	Continuous: -55°C to 200°C Intermittent: -55°C to 300°C
Storage Modulus @ 23°C:	808, 700 psi
Ion:	Cl ⁻ 73 ppm; Na ⁺ 2 ppm; NH ₄ ⁺ 98 ppm; K ⁺ 3 ppm
Particle Size:	≤ 45 microns
Electrical Properties:	
Volume Resistivity @ 23°C:	≤ 0.0004 Ohm-cm
Thermal Properties	
Thermal Conductivity:	2.50 W/mK
Thermal Conductivity:	29 W/mK Based on Thermal Resistance Data: R=L x K-1 x A-1
Thermal Resistance:	(Junction to Case): TO-18 package with nickel-gold metalized 20 x 20 mil chips and bonded with Epo-Tek H20E (2 mil thick)
Epo-Tek®H20E:	6.7 to 7.0°C/W
Solder:	4.0 to 5.0°C/W



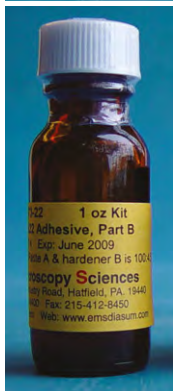
RT 12670-EE Epo-Tek® EE129-4 Adhesive

1 oz

RT 12671-20E Epo-Tek® H20E Adhesive

1 oz

continued >>>>

ADHESIVES AND MOUNTANTS**➤ EPO-TEK – Epoxy Conductive Adhesive (continued)****➤ EPO-TEK® H20S**

Epo-Tek® H20S is a modified version of Epo-Tek® H20E. Epo-Tek® H20S is a highly reliable, two component, silver-filled epoxy with a smooth, thixotropic consistency (mixing ratio 1:1). This modified version offers high electrical conductivity, short curing cycles, proven reliability, and the convenient mix ratio. Epo-Tek® H20S is extremely simple to use. Epo-Tek® H20S pot life is 2.5 days and shelf life is one year when store at room temperature.

Maximum Bond Line Cure Schedules:

175°C.....	45 seconds
150°C.....	5 minutes
120°C.....	15 minutes
100°C.....	45 minutes
80°C.....	90 minutes

➤ EPO-TEK® H22

Epo-Tek® H22 is a two component, silver-filled epoxy system. Mixing ratio of silver resin paste and liquid hardener is 100:4.5. Pot life 16 hours, and shelf life is 6 months at room temperature.

- Smooth, free-flowing, slightly thixotropic paste
- High Tg allows it to be used for high temperature applications ≤300°C)
- Contains no solvents – It is a NASA approved low outgassing epoxy.
- Excellent resistance to solvents, chemicals and moisture
- Extended pot life and fast curing at low temperature <100°C
- Designed for die bonding and sealing hybrid circuit. Recommended for SEM small angle cleavage and wafer bonding.

Maximum Bond Line Cure Schedules:

150°C.....	5 minutes
120°C.....	10 minutes
100°C.....	20 minutes
80°C.....	45 minutes

Typical Properties (to be used as a guide only, not a specification)**Physical Properties:**

Color:	Part A – silver; Part B – silver
Consistency:	Smooth, thixotropic – 4000 cPs
Viscosity (@ 100 RPM / 23°C):	1,800 – 2,800 cPs
Thixotropic Index:	5
Glass Transition Temp (Tg):	≥ 80°C (Dynamic cure 20 – 200°C / ISO 25 Min; Ramp -10 – 200°C @20°C/Min)
Coefficient of Thermal Expansion (CTE):	Below Tg: 31 x 10 ⁻⁶ in/in/°C Above Tg: 120 x 10 ⁻⁶ in/in/°C
Shore D Hardness:	57
Lap Shear Strength @ 23°C:	1,240 psi
Die Shear Strength @ 23°C:	≥ 5 kg / 1,700 psi
Weight Loss:	@200°C: 0.40%; @250°C: 0.60%; @300°C: 1.37%
Degradation Temp (TGA):	414°C
Operating Temp:	Continuous: -55°C to 200°C Intermittent: -55°C to 300°C
Storage Modulus @ 23°C:	339, 720 psi
Ion:	Cl ⁻ 162 ppm; Na ⁺ 0 ppm NH ₄ ⁺ 282 ppm
Particle Size:	≤ 20 microns

Electrical Properties:

Volume Resistivity @ 23°C: ≤ 0.0005 Ohm-cm

Thermal Properties

Thermal Conductivity: 3.25 W/mK

Typical Properties (to be used as a guide only, not a specification)**Physical Properties:**

Color:	Part A – silver; Part B – amber
Consistency:	Smooth, flowing paste
Viscosity (@ 100 RPM / 23°C):	12,000 – 20,000 cPs
Thixotropic Index:	2.36
Glass Transition Temp (Tg):	≥ 100°C (Dynamic cure 20 – 200°C / ISO 25 Min; Ramp -10 – 200°C @20°C/Min)
Coefficient of Thermal Expansion (CTE):	Below Tg: 39 x 10 ⁻⁶ in/in/°C Above Tg: 224 x 10 ⁻⁶ in/in/°C
Shore D Hardness:	80
Lap Shear Strength @ 23°C:	1,980 psi
Die Shear Strength @ 23°C:	≥ 5 kg / 1,700 psi
Weight Loss:	@200°C: 0.09%; @250°C: 0.23%; @300°C: 1.42%
Degradation Temp (TGA):	454°C
Operating Temp:	Continuous: -55°C to 250°C Intermittent: -55°C to 350°C
Storage Modulus @ 23°C:	540, 120 psi
Ion:	Cl ⁻ 175 ppm; Na ⁺ 60 ppm NH ₄ ⁺ 148 ppm; K ⁺ 6 ppm
Particle Size:	≤ 45 microns

Electrical Properties:

Volume Resistivity @ 23°C: ≤ 0.005 Ohm-cm

Thermal Properties

Thermal Conductivity: .94 W/mK

RT 12672-20S Epo-Tek® H20S Adhesive 1 oz

RT 12673-22 Epo-Tek® H22 Adhesive 1 oz

ADHESIVES AND MOUNTANTS

➤ Mounting Medium for all Laser Scanning and Conventional Microscopes

A revolutionary new Mounting Medium which helps to control the effects of Refraction.

These Mountant Solutions:

- Have a refractive index of 1.52 to match the refractive index of your slides and coverslips
- Are simple to use – Just apply the solution to the specimen followed by a cover slip
- May be kept at room temperature – comes with dropper tip to aid in dispensing
- Are water miscible (aqueous glycerol based), and therefore the specimen does not need to be dehydrated prior to the addition of the mounting solution.
- Have a pH compatible with the specimens: CFM-1 has a pH of ~6.5, and CFM-2 has a pH of ~8.5
- Contain an antifadent to help reduce the bleaching of the fluorochromes (CFM-1 Plus Antifadent)
- May be used as a immersion oils in addition to being a mountant solution and since they are water-based, they facilitate cleaning the microscope optics.

➤ CFM-1 and CFM-1 Plus Antifadent

This glycerol-phosphate buffered saline based mountant solution has been specially formulated so as to have a refractive index of ~1.52 @ room temperature. The addition of antifadent retards the bleaching of fluorochromes. Its refractive index is similar to glass; therefore effects of refraction on image quality are minimized. The CFM-1 Plus antifadent will be particularly useful for high magnification work, where immersion oils are used to minimize distortion of the image due to the refraction of the viewing light and where bleaching of the fluorochrome occurs.

The solutions should also be very valuable for laser scanning microscopy where, three-dimensional imaging of specimens is carried out e.g. with confocal fluorescence microscopy where integrity of the image has to be maintained.

Both solutions are medium viscosity, and water-clear. CFM-1 Plus Antifadent have a pH of ~10. CFM-1 has a pH of ~6.5

➤ CFM-2 Mountant

This glycerol-tris-buffered based mountant solution has been specially formulated to have a refractive index of ~1.52 (at room temperature) i.e. a refractive index similar to glass so that the effects of refraction on image quality are minimized. This mountant solution may also be used as an immersion oil. The CFM solutions will be particularly



useful for high magnification work where immersion oils are used to minimize distortion of the image due to refraction of the viewing light. The solutions should also be particularly valuable for laser scanning microscopy where three-dimensional imaging of specimens is carried out e.g. with confocal microscopy.

The solution has a medium viscosity, and it is water-clear, and has a pH of ~8.5

RT	17980-10	CFM-1	10 ml
RT	17980-25	CFM-1	25 ml
RT	17981-10	CFM-1 Plus	10 ml
RT	17981-25	CFM-1 Plus	25 ml
RT	17982-10	CFM-2	10 ml
RT	17982-25	CFM-2	25 ml

➤ CITIFLUOR™ - Antifadent Mountant Solutions

A mounting medium for immunofluorescence, which overcomes the problems of fading.

This mounting media is designed to reduce the fading of the fluorescence of dyes used for labeling biological specimens.

In the technique of fluorescence microscopy, the fluorescence is stimulated by high intensity UV and/or visible light. Absorption of the light populates an excited state of the dye (usually a singlet state) and this leads to fluorescence. However, the excited state of the dye may undergo chemical reaction, which leads to destruction as evidenced by the fading of the fluorescence and consequent loss of the image. Citifluor™ mounting media is designed to solve this problem.

Selection of the appropriate product:

There is no universal antifadent due to the fact that biological material is so varied in nature that the fluorescence fading of fluorochromic conjugates is a complex process.

The general anti-fadents are AF1, AF2, and AF3. The AF87 is a specialist immersion oil-based antifadent.

AF1 (Glycerol-phosphate buffered solution containing an additive for use with labeled tissue sections). Should be used if you normally examine specimens in glycol solution. If you normally use saline solution with your specimens. Refractive Index is 1.46.

AF2 (Glycerol solution containing additives for use with labeled tissue sections) is simply a glycerol solution of the antifadent. Refractive Index is 1.47.

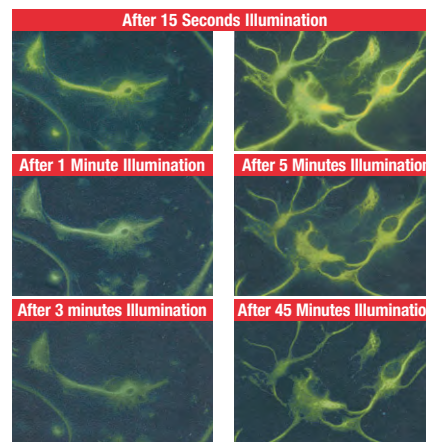
AF3 (Phosphate-buffered saline solution containing additives for examination of whole cell) is appropriate. Refractive Index is 1.34.

AF87, the antifadent, is contained in non-fluorescent immersion oil. It is designed for those requiring work at high magnification. It is useful for preventing the fading of such dyes as DAPI, which have the tendency to disperse in glycerol based mountant solutions.

CFPVOH is an aqueous solution of poly (vinyl alcohol) for use as a solid mountant. Apply a few drops of the solution to your sample, and allow drying to give a clear film. Refractive Index is 1.34–1.35.

AF100 is a solution of antifadents to be used with CFPVOH when fading of fluorescence in the poly(vinyl alcohol) is a problem. To prepare a CFPVOH solution containing AF100, add 0.1ml of Af100 to 0.9ml of CFPVOH. If more or less of the solid mountant solution is required, mix the reagent in the appropriate ratio. Once these solutions have been made up, they should be used within a period of days since the solution deteriorates on storage. Refractive Index is 1.34-1.35.

All of these products have a long shelf life, a minimum of 2 years. The solution can be stored at room



temperature. With LD50's >2000mg/kg (in rat), this product exhibits no toxicological problems.

RT	17970-25	CitiFluor™ AF1	25 ml
RT	17970-100	CitiFluor™ AF1	100 ml
RT	17971-25	CitiFluor™ AF2	25 ml
RT	17971-100	CitiFluor™ AF2	100 ml
RT	17972-25	CitiFluor™ AF3	25 ml
RT	17972-100	CitiFluor™ AF3	100 ml
RT	17976-10	CitiFluor™ AF87	10 ml
RT	17976-25	CitiFluor™ AF87	25 ml
RT	17978-35	Set of CitiFluor™ 25 ml + 5 ml CFPVOH and AF100*	

* Only available when ordering with CFPVOH

ADHESIVES AND MOUNTANTS**➤ CitraMount® Mountant**

This butyl acetate and acrylic resin mixture is the first mounting medium developed for coverslipping directly from d-limonene based clearants. Superior results are also achieved with xylene. CitraMount® medium is recommended for manual coverslipping only as it may cause damage to the valves of automated coverslippers.

- Clear seal with drying time is less than 24 hours
- Refractive index is 1.42 – Viscosity is 90 cPs

RT	18005-01	CitraMount® Mountant	100 ml
RT	18005-05	CitraMount® Mountant	500 ml

Clearium® Mounting Media

Clear and coverslip your slide preparations in one easy step

This unique product eliminates the need for hazardous xylene or xylene substitutes as a clearing agent in histology and cytology laboratories. With Clearium, simply do away with the final step of clearing and coverslip directly from absolute isopropyl alcohol.



Cat No.	Description	Qty.
RT 13520-11	Clearium®, Pint	each
RT 13520-12	Clearium®, Pint	4/case
RT 13520-13	Clearium®, 4 oz. Dropper Bottle	12/case

➤ CMCP Macroinvertebrate Mounting Medium

CMCP is a colorless, non resinous, water miscible mounting medium for permanent transparent mounts. This medium used like Canada Balsam, it can be used to mount almost any material, provided it is not stained, calciferous material, or thin tissue sections. This mounting media has the advantage of allowing live or preserved specimens to be mounted directly from water or alcohol.

Free living nematodes and live parasitic worms are among the organism suitable for mounting with CMCP. The CMCP mounting provide them with rapid relaxation, death, and clearing action.

RT	18003-01	CMCP-9 Low Viscosity Mountant	100 ml
RT	18003-05	CMCP-9 Low Viscosity Mountant	500 ml
RT	18004-02	CMCP-10 High Viscosity Mountant	250 ml
RT	18004-05	CMCP-10 High Viscosity Mountant	500 ml

➤ Crystalbond; Wafer Mount See page 372-373: 437 >>>>**➤ Cytoseal Mounting Medium See page 515 >>>>****➤ Entellan® A rapid mounting media for microscopy**

For long life preparations, without bubble formation at high ambient temperatures. It can be used for all dehydrated microscopic preparations. Cure time is 20 minutes at room temperature. It is colorless with an acid number less than 2.50 and a R.I. N_D^{20} approx 1.49-1.5. (Contains xylene).

RT	14800	Entellan®	100ml
RT	14802	Entellan®	500ml

➤ Eukitt™; Mounting Medium

Eukitt is a mounting medium (contains 45% Acrylic Resin and 55% Xylenes), used in microscopy. It is an adhesive and specimen preservative that can be used manually and in automated cover-slipping equipment. Adhesive and sealant for use with glass, non plastic and other non-reactive materials. Spreads quickly and evenly without forming any air bubbles.

**Properties:**

- Fast-drying (20 minutes)
- Refractive index close to glass (1.510)
- Chemically neutral
- Little sensitivity to water
- No reaction to staining
- Temperature limits: 42°C-17°C
- Passive to ultraviolet light
- Can be used in place of epoxy resins for mounting petro-graphic thin sections
- Used in fluorescence dyes in bones

RT	15320	Eukitt™	100ml
RT	15322	Eukitt™	500ml

➤ Fluoromount-G™ Slide Mounting Medium

A special mounting media for immunofluorescent staining procedures. It is a water soluble, non-fluorescing medium which is well suited for use when the staining procedure has an aqueous final step. It contains 10% polyvinyl alcohol in phosphate buffered glycerol with 0.1% sodium azide as a preservative. One bottle is sufficient to mount up to 500 slides. Refractive Index: 1.46



0-5°C	17984-25	Fluoromount-G	25 ml
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➤ DAPI-Fluoromount G™

DAPI-Fluoromont™ G is a water-soluble, instant blue nuclear probe fluorescing (455nm) compound for mounting fixed slides using a staining procedure having an aqueous final step. Mounting slides with DAPI Fluoromont™ G stains the cell nucleus and may reduce fluorochrome quenching during analysis of slides by fluorescence microscopy. This mounting medium also provides a semi permanent seal for long term storage of slide preparations.

0-5°C	17984-24	DAPI Fluoromount-G™	20 ml
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➤ DPX Mountant for Microscopy

A mixture of Distyrene, a plasticizer, and xylene. A colorless synthetic resin mounting media which replaces Xylene-Balsam. It preserves the stain and dries quickly. R.I. 1.5175 @ 23°C.

RT	13510	100ml
RT	13512	500ml

➤ DEPEX Mounting Media

A colorless, neutral, xylene miscible mountant which is suitable for preparations where Canada Balsam is usually used. R.I. 1.5222 @ 23°C.

RT	13514	DEPEX Mounting Media	100ml
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TECHNICAL TIP DEPEX (EMS Cat. #13514) is an Improved Mounting Medium

Most mounting media cause fading of histological preparations over time. A study was conducted to find the most suitable mounting media that would not fade. Depex as a Mounting Media appeared to have a conserving effect on the stain as compared to other available mounting media. The study was based on Araldite embedded semithin sections of rabbit cerebral cortex stained with Toluidine Blue and Pyronin G. The study also showed that the average optical density of sections prepared with DEPEX after one year was higher than the sections treated with other mounting techniques.

Cordula Schmolke (1993). Effects of Mounting Media on Fading of Toluidine Blue and Pyronin G Staining in Epoxy Sections. Biotech. & Histochem. 68/3, pg.132-136

ADHESIVES AND MOUNTANTS

➤ Histomount

A mixture of xylene - mixed isomers and non hazardous ingredients to offer a very good synthetic mountant. Once dried the refractive index is 1.58.

RT	17995-01	Histomount	100 ml
RT	17995-05	Histomount	450 ml

➤ Hydromount™

Ideal for frozen tissue sections

Hydromount™ is the traditional choice whenever a nonfluorescing aqueous medium is needed. Hydromount™ is water-based and is suitable for mounting specimens that have been processed in water. Hydromount™ is effective for frozen sections, amyloid, and immunofluorescent staining procedures. Should it become necessary, Hydromount™ may be removed by soaking the slides in warm saline.



RT	17966-01	Hydromount™	100ml
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Histomount™ and Hydromount™ are Trademarked names of National Diagnostics

➤ Glycerin Jelly

For the mounting of hydrated sections.



RT	17998-10	Glycerin Jelly,	100ml
RT	17998-50	Glycerin Jelly,	500ml

➤ Krazy Glue™ Pen

The one we all know and have used. Ready to use. Requires no mixing or preparation. This pen contains cyanoacrylate. Clear in color and bonds immediately. Comes in a 3g tube.



RT	12646-05	Krazy Glue™ Pen	each
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➤ Liquid Coverglass; SHUR/Mount™

Shur/Mount is a liquid coverglass and mounting medium. Its low viscosity minimizes bubble formation under the coverglass. An antioxidant present in the medium prevents fading of the stain even over years of storage. A UV absorbent present in our Shur/Mount prevents the yellowing of the resin.



Available in three types:

- A toluene-based acrylic resin; rapid drying. It is used for mounting and preservation of microscope slide specimens, and is ideal for manual coverslipping. Refractive index: 1.49
- A xylene-based formula which is used for automatic cover slipping instruments. Refractive index: 1.48
- A unique water based mounting medium for Immuno procedures.

RT	17990-01	Shur/Mount - Toluene Based	4 oz.
RT	17990-12	Shur/Mount - Toluene Based	12x4 oz./cs
RT	17991-01	Shur/Mount - Xylene Based	16 oz.
RT	17991-06	Shur/Mount - Xylene Based	4x16 oz./cs
RT	17992-01	Shur/Mount - Water Based	20ml
RT	17992-04	Shur/Mount - Water Based	4x20ml

➤ Loctite Adhesives

Loctite 409™ Super Bonder®

For a general-purpose gel adhesive, clear, gap fills 0.010"; surface insensitive Ethyl, tensile shear strength 3,200 psi, and temperature range -65°F to 180°F. Cure speed: fixture - 75 seconds, full - 24 hours.

Loctite 454™ Prism®

For use with porous surfaces, clear, gap fills 0.010", surface insensitive Ethyl, gel type, tensile shear strength 3200 psi, temperature range -65°F to 180°F. Cure speed: fixture - 15 seconds, full - 24 hours.

Loctite 4861™ Prism®

For use with flexible surfaces, clear, gap fill 0.008", surface flexible Alkyl, viscosity 4,000 cP, tensile shear strength 2465 psi, temperature range -65°F to 212°F. Cure speed: fixture - 25 seconds, full - 24 hours.

Loctite 349™ Impruv®

For bond glass/metal, appearance: clear/straw, cure type: UV, viscosity: 9,500cP, shore hardness: D70, temperature range: -65°F to 266°F

Loctite 4011™ Prism®

Designed for the assembly of difficult-to-bond materials, such as wood, paper, leather and fabric. Suitable for use in the assembly of disposable medical devices. The product provides rapid bonding of a wide range of materials, including metals, plastic and elastomers. Cure speed: 2 to 20 seconds depending on the material.

Chemical type: Ethyl cyanoacrylate, transparent, colorless to straw colored fluid. One part required no mixing. Low-viscosity (100 cP). Cure by humidity, and temperature range -65°F to 180°F

RT	72570-09	Loctite Super Bonder 409	3 g Tube
RT	72571-54	Loctite Prism 454 Adhesive	3 g Tube
RT	72572-61	Loctite Prism 4861 Adhesive	20 g
RT	72582-01	Loctite 349 Impruv Adhesive	50 ml
RT	72573-11	Loctite Prism 4011 Adhesive	20 g

Loctite 404 Quick Set Tissue Adhesive

This adhesive is perfect for those applications where a quick-curing adhesive is needed. Comes in an applicator-tipped bottle, 0.33 oz. (10ml).

RT	12687-01	Loctite 404 Quick Set Tissue Adhesive	10ml
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Loctite™ 460 Adhesive

Our Loctite™ 460 is a quick curing low viscosity glue that can be used for mounting samples to any substrate (glass, metal and/or plastic). It is soluble in acetone. Comes in an applicator-tipped plastic bottle — 20 g.

RT	12646-08	Loctite™ 460 Adhesive	each
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Loctite® Fixmaster® Poxypak™, Fast Cure Epoxy

This fast cure, general purpose epoxy bonds virtually any material. It will also fill or seal cracks and rebuild worn surfaces. Comes in a 1 oz. syringe with a built-in plunger for easy dispensing without equipment. Working time is approximately 4 minutes. Includes nozzle and mixing stick. This unique adhesive may be made electrically conductive with the addition of any conductive powder (Silver, Carbon etc.)

RT	12646-09	Loctite® Fixmaster® Poxypak™, Fast Cure Epoxy	each
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ADHESIVES AND MOUNTANTS**► M-Bond System**

The M-Bond system includes M-Bond 43-B, M-bond 600 and M-Bond 610. These adhesives are high-performance epoxy resins, which are formulated especially for bonding strain gages and special-purpose sensors. When properly cured, these adhesives are useful in temperatures ranging from -452°F to +350°F (-269°C to +175°C) with M-Bond 43-B, and to +700°F (+370°C) for short periods with M-bond 600 and 610. In common with other organic materials, oxidation and sublimation effects at elevated temperatures limit life. M-Bond 43B is particularly recommended for transducer applications up to +250°F (+120°C) and M-Bond 610 for transducers up to +450°F (+230°C)

Shelf Life and Pot Life: At room temperature, M-Bond 600 has a useful storage life of approximately three months, while M-Bond 43-B and M-Bond 610 will last about nine months.

Once opened and mixed, M-Bond 600 and 610 have room temperature pot lives of two weeks and six weeks, respectively. Since M-Bond 43B is supplied already mixed, its pot life is about the same as its shelf life when kept in a tightly closed container. These periods of adhesive usefulness can often be doubled by refrigeration at +30° to +40°F (0 to +5°C). Never open a refrigerated bottle until it has reached room temperature.

Curing Time:

M-Bond 43B is about 2 hours at +375°F (+190°C)
M-Bond 600 is about 3.5 hours at +350°F (170°C)
M-Bond 610 is about 3 hours at 375°F (190°C)

0-5°C	50410-10	M-Bond 43B	Kit
0-5°C	50410-20	M-Bond 600	Kit
0-5°C	50410-30	M-Bond 610	Kit

► Mascot® Instant Adhesive

A gel type, no-drip formula that fills the gaps and is ideal for use on vertical surfaces. A high performance, extended range cyanoacrylate adhesive that bonds metals, most plastics, rubber, ceramics, and glass, in seconds. It is optically transparent and sets in about 30 seconds depending upon the objects being joints. Pack 0.1 oz (3g) per dispensing tube.

RT	72587-01	Mascot® Instant Adhesive	3g
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► Cargille Meltmounts

- Instant thermal mountants that require "no-oven-time".
- 100% Usable; contains no solvents.
- Reversible, thermally, for particle retrieval or re-orientation
- Soluble in toluene for special techniques or clean-up.
- Fluid at 65°C, a temperature chosen because it makes permanent mount and protects the majority of specimens from thermal changes.
- PCB-Free.
- Direct replacement for old mountant mediums (Canada Balsam, Aroclor 5442, Naphrax...)

Cargille Meltmount™ (optical quality) is a series of mounting media which are specifically formulated for use in microscope slide mounting and in other optical coupling applications.

1. Meltmount™ 1.539

Has a refractive index (n_D @25°C) of 1.539 and an Abbe V dispersion of 45. Its optically similar to Canada Balsam and therefore ideal for mounting many biological specimens but without the long drying time of Canada Balsam.

RT	17994-10	Meltmount 1.539	1 oz.
RT	17994-11	Meltmount 1.539 Quick-Stick™	each

2. Meltmount™ for Chrysotile Asbestos

It has dispersion characteristics making it appropriate for mounting chrysotile asbestos.

RT	17994-20	Meltmount for Chrysotile	1 oz.
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3. Meltmount™ 1.582

It has a refractive index n_D @25°C) of 1.582 and an Abbe V dispersion of 33. Its optical clarity makes it the preferred choice for minimum visible absorption.

RT	17994-30	Meltmount 1.582	1 oz.
RT	17994-31	Meltmount 1.582 Quick-Stick™	each

4. Meltmount™ 1.605

It has a refractive index (n_D @25°C) of 1.605 and an Abbe V dispersion of 30, making it appropriate for mounting Asbestiform Tremolite, Anthophyllite, and Actinolite.

RT	17994-40	Meltmount 1.605	1 oz.
RT	17994-41	Meltmount 1.605 Quick-Stick™	each

5. Meltmount™ 1.662

It has a refractive index (n_D @25°C) of 1.662 and an Abbe V dispersion of 26, optically similar to Aroclor 5442 but is PCB-free.

RT	17994-50	Meltmount 1.662	1 oz.
RT	17994-51	Meltmount 1.662 Quick-Stick™	each

6. Meltmount™ 1.680

It has a refractive index (n_D @25°C) of 1.680 and an Abbe V dispersion of 25, making it appropriate for mounting Amosite and Crocidolite asbestos.

RT	17994-60	Meltmount 1.680	1 oz.
RT	17994-61	Meltmount 1.680 Quick-Stick™	each

7. Meltmount™ 1.704

It has a refractive index (n_D @25°C) of 1.704 and an Abbe V dispersion of 24, similar to Naphrax.

RT	17994-70	Meltmount 1.704	1 oz.
RT	17994-71	Meltmount 1.704 Quick-Stick™	each



Melt Mount is also available in a Quick-Stick™ form which can be used to make permanent microscope slide mounts quickly. These Melt Mount sticks can be applied to a slide on a hotplate. As soon as the specimen and coverglass are positioned and the slide is cooled you have a permanent prepared slide that can be reversed by reheating, if you should wish to retrieve a particular particle. Each Quick-Stick™ weighs approximately ½ oz. (18g).

ADHESIVES AND MOUNTANTS

➤ Mikrostik™ Adhesive, Non-Conductive

Fast drying, ultrathin clear adhesive suitable for mounting small particles which can be submerged in other adhesives. It can be diluted with methyl ethyl ketone. Quick-drying. Comes in a bottle with an applicator brush. 14 ml.



12646-01 Mikrostik™ Adhesive, Non-Conductive 14ml

➤ Mount Quick, Solvent/Water Base

Mounting media for cover glass. It comes in a convenient dispensing tube or bottle. Solvent based media which is soluble in xylene and has a 10 minute dry time. Its viscosity is 33 cps at 25°C.



RT	18000	Mount Quick-Solvent Base;	30cc
RT	18002	Mount Quick-Water Base;	30cc

➤ Omnimount™

- Optical clarity combined with exceptional durability
- Compatible with HistoClear II
- Higher flash point and lower toxicity than xylene based mountants

Specially developed to provide compatibility with National Diagnostic clearing agents, HistoClear II. Omnimount™ combined outstanding optical characteristics with low fluorescence and exceptional durability. In addition to being the ideal partner for HistoClear II, Omnimount is a truly universal mounting medium compatible with all common clearing agents: xylene, toluene, limonene, and petroleum derived products.

The Omnimount solvent has a higher flash point and a lower toxicity than xylene based mountants, so Omnimount™ provides both a safer work environment and reduce shipping costs.



RT	17997-01	Omnimount™	100 ml
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MM 24® Mounting Media

Specially formulated for automatic glass coverslippers

MM 24 is a low viscosity mounting medium that is compatible with both aliphatic (eg Sub-X) and aromatic (eg xylene) clearing agents. It is specially formulated to achieve optimum results with automatic glass coverslippers, yet is also effective for manual slide preparation. Set up time before permanent filing is normally 24 hours with aromatic agents and 48 to 72 hours with aliphatics.



Cat No.	Description	Qty.
RT 13520-21	MM 24® Mounting Media, Pint	each
RT 13520-22	MM 24® Mounting Media, Pint	4/case
RT 13520-23	MM 24® Mounting Media, 4 oz. Dropper Bottle	12/case

➤ Permabond 910, Tissue Adhesive

See Specimen Preparation, page 216 >>>>

➤ Permout™* Mounting Medium

A toluene-based synthetic resin mounting medium. The right choice for both rapid mounting and long term storage of slides. Its low viscosity allows for a thinner mounting layer offering better optical quality and bubble-free preparations. It has a refractive index near that of a fixed protein which helps to keep images free of distortion. Ideal for mounting coverslips to slides with thick or thin specimens. Permout preserves most biological stains with little or no fading when the slides are stored in darkness. It contains an anti-oxidant to prevent the formation of annular rings and its high softening point (155°C/311°F) makes it suitable for microprojection.



RT	17986-01	Permout Mounting Medium	100ml
RT	17986-05	Permout Mounting Medium	500ml

*Ownership of Fisher Scientific

➤ Quick Bond See page 216 >>>>

➤ Rubber Cement, Non-Wrinkle

Elmer's non-wrinkle rubber cement is a combination of isopropanol, heptane and natural rubber. Comes with a brush applicator for ease of use. Dries fast and it does not wrinkle.

72170 Non-Wrinkle Rubber Cement 4 oz



➤ Slide Coating Adhesive

See Specimen Preparation section, page 555 >>>>

➤ Sub-X Mounting Medium

Sub-X Mounting Medium is a toluene based low viscosity quick-drying, permanent mountant formulated to be compatible with all xylene substitutes on the market. It may be used for all coverslip preparations that are cleared in xylene and or toluene. It may be used for manual as well as automated coverslipping. Sub-X contains an antioxidant to inhibit fading of stains.



13519 Sub-x Mounting Medium Pint

➤ Tissue-Tack Adhesive

- Good for JB-4 and JB-4 Plus Sections.
- Improves permanent adhesion of sections to the glass slide during prolonged staining procedures and washes.
- Useful for immunofluorescent, immunoperoxidase and routine staining procedures.

RT	71301-01	Tissue-Tack Adhesive	100ml
RT	71301-05	Tissue-Tack Adhesive	500ml

➤ UV Mount Medium

- A mounting medium that is designed to match the refractive index of JB-4 embedded sections.
- Cures within 2 minutes when exposed to long wave UV light
- (365nm) when applied to moist sections.
- Sections are mounted after last staining water rinse.
- Slides must be coverslipped.

0-5°C	17996	UV Mount Medium	100ml
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➤ Agar, Powder, Bacteriological Grade

(C₁₂H₁₈O₉)_x F.W. 3000-9000 CAS #9002-18-0

Gelling Temperature (1.5% in H₂O)~35°C
Gel Strength (1.5% gel)300g/cm²

Specifications:

Acid insoluble ash0.5%
Arsenic3ppm max
GelatinTo Past Test
Heavy Metals<0.004%
Lead<0.001%
Total ash<6.5%
Water<20%

RT	10200	100g
RT	10202	500g

➤ Agarose I™ trademark of Amresco®

(C₆H₁₀O₅·C₆H₈O₄)_n CAS # 9012-36-6

- All purpose, high-purity Agarose
- Exceptional Band Resolution & Clarity
- Convenient Tablet Form is available — no weighing required
- Nuclease & Protease free

Agarose I is standard melting/gelling agarose, suitable for routine nucleic acid analytical/preservative applications. Agarose I has a low EEO for shorter electrophoresis runs without compromising resolution. Excellent for blotting technique and general manipulations.

Biotechnology Grade:

Gel Strength (1.5%)≥ 1200 g/cm²
Gelling Range (1.5%)36-39°C
Melting Point87-89°C
EEO≤ 0.10 mr
Sulfate≤ 0.15 %
DNaseNone Detected
RNaseNone Detected
ProteaseNone Detected
pH (3%, Water) @ 25°C5.7 – 7.7
Conductivity (3%, Water) @ 25°C≤ 17.0 μohms
Moisture (KF)≤ 10 %
Endonuclease/Ligase Inhibitory FactorsNone Detected

RT	10205	Agarose I™	Powder	100g
RT	10206	Agarose I™	500 mg/Tablet	100 Tabs

TECHNICAL TIP

Purification Of Alcian Blue

Commercially available Alcian Blue contains about 49% dye; the remaining constituents are boric acid, sulphates, dextrin, and other unknown organic substances. It can be purified by the following method, presented by McAuliffe. W.G. McAuliffe (1983) - A Note on the Purification of Alcian Blue. Stain Technology, 58, pg 374.

- One gram of Alcian Blue is placed in a flask to which is added 100ml of 9:1 mixture of acetone and distilled water.
 - This mixture is stirred for 1 hour and then filtered through No. 2 filter paper. Small quantities of additional acetone are used to wash the dye from the flask and down the side of the filter paper.
 - The filtrate has a faint yellow-green color. The residue is recovered from the filter paper and dried.
 - Small quantities of the dye should be purified as they are needed.
- The above method yields Alcian Blue containing about 78.7-83.5% dye, depending on the commercial source. Hayat, M. A. (Ed.), (1989). Principles and Techniques of Electron Microscopy. Third Edition. CRC Press Inc., Florida.

➤ Agarose SFR™ trademark of Amresco®

(C₆H₁₀O₅·C₆H₈O₄)_n CAS #9012-36-6

- Super fine resolution: Resolve 238 bp & 242 bp band
- Low melting point
- Consistent & reproducible results
- Nuclease & protease free
- Ideal for AFLPs, STRs & Tetranucleotide repeats.

Agarose SFR is a high resolution sieving agarose with unsurpassed clarity. DNA bands differing in size by 2% can be resolved in the range of 200 – 1,000 bp. This agarose is suitable for the analysis of AFLPs (Amplified Fragment Length Polymorphisms), STRs (Short Tandem Repeats) and tetranucleotide repeats. The low melting point of agarose SFR makes it an excellent medium for analytical and preparative electrophoresis.

Biotechnology Grade

Gel Strength (1.5%)≥ 500 g/cm²
Gelling Range (1.5%)≤ 30°C
Melting Point≤ 70°C
EEO≤ 0.12 mr
Sulfate≤ 0.11 %
Moisture (KF)≤ 7.0 %
Ash≤ 0.35 %
DNaseNone Detected
RNaseNone Detected
ProteaseNone Detected
pH (3%, Water) @ 25°C5.7 – 7.7
Conductivity (3%, Water) @ 25°C≤ 10.0 μohms

RT	10207	Super Fine Resolution Agarose SFR™	100g
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➤ Alcian Blue 8GX, Certified, C.N. #AnAn-6

(Ingrain Blue I)
C₅₆H₆₈N₁₆S₄CU F.W. 1298.88 CAS #12040-44-7

Solubility: Water-soluble
Dye Content: Approx. 50%

Used as a fixative: 0.5-2% Alcian Blue in Glutaraldehyde fixative enhances the preservation and contrast of the cell coat and intercellular substances. Used as a stain: For staining cell surface materials and cartilage components.

Schofield, et al., Histochem J. 7, 139,1975

Used as a wetting agent: Sommer, J. R (1977). To cationize glass.

J.Cell Bio. 75, 245a. Alcian Blue and Ruthenium Red were used to study cartilage ultrastructure. Thyberg, J., Lohmander, S., and Friberg, U., J. Ultrastruct. Res., 45, 407 (1973).

RT	10350	25g
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➤ Alcoholic Congo Red Solution

A stock solution of alcoholic congo red for Amyloid staining.

RT	26090-05	Alcoholic Congo Red Solution	500ml
RT	26090-06	Alcoholic Congo Red Solution	1 L

➤ Alizarin Red S, Certified, C.N. #DcAr-5

(Alizarin Carmine, Mordant Red 3)
C₁₄H₇O₇·SNa·H₂O F.W. 360.28 CAS #130-22-3

Solubility: 7.69% Water; 0.1% Alcohol.

Certified for Staining Bone. Stain for nervous tissue in small invertebrates, and for sections of nervous tissue. Lee, "The Microtometist's Vade-Mecum", 10th Ed., The Blakiston Co., Phila., 1937; Dawson, Stain Tech., 1, 123 (1926); Lundvall, Anat. Anz., 27, 521 (1905); 137. Used to differentiate bone from cartilage in mammalian embryos; used with Toluidine Blue. William, Stain Tech., 16, 23 (1941)

RT	10360	25g
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➤ **Aluminum Oxide, 90 Basic (63-200µm)**

Al₂O₃ F.W. 101.96 CAS 1344-28-1

Specifications:

Chloride:0.005%
 Iron (Fe)0.03%
 Substances not precipitated by NH₄OH:0.75%
 Loss on Ignition:5.0%

RT 10400 500 g

➤ **Amphibian Ringer Solution**

Ingredients: NaCl; KCl; CaCl₂.6H₂O and Distilled water.

RT 11762-05 Amphibian Ringer Solution 500ml

RT 11762-10 Amphibian Ringer Solution 1 L

➤ **Ammonium Hydroxide, 28% Reagent, A.C.S.**

NH₄OH FW. 35.05 CAS #1336-21-6 Specific Gravity: 0.91

Assay28-30%

Specifications:

Residue After Ignition0.002%
 Carbon Dioxide0.002%
 Chloride0.5 ppm
 Phosphate2 ppm
 Sulfate2 ppm
 Heavy Metals0.5 ppm
 Iron0.2 ppm

RT 10600 450ml

RT 10601 4x450ml

➤ **Ammonium Molybdate, Reagent, 99%**

(Molybdic acid, ammonium salt)

(NH₄)₆Mo₇O₂₄.4H₂O FW 1235.86 CAS #12027-67-7

Used in the negative staining of viruses for TEM.

Modifications caused by uncoupling agents.

Muscattello, U., et al, J. Ultrastruct., Res., 52, 2 (1975)

RT 10500 100g

➤ **Amyl Acetate, Reagent, A.C.S.**

CH₃COOC₅H₁₁ FW 130.18 CAS #628-63-7

Boiling Range: 140°C-150°C

Specific Gravity @ 25/25° C: 0.870-0.875

A.C.S. Specifications:

Acidity (as CH₃COOH)0.01%
 Non-volatile Matters0.01%
 Water (W/W)0.2 %

RT 10800 1qt (946ml)

RT 10810 4x1qt

➤ **Amyl Acetate, Purified, Glass Distilled**

CAS #628-63-7

RT 10815 100ml

RT 10816 4x100ml

**ULTRA
PURE!**

➤ **Aniline Blue Disodium Salt, Water Soluble, Certified, C.N. #DcK-11**

C₃₂H₂₅N₃O₉S₃Na₂ F.W. 737.74 CAS #28631-66-5

(Acid Blue 22; China Blue; Cotton Blue; Marine Blue V; Soluble Blue 3M, 2R; Water Blue)

Solubility: 50% Water; 0.0% Alcohol; 4.5% Cellosolve; 7.8% Glycol; 0.0% Xylene. Used in connective tissue staining procedures to stain collagen. Used in differential staining. Snodgrass et al., Lab Invest. 26:329, 1972.

RT 10840 25g

➤ **Antibody Diluent**

Buffer for diluting your primary and secondary antibodies, especially if they were stored for a while, even at -20 in glycerol, or in refrigerator. Nonspecific binding of the antibodies, negative effects of disturbing substances and low or medium affinity cross-reactivities of the antibodies will be minimized, making your result more reliable. Excellent for IHC (frozen and formalin sections), flow cytometry on fixed cells, Western Blot and other immune assays.

When used in pathology, it also greatly reduces non-specific reactivity of human serum components and immunoglobulins in tissue, vessels and cells with mouse antibodies used on section.

For especially "trouble"-giving antibodies, as well as for in situ PCR applications, this diluent may also be used as a washing buffer, preventing secondary binding of your analytes during washing.

4-8°C	62713	Antibody Diluent	50 ml
4-8°C	62714	Antibody Diluent	125 ml
4-8°C	62715	Antibody Diluent	500 ml
4-8°C	62713-01	Antibody Diluent for Frozen Sections	50 ml
4-8°C	62714-01	Antibody Diluent for Frozen Sections	125 ml
4-8°C	62715-01	Antibody Diluent for Frozen Sections	500 ml

➤ **Araldite Resin**

W.P.E. number included on each bottle.

RT	10900	Araldite 502; CAS #84-74-2, Specific Gravity: 1.13	450ml
RT	10910	Araldite 506; CAS #25068-38-6, Specific Gravity: 1.13	450ml
RT	10920	Araldite 6005; CAS #3101-60-8, Specific Gravity: 1.16	450ml
RT	10930	Araldite 507; CAS #26447-14-3, Specific Gravity: 1.14	450ml

➤ **Araldite Embedding Kits**

See Embedding Media Kits, Page 92 >>>>

RT	13900	Araldite 502 Kit consists of: 450 ml Araldite 502 450 ml DDSA; Specially Distilled *50 ml DMP-30	kit
RT	13920	Araldite 6005 Kit consists of: 450 ml Araldite 6005 450 ml DDSA; Specially Distilled 100 ml BDMA 225 ml DBP	kit
RT	13940	Araldite-EMbed (Mollenhauer's Kit): 450 ml EMbed-812 450 ml Araldite 502 450 ml DDSA; Specially Distilled *50 ml DMP-30	kit

* Please note that wherever DMP-30 is listed as the accelerator in our embedding media kits you have the option to use BDMA in place of it. BDMA is less viscous, has a longer shelf life, and offers better penetration (it should be noted, however, that in order to achieve the optimum results when using BDMA in place of DMP-30 you must vary the amount. DMP-30: 1.5-2%; BDMA: 2.5-3%).

TECHNICAL TIP

For Araldite RD-1 see BGE (catalog # 12000) page 30.
 For Araldite RD-2 see BDE (catalog # 11800) page 30.

➤ **Auramine O, Certified, C.N. #DcAu-4**

(Pyocyaninum aureum; Basic Yellow 2; Pyoktanin Yellow; Canary Yellow)

C₁₇H₂₁N₃HCl•H₂O F.W. 321.86 CAS # 2465-27-2

Solubility: 1.0% Water; 4.0% Alcohol; 1.2% Cellosolve; 1.75% Glycol; 0.05% Xylene

RT 10850 25 g

➤ Azocarmine G

(Acid red 101; Basalan Carmine GE; Rosinduline)

 $C_{28}H_{17}N_3Na_2O_6S_2$ F.W. 601.57 CAS #25641-18-3

Solubility: 1.0% Water; 0.1% Alcohol; 1.75% Cellosolve; 4.5% Glycol; 0.01% Xylene

RT **11150** 5 g**➤ Azur A**

(Methylene Azur A)

 $C_{14}H_{14}ClN_3S$ F.W. 291.80 CAS #531-53-3

Solubility: Water-soluble; Alcohol-soluble

Used in nuclear staining; A polychromatic blood stain.

RT **11240** 10G**➤ Azur B**

(Azur I; Methylene Azur B)

 $C_{15}H_{16}N_3Cl$ F.W. 305.83 CAS #531-55-5

Solubility: Water-soluble; Alcohol-slightly soluble. An important component of Giemsa's stain for blood protozoa. Used for staining semi-thin sections of plant tissue. Hoefert, L.L. (1968). Polychromatic stains for thin sections of Beta embedded in epoxy resin.

Stain Tech. 43:145RT **11200** 10g**➤ Azur II**

(Azur B/Methylene Blue 1:1) CAS #37247-10-2

RT **11210** 10g**➤ Azur II Eosin**

(Azur B/Methylene Blue/Eosin 1:1:1) CAS #53092-85-6

RT **11220** 10g**➤ Azur Mixture Solution,****See Giemsa Sol, Page 46, 473 >>>****➤ Basic Fuchsin, Certified, C.N. #DcFb-26**

(Rasaniline Hydrochloride; Basic Violet 14, Dye Content: ~88% min.)

 $C_{20}H_{19}N_3.HCl$ F.W. 337.86 CAS #632-99-5

Berkowitz et al., (1968). Selective staining of nervous tissue for light microscopy following preparation for electron microscopy. J. Histochem. Cytochem. 16:808. Sato, T., and Shamoto, M (1973). A simple rapid polychrome stain for epoxy-embedded tissue. Stain Technol. 48:223.

RT **11260** 25g**➤ Basic Green 4, Certified, C.N. #DcMg-11**

(Malachite Green Oxalate; Diamond Green B; BX or P Extra; Light Green N,

Solid Green O; Victoria Green B or WB; Dye Content ~90%, (oxalate form)
 $2(C_{23}H_{25}N_3) \cdot 2(C_2H_2O_4) \cdot C_2O_4$ F.W. 927.03 CAS #2437-29-8

Solubility: 10.0% Water; 8.5% Alcohol; 5.5% Cellosolve; 7.0% Glycol; 0.0% Xylene.

Used as a bacteria stain and a counterstain for botanical material.

RT **18100** 25g**➤ Benzoin, U.V. Catalyst** $C_6H_5CH(OH)COC_6H_5$ F.W. 212.25 CAS #579-44-2

m.p. 134-136°C

RT **11270** 100g**➤ Benzoin Ethyl Ether**

(Ethoxy phenylacetophenone)

 $C_6H_5COCH(CO_2H_5)C_6H_5$ F.W. 240.31 CAS #574-09-4

m.p. 56-59°C

RT **11280** 50g**➤ Benzoin Methyl Ether, UV Catalyst**

[alpha-Ethoxy-alpha-phenylacetophenone)

 $C_6H_5CH(OCH_3)COC_6H_5$ F.W. 226.28 CAS #3524-62-7Assay>98%
m.p. 47 - 49°CRT **11290** 10ml**➤ (BDMA), Benzylidimethylamine**

N-Benzyl-N, N-Dimethylamine

 $C_6H_5CH_2N(CH_3)_2$ FW. 135.21 CAS #103-83-3

b.p. 177-180 °C

Specific Gravity @ 20°C: 0.898g/ml

An amine accelerator for polymerization of epoxy resins.

A direct alternative to DMP-30 with a longer shelf life and better penetration. Purity: 98%

RT **11400** 100mlRT **11400-25** 25ml**TECHNICAL TIP****Accelerators For Epoxy Resins**

Embedding media for Electron Microscopy based on the epoxy resins Araldite and Epon (replacements) all require the addition of an amine accelerator to hasten polymerization (Glauert, 1974).

• DMP-30 • BDMA

Both of the above accelerators are equally efficient during polymerization, but BDMA has the great advantage of being much less viscous than DMP-30. This is important since accurate measurement of small amounts of the accelerator and its complete mixing with the other components of the embedding media are essential for the production of satisfactory blocks. See Audrey Glauert (Proc. Roy. Micros., Vol 22/5 Sept. 1987) NOTE: In order to achieve optimum results when using BDMA in place of DMP-30 you must remember that the amount of DMP-30 added is 1.5% - 2% of the final mixture and BDMA is 2% - 3%.

➤ Biebrich Scarlet, Water Soluble

(Boncau BS; Acid Red 66; Croceine Scarlet; Double Scarlet BSF)

 $C_{22}H_{14}N_4Na_2O_5S_2$ F.W. 556.49 CAS #4196-99-0

Solubility: 5.0% Water; 0.25% Alcohol; 1.5% Cellosolve; 1.5% Glycol; 0.0% Xylene

RT **11265** 25 g**➤ BioBond; Tissue Section Adhesive****See Adhesives and Mountants, Page 9 >>>****➤ BioMeda Mounting Media****See Adhesives and Mountants, Page 10-11, 512-513 >>>****➤ BioMount****See Adhesives and Mountants, Page 11, 512 >>>**

➤ **Bismarck Brown Y**

(Basic Brown 1; Basic Brown G, GX, GXP; Vesuvine; Leather Brown; Manchester Brown; Phenylene Brown)
 $C_{18}H_{18}N_6 \cdot 2HCl$ F.W. 419.32 CAS #10114-58-6
 Solubility: 1.5% Water; 3.0% Alcohol; 3.0% Cellosolve; 7.9% Glycol; 0.05% Xylene

RT 11310 25 g

➤ **Bismuth Carbonate, Basic, Purified**

(Bismuth Subcarbonate) Approx. CAS # 5892-10-4 $(BiO)_2CO_3$
 Used for staining synapses.
 Pfenninger, K., Sandri, C., Albert, K. and Eugster, C.H. (1969).
 Contribution of the problem of structural organization of the presynaptic area. Brain Res., 12:10

RT 11420 25g

➤ **Borax Tetra, Sodium Borate, Reagent, A.C.S.**

(Sodium Tetraborate, Decahydrate)
 $Na_2B_4O_7 \cdot 10H_2O$ FW. 381.37 CAS #1303-96-4

A.C.S. Specifications

Assay	99.5-105%
Calcium	0.005%
Chloride	0.001%
Insoluble Matter	0.005%
Iron (Fe)	5ppm
pH of 0.01M Solution @ 25° C	9.15-9.20
Other Heavy Metals (as Pb).....	0.001%
Phosphate (PO ₄)	0.001%
Sulfate (SO ₄)	0.005%

RT 21130 500g

➤ **Boric Acid, Reagent, Powder, A.C.S.**

H_3BO_3 FW 61.83 CAS #10043-35-3
 Assay 99.95% minimum.
 A buffer component in Tris-EDTA-Borate buffer. Also used in Silver-Methenamine buffer. Swift, J.A. (1968). The Electron histochemistry of cystine-containing proteins in thin transverse sections of human hair. J.R. Microsc. Soc. 88,449.

RT 11460 500g

➤ **Bouin's Fixative**

A fixative that is used in light microscopy for the preservation of soft delicate structure.

RT 15990* 10x10ml

See page 38, 446 for different packaging. >>>>

➤ **Brilliant Cresyl Blue, Certified, C.N.#DcV-5**

(Brilliant Blue C; Cresyl Blue 2RN)
 $C_{17}H_{21}N_3OCl$ F.W. 332.84 CAS #10127-36-3
 Solubility: 3.0% Water; 2.6% Alcohol; 2.25% Cellosolve; 8.0% Glycol; 9.5% Xylene

RT 11465 10g

➤ **Bromophenol Blue, Reagent, A.C.S.**

(3',3'',5'5'-Tetrabromophenol-sulfonothalein)
 $C_{19}H_{10}O_5SBr_4$ F.W. 669.97 CAS #115-39-9

RT 11470 5g

RT 11471 25g

Bismuth Staining Procedures

➤ **Bismuth Subnitrate, Crystalline, USP Grade**

(Bismuth Nitrate, Basic; Bismuth Oxynitrate Hydrate)
 $4BiNO_3(OH_2) \cdot BiO(OH)$ F.W. 1461.99 CAS #1304-85-4
 Bismuth staining for light and electron microscopy. M .Locke and P. Huie, Tissue & Cell, 9, 347 (1977); G.L. Brown & M. Locke, ibd. 10, 365 (1978)

RT 11450 25g

➤ **Bismuth Stain Kit**

Bismuth specifically stains Golgi beads and interchromatin granules after fixation with glutaraldehyde, whereas it stains nucleoli, basic protein, and biogenic amines after formaldehyde fixation. Bismuth staining of sections is relatively nonspecific: it can stain glycogen, lysosomes, ribosomes, polysaccharides, ferritin, and DNA. M.A. Hayat, "Basic Techniques for TEM" p. 184 (1986).

1. Specific En Bloc Staining (Locke & Huie, 1977)

Kit contains:

10 x 5ml Solution A (Sodium tartrate, Sodium hydroxide and Bismuth Subnitrate,
 10x10ml solution B (.2M Triethanolamine-HCl buffer)

Procedures

Mix Solution A and B together (One part of A into two parts of B) then adjust to pH 7.0 with 1N HCl.
 Aldehyde-fixed tissue blocks are rinsed in the above buffer and stained en-bloc with Bismuth for one hour at room temperature on a gentle rotary shaker. Postfixation is carried out with 1% Osmium Tetroxide in 0.05M Sodium Cacodylate buffer, pH 7.2.
 Post-staining is not needed.

RT 11430 Kit

2. Enhancing Contrast in General (Riva, 1974)

Kit contains:

5 x 10ml Solution A(Sodium tartrate in NaOH)
 5 x 200mg ingredient B (Bismuth subnitrate)

Procedures

Drops of solution A are added into the ingredient B (Bismuth Subnitrate). The mixture is cleared after 6-8ml of solution A is added; and after the addition of all of solution A, all the Bismuth is chelated.
 Conventionally fixed tissue specimens are stained en-bloc with a saturated Uranyl Acetate aqueous solution for 20 minutes. Thin sections on grids are stained under cover for 3 minutes by immersion in the Bismuth Subnitrate chelated above, and then rinsed with distilled water.

RT 11434 Kit

3. Staining of Mucosubstances & Polysaccharides

(Ainsworth et al., 1972)

Kit contains:

10 x 10ml Solution A (Periodic acid, Ethanol, Sodium acetate)
 10 x 10ml Solution B (Sodium tartrate, NaOH, Bismuth subnitrate)

Procedures

Thin sections of conventionally fixed tissues are mounted on copper grids and floated on solution A for 10-30 minutes at room temperature. After being thoroughly washed 20-30 times for 5-10 minutes with distilled water to remove periodate, the grids are floated on solution B for 30-60 minutes at room temperature. They are then again thoroughly washed with distilled water.

RT 11436 Kit

READY-TO-USE PREPARED BUFFERS**All of our ready-to-use buffers are...**...**Conveniently packaged.**...**Prepared fresh for each order.**...**Economical and time-saving.****Desired pH should be specified when ordering.****➤ Acetate Buffer**

Acetic Acid and Sodium Acetate 0.2M pH range 3.6-5.6

0-5°C	11480	Acetate Buffer	225ml
0-5°C	11482	Acetate Buffer	500ml

➤ Acetate Buffer

RT	11482-42	Acetate Buffer, 0.2M, pH 4.2	500 ml
RT	11482-50	Acetate Buffer, 0.2M, pH 5.0	500 ml
RT	11482-56	Acetate Buffer, 0.2M, pH 5.6	500 ml

➤ Antibody Diluent

Buffer for diluting your primary and secondary antibodies, especially if they were stored for a while, even at -20 in glycerol, or in refrigerator. Nonspecific binding of the antibodies, negative effects of disturbing substances and low or medium affinity cross-reactivities of the antibodies will be minimized, making your result more reliable. Excellent for IHC (frozen and formalin sections), flow cytometry on fixed cells, Western Blot and other immune assays.

When used in pathology, it also greatly reduces non-specific reactivity of human serum components and immunoglobulins in tissue, vessels and cells with mouse antibodies used on section.

For especially "trouble"-giving antibodies, as well as for in situ PCR applications, this diluent may also be used as a washing buffer, preventing secondary binding of your analytes during washing.

4-8°C	62713	Antibody Diluent	50 ml
4-8°C	62714	Antibody Diluent	125 ml
4-8°C	62715	Antibody Diluent	500 ml
4-8°C	62713-01	Antibody Diluent for Frozen Sections	50 ml
4-8°C	62714-01	Antibody Diluent for Frozen Sections	125 ml
4-8°C	62715-01	Antibody Diluent for Frozen Sections	500 ml

➤ Antibody Dilution Buffer with Immunoglobulin- Free BSA

This ready-to-use Antibody Dilution Buffer is designed for the dilution of antibodies in all immunoassays, including immunofluorescence, IHC, ELISA, WB. This buffer contains immunoglobulin free BSA and does not contain phosphate, sodium azide, or mercury preservatives. It can be used for the dilution of all antibodies, including peroxidase, and antibodies to phosphoproteins. However, it is not suitable for dilution of antibodies to S100 proteins. This buffer contains green food color.

■ **Reagent Supplied: Ready to use buffer**

■ **Application: Dilute antibodies, primary or secondary as recommended in the protocol by the manufacturer of these products.**

■ **Storage: 2 – 8°C. Diluted antibodies can be stored at 2° – 8°C for several weeks, depending upon the stability of antibodies.**

2-8°C	25886-01	Antibody Dilution Buffer, free BSA	100 ml
2-8°C	25886-05	Antibody Dilution Buffer, free BSA	500 ml

The buffer is a vehicle for the fixative and requires certain properties:

a.) To maintain constant pH during the time of the fixation. The pH of the fixative in EM is adjusted using the buffer system chosen; e.g. range 6.5-8.0.

b.) The ionic constitution to prevent the extraction of cellular components, or the deposition of precipitates of fixative chemicals.

➤ Borate Buffer

RT	11455-78	Borate Buffer, pH 7.8	500 ml
RT	11455-82	Borate Buffer, pH 8.2	500 ml
RT	11455-90	Borate Buffer, pH 9.0	500 ml

➤ Citrate Buffer

Citric acid and Sodium citrate 0.1M pH range 4.6-6.2

0-5°C	11490	225ml
0-5°C	11492	500ml

➤ Citrate Buffer 0.2M

Buffer of Citric Acid and Sodium Citrate

0-5°C	11492-04	Citrate Buffer 0.2M, pH 4.0	1 L
0-5°C	11492-06	Citrate Buffer 0.2M, pH 6.0	1 L

➤ Citrate Buffer pH 6.0 (10x)

Description: This buffer is intended for heat-induced antigen retrieval on formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. In IHC most commonly used fixative like formalin mask tissue antigens (cellular, membrane and nuclear) by cross-linking process, this results in poor or no staining in IHC. The use of this buffer on FFPE tissue section improves accessibility of antibodies to tissue antigens.

Storage: 2–8°C. **DO NOT FREEZE**

Intended Use: 1X buffer solution is intended for heat-induced antigen retrieval in IHC. Please refer to primary antibody protocol.

Reagent: 10 X, pH 6 antigen retriever solution.

Preparation of Working Solution: Dilute this 10X buffer as needed (e.g. 90 ml of deionized or distilled water + 10 ml of this buffer), mix well, 1X buffer can be stored at 2–8°C

2-8°C	64142-07	Citrate Buffer pH 6.0	100 ml
2-8°C	62142-08	Citrate Buffer pH 6.0	1000 ml

➤ Dulbecco's Phosphate Buffer Saline – D-PBS

All of our Dulbecco's Phosphate Buffer Saline Solutions contain: Potassium Chloride, Potassium Phosphate Monobasic, Sodium Chloride, Sodium Phosphate Dibasic, and D-Glucose. Some formulations may contain additional components. Use the table below as a quick reference for identifying the one that best suits your application. All of the solutions are prepared 1X strength.

Ingredients	F.W.	Formula I	Formula II	Formula III
KCl	74.56	X	X	X
NaCl	58.44	X	X	X
Na ₂ HPO ₄ · 7H ₂ O	268.07	X	X	X
KH ₂ PO ₄	136.09	X	X	X
CaCl ₂ · 2H ₂ O	147.02	X	X	X
MgCl ₂ · 6H ₂ O	203.31	X	X	X
Phenol Red		–	–	0.2 g/L

RT	11772-05	D-PBS, Formula I, 0.15M	500 ml
RT	11772-10	D-PBS, Formula I, 0.15M	1 L
RT	11773-05	D-PBS, Formula II, 0.19M	500 ml
RT	11773-10	D-PBS, Formula II, 0.19M	1 L
RT	11774-05	D-PBS, Formula III, 0.15M	500 ml
RT	11774-10	D-PBS, Formula III, 0.15M	1 L

READY-TO-USE PREPARED BUFFERS

➤ EARLE's Balanced Salts Solutions - EBSS

All of our Earle's Balanced Salt Solution contains: Potassium Chloride, Sodium Chloride, Sodium Phosphate Monobasic, and D-glucose. Some formulations may contain additional components. Use the table below as a quick reference for identifying the one that best suits your application. All of the solutions are prepared 1X strength.

Ingredients	F.W.	Formula I	Formula II	Formula III
KCl	74.56	X	X	X
NaCl	58.44	X	X	X
NaH ₂ PO ₄ · H ₂ O	137.99	X	X	X
D-Glucose	180.16	1 g/L	—	1 g/L
MgSO ₄ · 7H ₂ O	246.48	X	X	X
CaCl ₂ · 2H ₂ O	147.02	X	X	X
NaHCO ₃	84.01	X	X	X
Phenol Red		—	0.015 g/L	0.050 g/L

RT	11765-05	ESBSS, Formula I, 0.157M	500 ml
RT	11765-10	ESBSS, Formula I, 0.157M	1L
RT	11766-05	ESBSS, Formula II, 0.152M	500 ml
RT	11766-10	ESBSS, Formula II, 0.152M	1L
RT	11767-05	ESBSS, Formula III, 0.157M	500 ml
RT	11767-10	ESBSS, Formula III, 0.157M	1L

➤ EDTA Buffer pH 8.5 (10x)

Description: This buffer is intended for heat-induced antigen retriever on formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. In IHC most commonly used fixative like formalin mask tissue antigens (cellular, membrane and nuclear) by cross-linking process, this results in poor or no staining in IHC. The use of this buffer on FFPE tissue section improves accessibility of antibodies to tissue antigens.

Storage: 2–8°C. **DO NOT FREEZE**

Intended Use: 1X buffer solution is intended for heat-induced antigen retriever in IHC. Please refer to primary antibody protocol.

Reagent: 10 X, pH 8.5 antigen retriever solution.

Preparation of Working Solution: Dilute this 10X buffer as needed (e.g. 90 ml of deionized or distilled water + 10 ml of this buffer), mix well, 1X buffer can be stored at 2–8°C

Cat. #	Description	Qty.
4-8°C 64142-09	EDTA Buffer pH 8.5	100 ml
4-8°C 62142-10	EDTA Buffer pH 8.50	1000 ml

➤ Hepes Buffer Solution

0.2M pH range: 7.0-8.0

0-5°C 11494	Hepes Buffer Solution	500ml
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➤ Hepes, Good's Buffer

Crystalline, See page 48 >>>>

➤ HRP-Conjugate Diluent

Specifically designed for preparing solution of your HRP-conjugate used as the detection reagent. It is the Antibody-diluent buffer with additional component for stabilizing your HRP-conjugate. Allows you to further standardize the assay preparing ready-to-use conjugate solutions in advance and store them in refrigerator without loss of activity.

Cat. #	Description	Qty.
4-8°C 62716	HRP Conjugate Diluent	50 ml
4-8°C 62717	HRP Conjugate Diluent	125ml
4-8°C 62718	HRP Conjugate Diluent	500 ml

➤ ImmunoHistoZyme™, Ready-to-Use

Description: ImmunoHistoZyme is used for proteolytic digestion of formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. In IHC most commonly used fixative like formalin mask tissue antigens (cellular, membrane and nuclear) by cross-linking process, this results in poor or no staining in IHC. ImmunoHistoZyme digestion of FFPE tissue section improves accessibility of antibodies to tissue antigens.

Storage: 2–8°C. **DO NOT FREEZE**

Intended Use: Use as antigen retriever for some antibodies in IHC. Please refer to primary antibody protocol for IHC.

Reagent: Ready-to-use ImmunoHistoZyme Reagent.

2-8°C 64142-13	ImmunoHistoZyme	15 ml
2-8°C 62142-14	ImmunoHistoZyme	100 ml

➤ Michel's Buffer

RT 18041-05	Michel's Buffer	500 ml
RT 18041-10	Michel's Buffer	1 L

➤ Millonig's Phosphate Buffer

Millonig (1964); Karlsson and Schultz (1965)

Ingredients: Sodium Phosphate, monobasic (NaH₂PO₄•xH₂O);

Sodium Phosphate, dibasic (Na₂HPO₄•xH₂O); 0.5% Sodium Chloride (NaCl)

Shipping Conditions: Ambient Temperature

The pH of this buffer is 7.4 (0.1M); the osmolarity is 440 mosmols, so this buffer is hypertonic to most body fluids. Millonig recommended to use this buffer for the fixation of very hydrated tissues with osmium tetroxide. For marine organisms, a higher concentration of sodium chloride (3%) is recommended. We supply it in a double strength (0.2M), pH 7.4. Dilution is needed before use.

0-5°C 11582-05	Millonig's Phosphate Buffer 0.2M	500ml
0-5°C 11582-10	Millonig's Phosphate Buffer 0.2M	1 L

➤ Mops, Biological Buffer

(3-(N-Morpholino) propanesulfonic acid)

pH range 6.5-7.9

0-5°C 18900	Mops, Biological Buffer	100g
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➤ Pepsin Reagent, Ready To Use

Description: Pepsin is used for proteolytic digestion of formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. In IHC most commonly used fixative like formalin mask tissue antigens (cellular, membrane and nuclear) by cross-linking process, this results in poor or no staining in IHC. Pepsin digestion of FFPE tissue section improves accessibility of antibodies to tissue antigens.

Storage: 2–8°C. **DO NOT FREEZE**

Intended Use: Use as antigen retriever for some antibodies in IHC. Please refer to primary antibody protocol for IHC.

Reagent: Ready-to-use Pepsin reagent available in 2 sizes: 15 and 100 ml

Cat. #	Description	Qty.
2-8°C 64142-05	Pepsin Reagent	15 ml
2-8°C 62142-06	Pepsin Reagent	100 ml

READY-TO-USE PREPARED BUFFERS**➤ Phosphate Buffer, 0.1M***

Prepared from Sodium Phosphate Monobasic Hydrate and Sodium Phosphate Dibasic Heptahydrate Non-Sterile. Meant for research purposes only.

0-5°C	19340-60	Phosphate Buffer, pH 6.0	1 L
0-5°C	19340-65	Phosphate Buffer, pH 6.5	1 L
0-5°C	19340-70	Phosphate Buffer, pH 7.0	1 L
0-5°C	19340-72	Phosphate Buffer, pH 7.2	1 L

*Meant for biological research only. Not to be used for medical or any other purposes.

➤ Phosphate Buffer Saline (PBS)

PBS is commonly used in biochemistry. It is a salty solution containing calcium chloride, sodium phosphate and potassium phosphate. PBS is isotonic and non-toxic to cells. 1X PBS final concentration is 0.137M NaCl, 0.01M Na₂HPO₄, 0.0027M KCl and pH 7.4.

0-5°C	19342-10	Phosphate Buffered Saline, 10X	1L
0-5°C	19242-40	Phosphate Buffered Saline, 10X	1 gal
0-5°C	19343-10	Phosphate Buffered Saline, 2X	1L
0-5°C	19343-40	Phosphate Buffered Saline, 2X	1 gal
0-5°C	19344-10	Phosphate Buffered Saline, 1X	1L
0-5°C	19344-20	Phosphate Buffered Saline, 1X	1 gal

➤ Pipes, Good's Buffer

Crystalline, See Page 58 >>>>

➤ Pipes Buffer Solution, 0.3M

Aqueous PIPES solution adjusted by 0.1N Sodium Hydroxide to pH 5.5-6.0.

0-5°C	11610	Pipes Buffer Solution, 0.3M	500ml
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➤ Pronase Reagent, Ready To Use

Description: Pronase is used for proteolytic digestion of formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. In IHC most commonly used fixative like formalin mask tissue antigens (cellular, membrane and nuclear) by cross-linking process, this results in poor or no staining in IHC. Pronase digestion of FFPE tissue section improves accessibility of antibodies to tissue antigens.

Storage: 2-8°C. **DO NOT FREEZE**

Intended Use: Use as antigen retriever for some antibodies in IHC. Please refer to primary antibody protocol for IHC.

Reagent: Ready-to-use Pronase reagent available in 2 sizes: 15 and 100 ml.

2-8°C	64142-03	Pronase Reagent	15 ml
2-8°C	62142-04	Pronase Reagent	100 ml

➤ R-UNIVERSAL Epitope Recovery Buffer (10x stock)

Properties: Clear, non-toxic solution.

Presentation: R-Universal Buffer is supplied as 10x concentrate. For epitope recovery dilute 1 part of stock with 9 parts of deionized water.

Application: For epitope recovery dilute 1 part of stock with 9 parts of deionized water.

Stability and Storage: The preparation is stable for 1 year when stored unopened at +4°C. Every lot is issued with a certificate indicating the expiry date. After opening, store at +4°C in the refrigerator and use within 6 months.

Certification: Each lot is certified for compliance to specifications. The product is produced under DIN EN ISO 9001: 2008 Quality Management system for the products in Immunoassay Development and Measurement, Products for Bioanalytics and Immunoassays.

0-4°C	62719-10	R-UNIVERSAL Epitope Recovery Buffer (10x stock)	125 ml
0-4°C	62719-20	R-UNIVERSAL Epitope Recovery Buffer (10x stock)	500 ml

➤ Section Block

A new class of blocking solutions based on chemically modified and fragmented ultra-pure casein. Effectively reduces unwanted binding of primary antibody and conjugates you use to charged surface of the slide and tissue section. Greatly reduces non-specific binding while preserving the specific reaction, by saturating potential non-specific protein-protein interactions. Moreover, in contrast to BSA-based, IgGm casein or serum -based blocking solutions there is no interaction of specific antibody and blocking protein itself. or oth ls not comparable to other commercially available or home-made blocking solutions. Recommended for research and diagnostic pathology, especially for retrieved sections and polyclonal antibodies..

62710	Section Block	50 ml
62711	Section Block	125 ml
62712	Section Block	500 ml

➤ Sodium Cacodylate Buffer

Prepared from Sodium Cacodylate Trihydrate (F.W. 214.02).

0-5°C	11650	Sodium Cacodylate Buffer, 0.2M, pH 7.4	225 ml
0-5°C	11652	Sodium Cacodylate Buffer, 0.2M, pH 7.4	500 ml
0-5°C	11653	Sodium Cacodylate Buffer, 0.2M, pH 7.4	1 L
0-5°C	11654	Sodium Cacodylate Buffer, 0.4M, pH 7.2	500 ml
0-5°C	11655	Sodium Cacodylate Buffer, 0.4M, pH 7.2	1 L

➤ Sorensen's Phosphate Buffer

(Phosphate Mixed Sodium Salts)

Sorensen, see Dawson et. al, (1969)

Sodium Phosphate, dibasic (Na₂HPO₄•xH₂O)

Sodium Phosphate, monobasic (NaH₂PO₄•xH₂O)

0.2M, pH range 5.8 - 8.0

Shipping Conditions: Ambient Temperature

Maximum shelf life after receipt: 3 month

The osmolarity of a 0.1 M at a pH 7.2 is 226 mosmols; with the addition of 0.18 M of sucrose to the solution, the osmolarity raises to 425 mosmols. Standard pH 7.2; 0.2M is supplied. Otherwise, specify pH when ordering.

0-5°C	11600-05	Sorensen's Phosphate Buffer, pH 7.2	500ml
0-5°C	11600-10	Sorensen's Phosphate Buffer, pH 7.2	1 L
0-5°C	11600-10	Sorensen's Phosphate Buffer, 0.2M, pH 7.2	1 L
0-5°C	11600-40	Sorensen's Phosphate Buffer, 0.2M, pH 7.2	4 L
0-5°C	11601-10	Sorensen's Phosphate Buffer, 0.2M, pH 7.4	1 L
0-5°C	11601-40	Sorensen's Phosphate Buffer, 0.2M, pH 7.4	4 L
0-5°C	11682-05	Sorensen's Phosphate Buffer, 0.15M, pH 7.4	500 ml
0-5°C	11682-10	Sorensen's Phosphate Buffer, 0.15M, pH 7.4	1 L

➤ Sym-Collidine Buffer Kit

2,4,6-Trimethylpyridine

N:C(CH₃)CH:C(CH₃)CH:CCH₃

CAS #108-75-8 F.W. 121.18

Bennett & Luft., Biophys & Biochem. Cytol., 6,113 (1959).

A very stable buffer, used with Osmium tetroxide; provides excellent fixation, better stability and buffering capacity. The pH can be adjusted by varying the amount of hydrochloric acid in the final volume of 200ml. Preparation Instructions: Pour 9ml of 2N HCl; add 5.34ml of Sym-Collidine, mix well and add distilled water up to 200ml for a pH 7.4 solution.

Set consists of:

1 amp 5.34ml Sym Collidine

1 amp 9.0ml of 2N HCl

RT	11500	Sym-Collidine Buffer Kit	One set
RT	11510	Sym-Collidine Buffer Kit	Box/5 sets

READY-TO-USE PREPARED BUFFERS

➤ **Sym-Collidine, Reagent**

2,4,6-Collidine; 2,4,6-Trimethylpyridine
 $(C_5H_2N)(CH_3)_3$
 CAS #108-75-8 F.W. 121.18
 Assay: 99% Specific Gravity: 0.9170

RT	11520	Sym-Collidine Reagent	100ml
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➤ **Tris, (hydroxymethyl) aminomethane, Crystalline, See Page 67 >>>>**

➤ **Tris, (hydroxymethyl) aminomethane maleate**

Tris Maleate Buffer
 0.2M pH range 6.4-8.0

0-5°C	11730	250ml
0-5°C	11740	500ml

Tris Buffer
 0.2M pH 8.0

0-5°C	11730-05	250ml
0-5°C	11730-06	500ml

Tris Buffered Saline
 pH 7.4

0-5°C	11730-08	250ml
0-5°C	11730-09	500ml

Tris-HCL Buffer
 1M pH range 6-8

0-5°C	11730-12	250ml
0-5°C	11730-15	500ml

Tris HCL Buffer
 pH range 7.2-9.0

0-5°C	11730-20	250ml
0-5°C	11730-25	500ml

➤ **Tris Buffer pH 10.0 (10x)**

Description: This buffer is intended for heat-induced antigen retriever on formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. In IHC most commonly used fixative like formalin mask tissue antigens (cellular, membrane and nuclear) by cross-linking process, this results in poor or no staining in IHC. The use of this buffer on FFPE tissue section improves accessibility of antibodies to tissue antigens.

Storage: 2-8°C. **DO NOT FREEZE**

Intended Use: 1X buffer solution is intended for heat-induced antigen retriever in IHC. Please refer to primary antibody protocol.

Reagent: 10 X, pH 10 antigen retriever solution.

Preparation of Working Solution: Dilute this 10X buffer as needed (e.g. 90 ml of deionized or distilled water + 10 ml of this buffer), mix well, 1X buffer can be stored at 2-8°C

Cat. #	Description	Qty.
2-8°C 64142-11	Tris Buffer pH 10.0	100 ml
2-8°C 62142-12	Tris Buffer pH 10.0	1000 ml

➤ **Trypsin Reagent**

Description: Trypsin is used for proteolytic digestion of formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. In IHC most commonly used fixative like formalin; mask tissue antigens (cellular, membrane and nuclear) by cross-linking process, this results in poor or no staining in IHC. Trypsin digestion improves immunoreactivity of some antigens in FFPE tissue sections. For cytokeratin clone AE3 and AE1/AE3, this enzyme works much better than boiling the tissue with citrate buffer.

Storage: 2-8°C. **DO NOT FREEZE**

Intended Use: Use as antigen retriever for some antibodies in IHC. Please refer to primary antibody protocol for IHC.

Reagent: This enzyme is supplied as concentrated form along with buffer. The kit comes in 2 sizes. Small: Reagent B (Buffer) is 15 ml and the Reagent E (Enzyme) is 2 ml

Large: Reagent B (Buffer) is 100 ml and the Reagent E (Enzyme) is 10 ml

Cat. #	Description	Qty.
2-8°C 64142-01	Trypsin Kit Small	Kit
2-8°C 62142-02	Trypsin Kit Large	Kit

➤ **Universal Immunoassay Buffer™, 10X**

Immunoassay buffer is used as a 1X in all immunoassays (immunofluorescence, IHC, ELISA, WB etc.) as a washing buffer and it can be used as a dilution buffer for antibodies; however it does not contain any carrier proteins. This buffer also does not contain any phosphate, sodium azide or mercury as preservatives and can be used for dilution of all antibodies, including peroxidase, antibodies to phosphoproteins. It is not suitable for dilution of antibodies to S100 proteins.

■ **Reagent Supplied:** 10X Buffer

■ **Application:** Dilute this 10X buffer 10 times with DI water. (90 ml water + 10 ml this buffer – mixed well). Wash 3-5 times with this buffer in between the steps of your immunoassay protocol.

RT	25880-01	Universal Immunoassay Buffer, 10X	100 ml
RT	25880-10	Universal Immunoassay Buffer, 10X	1 L

➤ **Universal Antibody Dilution Buffer™**

This ready-to-use Universal Antibody Dilution Buffer is designed for dilution of antibodies in all immunoassays, including immunofluorescence, IHC, ELISA, WB. This buffer does not contain any mammalian proteins, phosphate, sodium azide, or mercury preservatives and can be used for dilution of all antibodies, including peroxidase, and antibodies to phosphoproteins. However, it is not suitable for dilution of antibodies to S100 proteins,

■ **Application:** Dilute antibodies, primary or secondary as recommended in the protocol by the manufacturer of these products.

■ **Storage:** 2 – 8°C. Diluted antibodies can be stored at 2° – 8°C for several weeks, depending upon the stability of antibodies.

2-8°C	25885-01	Universal Antibody Dilution Buffer	100 ml
2-8°C	25885-05	Universal Antibody Dilution Buffer	500 ml
2-8°C	25886-01	Antibody Dilution Buffer, free BSA	100 ml
2-8°C	25886-05	Antibody Dilution Buffer, free BSA	500 ml

➤ 1,4-Butanediol Diglycidyl Ether

(Araldite RD-2) $C_{10}H_{18}O_4$ F.W. 202.2 CAS #2425-79-8
 Approx. 70% Specific Gravity: 1.10

RT **11800** 100ml

➤ 2-Butoxy Ethanol

CAS #111-76-2
 (Butyl Cellosolve®; Ethylene Glycol Monobutyl Ether)
 $CH_3(CH_2)_3OCH_2CH_2OH$ F.W. 118.18
 Specific Gravity: 0.90 b.p. 169°C

RT **11820** 450ml

➤ Butvar B-98 Powder

CAS #63148-65-2
 (Terpolymer of polyvinyl butyl, polyvinyl alcohol & polyvinyl acetate)
 Polyvinyl butyl resin for thin film support. Stronger than Formvar and more sticky, resulting in a firm attachment for slotted or meshed grids. The standard solution is 0.25% Butvar B-98 in Chloroform. Handley, D.A., et. al., Ultramicroscopy, 4,479 (1979).

RT **11850** 100g

**EMS
EXCLUSIVE****TECHNICAL TIP****Tips For Butvar B-98 Support Films**

At the University of California, San Francisco a simplified and less hazardous method from the original Handley method (Handley, D.A. et al Butvar B-98 as a Thin Support Film. Ultramicroscopy 4, 479 (1979)) has been employed for the fabrication of Butvar support films. Antonia M. Milroy, Anatomy Department, University of California, San Francisco, CA. 94143-0452 FOR REPRINTS OF THE PROCEDURE PLEASE CONTACT US.

➤ Butvar B-98 Solution

Stock solution: 1% in Chloroform.

RT **11860** 100ml

➤ n-Butyl Acetate, Reagent, A.C.S.

$CH_3COO(CH_2)_3CH_3$ F.W. 116.16 CAS #123-86-4
 b.p. 127°C Specific Gravity: 0.88

RT **11900** 450ml

➤ n-Butyl Alcohol, Reagent, A.C.S.

(Butanol)
 $CH_3CH_2CH_2CH_2OH$ F.W. 74.12 CAS # 71-36-3
 Specific Gravity: 0.81

Assay99.4%
 Residue after evaporation0.005%
 Titratable acid0.0008meq/g
 Butyl Ether0.2%
 Water0.1%

RT **11920** 450ml

RT **11921** 4x450ml

TECHNICAL TIP**Preservation of Phospholipids**

The best method for preserving phospholipids and triglycerides is through ultrarapid cryofixation followed by freeze drying. Hagler, H.K. and Buja, L.M. (1986). **Reference:** Effect of specimen preparation and section transfer techniques on the preservation of ultrastructure, liquids and elements in cryosections. J. Microsc.,141:311

➤ (BGE), n-Butyl Glycidyl Ether

(Araldite RD-1) (Butoxymethyl oxirane)
 $C_7H_{14}O_2$ F.W. 130.19 CAS #2426-08-6
 b.p. 166-168°C Specific Gravity: 0.912

RT **12000** 100ml

➤ n-Butyl Methacrylate, Monomer

$CH_2C(CH_3)CO_2CH_2CH_2CH_2CH_3$ F.W. 142.20 CAS #97-88-1
 b.p. 162-164°C
 Stabilized with 10ppm MEHQ. (Hydroquinone, Mononethylether)

RT **12100** 225ml

➤ Cacodylic Acid, Free Acid

(Dimethylarsinic Acid)
 $(CH_3)_2AsO_2H$ F.W. 137.99 CAS #75-60-5
 Assay99.5%

RT **12200** 25g

RT **12201** 100g

➤ Cacodylic Acid - Sodium Salt, Trihydrate

Sodium Cacodylate
 Sodium dimethyl arsenate
 $C_2H_6AsNaO_2 \cdot 3H_2O$
 F.W. 214.02
 CAS #124-65-2

**Certificate of Analysis:**

IdentityConforming
 AppearanceSmall Crystals
 ColorWhite
 OdorNone
 Aqueous solution (2g+10ml).....Colorless
 Assay %99.52
 Loss on drying %.....25.39
 Chlorides %0.0050
 Sulfates %0.0150
 Inorganic Arsenic %.....0.0030

RT **12300-25** 25g

RT **12300** 100g

RT **12310** 500g

➤ Cadmium Iodide, Crystal, Reagent, A.C.S.

CdI_2 F.W. 366.21 CAS #7790-80-9

Assaymin. 99.0%

Used for negative staining.

m.p. 387°C

Possible Carcinogen.

RT **12320** 25g

RT **12321** 100g

➤ Calcium Chloride, Dihydrate, Reagent, A.C.S.

$CaCl_2 \cdot 2H_2O$ F.W. 147.02 CAS #10035-04-8

RT **12340** 100g

➤ Carbohydrazide

$CO(NHNH_2)_2$ F.W. 90.08 CAS #497-18-7
 m.p. 152-153°C

For GACH embedding kit.

A water-miscible, lipid-retaining, embedding polymer for E.M..

Heckman, et. al., Ultrastruct. Res., 42,156 (1973).

RT **12350** 25g

➤ Carbon Adhesives, See Adhesives and Mountants pages 12-16, 640-643 >>>>

➤ **Carbowax, Polyethylene Glycol**

H(OCH₂CH₂)_nOH CAS #25322-68-3
An embedding medium for microscopy and histochemistry.

Cat#	Carbowax	Average M.W.	Density		Melting/Freezing range, °C	Pack
			@ 20°C	@ 60°C	set to glass <-65	
RT 19700	PEG 200 viscous liquid	190-210	1.2390	1.0922	<-65	450ml
RT 19710	PEG 300 viscous liquid	285-315	1.1250	1.0928	-15 to -8	450ml
RT 19720	PEG 400 viscous liquid	380-420	1.1254	1.0930	4 to 8	450ml
RT 19730	PEG 600 viscous liquid	570-630	1.1257	1.0930	20 to 25	450ml
RT 19740	PEG 1000 Waxy	950-1050	—	1.0926	37 to 40	1 kilo
RT 19750	PEG 1450 Waxy	1300-1600	—	1.0919	43 to 46	1 kilo
RT 19760	PEG 3350 Waxy	3000-3700	—	1.0926	54 to 58	1 kilo
RT 19770	PEG 8000 Flakes	7000-9000	—	1.0845	60 to 63	1 kilo

Gao, K.X., (1993). Polyethylene Glycol as an Embedment for Microscopy and Histochemistry. CRC Press; ISBN# 0-8493-4323-2.

ARTICLES OF INTEREST

The Use of Polyethylene Glycol; Carbowax

Polyethylene Glycol 1500 (Carbowax 1500) is an excellent embedding medium for immunohistochemical studies. It provides structural preservation superior to frozen sections and increased sensitivity of antigen detection compared with paraffin sections. One limitation of PEG embedment is that PEG sections are difficult to handle and adhere poorly to glass slides. This article will share with you a simple and effective method to overcome those limitations. **Refer to:** Kuixiong Gao and James D. Godkin. (1991) "A New Method for Transfer of Polyethylene Glycol-embedded Tissue Sections to Silanated Slides for Immunocytochemistry". The J. of Histochem. and Cytochem. Vol. 39, No. 4, pg. 537-540.

➤ **Cardolite NC-513™**

CH₂OCHCH₂OC₆H₄C₁₅H₂₇ F.W. 356 W.P.E. 490
15-M-Phenylglycidyl-(n-pentadecca-8,11-dienyl) CAS #106-89-8
Specific Gravity: 0.97 at 24°C
A Long-chain, monofunctional epoxide; stable when mixed with resins.
Viscosity 50 cps at 25°C.

RT 12400	225ml
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➤ **Carmine, Certified, C.N. #DcCa-16**

Alum Lake of Carminic acid
(Natural Red 4) CAS # 1390-65-4
Solubility: 0.0% Water; 0.2% Alcohol; 0.5% Cellosolve; 4.0% Glycol;
0.0% Xylene.

RT 12410	10g
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➤ **Cedar Wood Oil**

CAS #8000-27-9 Refractive Index @ 20°C 1.504+/- .002
For clearing.

RT 12420	100ml
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➤ **Cedar Wood Oil**

CAS #8000-27-9 Refractive Index @ 20°C 1.515-1.520
Used as an immersion oil.

RT 12430	100ml
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➤ **Certified Dyes For Biological Staining**
See Histology section, pages 466-467 >>>>

➤ **Chloroform, Reagent, A.C.S.**

CHCl₃ FW 119.38 CAS #67-66-3
A.C.S. Specifications:
Color (APHA)10
Density @ 25°C.....1.471-1.476
Residue after Evaporation0.001%
Acetone & Aldehyde (about 0.00%).To Pass Test
Acid & ChlorideTo Pass Test
Free Chlorine (Cl).To Pass Test
Lead (Pb)0.05ppm
Subs. darkened by H₂SO₄To Pass Test
Suitability for Dithizone Test.....To Pass Test

RT 12540	450ml
RT 12541	4x450ml

➤ **Chloroform, Glass Distilled**

Specifications:
UV Absorption - 1 cm cell vs H₂O

λ (nm)	290	270	260	255	245
A	0.01	0.02	0.05	0.15	1.0

Assay99.7% min.
Evaporation Residue3ppm max.
Water0.03% max.

RT 12550	100ml
RT 12551	4x100ml

➤ **Chromic Acid Reagent, Crystals, A.C.S.**

CrO₃ FW 99.99 CAS #1333-82-0
A.C.S. Specifications:
Chloride (Cl).....0.005%
Insoluble Matter0.01%
Nitrate (NO₃)0.05%
Sodium (Na).....0.2%
Iron, Aluminum, Barium.0.03%
Sulfate (SO₄)0.05%
Assay.....98%

RT 12555	100g
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For Chromic Acid Solutions, see page 450 >>>>

➤ **Citrate Buffer**

Citric acid and Sodium citrate 0.1M pH range 4.6-6.2

0-5°C 11490	225ml
0-5°C 11492	500ml

➤ **Citrate Buffer 0.2M**

Buffer of Citric Acid and Sodium Citrate

0-5°C 11492-04	Citrate Buffer 0.2M, pH 4.0	1 L
0-5°C 11492-06	Citrate Buffer 0.2M, pH 6.0	1 L

➤ **Citrate Buffer pH 6.0 (10x)**

This buffer is intended for heat-induced antigen retriever on formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies.
Storage: 2-8°C. **DO NOT FREEZE**
Intended Use: 1X buffer solution is intended for heat-induced antigen retriever in IHC. Please refer to primary antibody protocol.
Reagent: 10 X, pH 6 antigen retriever solution.
Preparation of Working Solution: Dilute this 10X buffer as needed (e.g. 90 ml of deionized or distilled water + 10 ml of this buffer), mix well, 1X buffer can be stored at 2-8°C

2-8°C 64142-07	Citrate Buffer pH 6.0	100 ml
2-8°C 62142-08	Citrate Buffer pH 6.0	1000 ml

➤ Citric Acid, Anhydrous, Reagent, A.C.S.C₆H₈O₇ FW 192.13 CAS #77-92-9

A.C.S. Specifications:

Assay	Min. 99.5%
Insoluble Matters	0.005%
Residue after Ignition	0.02%
Chloride	0.001%
Oxalate (C ₂ O ₄) (about 0.05%)	To Pass Test
Phosphate	0.001%
Sulfate	0.002%
Heavy Metal (as Pb)	2ppm
Subs. carbonized by hot H ₂ SO ₄	To Pass Test
Iron	3ppm

RT 12480	500g
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➤ Cobalt Napthenate Solution

(55% Cobalt Napthenate; CAS#61789-51-3 and 45% Mineral Spirit; CAS #64742-88-7)

Used as an activator for the Vestopal embedding resin.

RT 12500	10ml
RT 12501	25ml

➤ s-Collidine Buffer See Buffer Section Page 28-29

RT 11500	One Set
RT 11510	box/5 sets

➤ Collodion, 5% Solution, USP

25% Alcohol, 75% Diethyl Ether in Pyroxylin CAS #9004-70-0

RT 12600	100ml
RT 12600-30	30ml

➤ Collodion (Parlodion), 2% in Amyl Acetate

Highly purified nitrocellulose (parlodion strip) in glass distilled amyl acetate. Useful for forming a negative replica to very fine detail. Two types are available: Our sterile formula which is filtered down to 0.45 micron and our non-sterile formula.

RT 12620-00	Non-Filter 2% Collodion in Amyl Acetate	100 ml
RT 12620-10	Sterile 2% Collodion in Amyl Acetate (Ultra-Pure)	100 ml
RT 12620-30	Non-filter 2% Collodion in Amyl Acetate	30 ml
RT 12620-34	Non-filter 2% Collodion in Amyl Acetate	4x30 ml
RT 12620-50	Sterile 2% Collodion in Amyl Acetate (Ultra-Pure)	30 ml
RT 12620-55	Sterile 2% Collodion in Amyl Acetate (Ultra-Pure)	4x30 ml

➤ Conjugates; ImmunoGold Reagents,**See Section 2, Pages 72-90 >>>>****➤ Cresyl Fast Violet, Certified, C.N.#DcW-5**

(Cresyl Violet Acetate)

C₁₈H₁₅N₃O₃ F.W. 321.33 CAS # 10510-54-0

Solubility: 0.13% water Dye Contents ~ 75%

Certified Stain. To differentiate DNA and Nissl bodies in spinal cord and brain tissues.

For staining Nissl substances in nerve cells and for bulk staining of nerve tissue. Stain Technol., 30, 83 (1955)

Stain for fresh tumor tissue for biopsy. J. Lab. Clin. Med., 8, 250 (1923). Biological Stains 9th Ed., 601 (1987)

RT 12780	5 g
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For Cresyl Fast Violet Solutions, see page 472 >>>>**➤ Cresyl Fast Violet, (FIRM)**

Rapid staining technique that provides high-contrast fluorescence microscopy imaging of resin embedded samples, reminiscent of low magnification transmission electron microscopy.

- Works with Epoxy and Acrylic type resins
- Simply mount your sections on glass slides, air dry, and overlay with 100 microliters FIRM for 30 seconds, wash and coverslip with water or an aqueous mountant. View in Rhodamine channel of a standard wide field Fluorescence Microscope.
- FIRM staining is unique in that the brightly fluorescent dye infiltrates the resin, revealing tissue structures in negative relief, with extremely high contrast and resolution.
- Perfect for previewing specimens prior to EM Analysis
- High Throughput, high contrast image phenotyping of model organisms such as drosophila
- Ideal for material and food science analytical microscopy

12780-05	FIRM for Acrylic Resin Sections	10ml
12780-06	FIRM for Epoxy Resin Sections	10ml

➤ Crystal Violet, Certified, C.N. #DcC-38

(Basic Violet 3; Gention Violet; Methyl Violet 10B; Hexamethyl Violet)

C₂₅H₃₀N₃Cl F.W. 407.99 CAS #548-62-9

Solubility: 9.0% Water; 8.75% Alcohol; 7.5% Cellosolve; 7.0% Glycol; 0.0% Xylene

Dye Contents ~88% min.

Certified Stain. For differentiating between gram-negative and gram-positive bacteria. Using Safranin O as a counterstain. Certified for staining chromatin and nucleoli in plant tissue. Biological Stains, 9th Ed. 586 (1977)

RT 12785	25 g
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For Crystal Violet Solutions, see page 472 >>>>**➤ Cuproinic Blue™**

Quinolinic Phthalocyanine

4,11,18, 25-tetraazoniaphthalocyanine tetrakis (methyl sulfate)

C₃₆H₃₆N₂O₁₆S₄Cu F.W. 1084.5

Used in the study of RNA in the fields of Histochemistry, Histology, and Genetics. Also used to study the molecular composition of the nature TM (Tectorial membrane) by specifically localizing and examining the morphology of Sulfated PGs (Proteoglycans) in the TM.

Peter A.Santi, M. Kathryn Lease, Robert G. Harrison and Eileen M. Wicker. J. of Electron Micro. Tech. 15:293-300 (1990) : Ultrastructure of Proteoglycans in the Tectorial Membrane.

RT 12800	For a 50ml solution	0.1g
RT 12802	For a 100ml solution	0.2g

For our Davidson's Fixative, see page 39, 452 >>>>**➤ Deionized Water, Reagent Grade A.C.S.**H₂O F.W. 18.02 CAS #7732-18-5

EMS Reagent Grade Water is typically prepared at 18 megohm/cm specific resistance using a reverse osmosis, mixed deionization, activated filtration and final filtration at 0.2 microns.

Color (APHA)	<+/-5
Bacteriological purity	0 CFUs/L
Residue after evaporation	10ppm
Coliform	negative

RT 22800-01	Deionized Water	1 gal
RT 22800-05	Deionized Water	5 gal

TECHNICAL TIP

The Use of Flexibilizers and Plasticizers

Flexibilizers such as Cardolite-513 and DER 736 helps embedding resins gain its stabilization under the electron beam. Plasticizers, such as DPB, prevents excessive brittleness and improves sectioning properties.

➤ **DER 736 Resin**

CAS #041638-13-5 Specific Gravity: 1.14

A light colored, flexible epoxy.

Epoxide equivalent weight: 175-205.

Used to simplify infiltration in combination with Epon 812 (Embed 812)

Kushida, J. Electron Micro., 16,278 (1964)

RT	13000	225ml
RT	13001	10x225ml lot

➤ **DER 732 Resin**

CAS #026142-30-3 Specific Gravity: 1.06

Used as a flexibilizer in Maraglas 655-epoxy formulation. Relatively low Viscosity (55-100 at 25°C).

Erlanson, J. Cell Bio., 22,704 (1964).

RT	13010	225ml
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➤ **DER 332 Resin**

CAS #001675-54-3 Specific Gravity : 1.16

A relatively soft embedding resin used when slower polymerization is needed.

Lockwood, Anat. Rec., 150,129 (1964).

RT	13030	225ml
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➤ **DER 332/732 Embedding Kit**

See Embedding Media Kits, Page 92 >>>>

RT	14000	kit
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➤ **Dextrose, Anhydrous, Reagent**

(D-Glucose)

C₆H₁₂O₆ FW 180.16 CAS #50-99-7

Assay Purity	99.8%
Insolubles	0.005%
Moisture (105°C)	0.2%
Ash	0.02%
Chloride	0.01%
Sulfate and Sulfite	0.005%
Arsenic	0.00004%
Heavy Metal (as Pb)	0.00005%
Iron	0.00005%
RNAse & DNAse Activity	None Detected

RT	13050	500g
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TECHNICAL TIP

Stability Of Special Staining Solutions

General Guidelines Concerning Solutions

1. Check stock solutions regularly for signs of deterioration.
2. All solutions should be dated and initialed by the person who prepared the solution.
3. Use caution to prevent cross solution contamination.
4. Use distilled or double distilled water to prepare solutions.
5. Use reagent grade chemicals.
6. Use dyes which are certified .
7. Keep solutions in well stoppered bottles at all times.
8. Refrigerated solutions should be poured into the staining jar, and the bottled solution returned to the refrigerator before it warms to room temperature.
9. Return all staining solutions to shelves soon after use to prevent mix-up.
10. Always use clean glassware.
11. Make sure that balance, pH meter, etc., are in proper working order.

➤ **(DAB), 3,3'-Diaminobenzidine, EM Grade, Purified free-base**

(3,3',4,4'-Biphenyltetramin)

C₁₂H₁₄N₄ F.W. 214.27 CAS #91-95-2

m.p. 173°C

Used as an ultrastructural protein tracer for immuno-cytochemistry.

A possible carcinogen.

0-5C	13060	1g
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➤ **(TMB), 3,3,5,5-Tetramethyl Benzidine**

A non-carcinogenic substitute for Benzidine (DAB-HCl); used as a sensitive and specific reagent for the detection of blood.

J. Histochem. Cytochem., 26, 106 (1978).

See page 65 for more information. >>>>

➤ **(DAB-HCl), 3,3-Diaminobenzidine Tetra Hydrochloride, EM Grade**

C₁₂H₁₄N₄.4HCl F.W. 360.12 CAS #7411-49-6

m.p. 300°C

Used for histochemical localization of peroxidase with DAB and in immunocytochemistry.

Sternberger, et.al., J. Histochem, Cytochem., 18,215 (1970)

0-5C	13080	1g
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We are now offering DAB 4HCl pre-weighed and packed in tablet form, to facilitate your work. Each tablet contains 10mg. Just break the tablet or tablets in a suitable bottle and add your buffer. All weighing and contact with the solid (DAB-HCl) is avoided.

0-5C	13082	10 tablets/pkg
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0-5C	13083	20 tablets/pkg
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➤ **(DBP) Dibutyl Phthalate**

C₆H₄(COOC₄H₉)₂ F.W. 278.35 CAS #84-74-2

Specific Gravity: 1.049

A plasticizer for epoxy resins.

RT	13100	225ml
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RT	13101	Lot of 10x225ml
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RT	13110	450ml
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➤ **1,2-Dichloroethane, Reagent, A.C.S.**

(Ethylene Dichloride)

CH₂ClCH₂Cl F.W. 98.96 CAS #107-06-2

A.C.S. Specifications

Color (A.H.S.A.)	10
Appearance	Clear
Odor	Resembling odor of CHCl ₃
Density @25°C	1.241 -1.251
Boiling Range, Incl. 83.5°C	20°C
Residue after Evaporation	0.002%
Titrateable Acid	0.0003 meq/g
Water	0.03%

RT	13250	450ml
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RT	13251	4x450ml
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➤ **Diethylene Glycol Distearate**

RT	13255	500gm
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See Embedding Media Kits page 92 >>>>

► Digitonin, Crystal, ReagentC₅₆H₉₂O₂₉ F.W. 1229.34 CAS #11024-24-1

An additive which stabilizes cholesterol. 0.2% digitonin in buffer added to Glutaraldehyde fixative may help to stabilize and retain the fine structural localization of free cholesterol and cholesterol esters.

- Okros, I *Histochemie* 13-91, 1968. Windaus, A. Hoop Seyler's Z. *Physio. Chem.* 65:110, 1910. *J. Cell Bio.*, 40, 802, 1969.
- Temkin, Robert J. (1993); *Microscopy Research and Tech.* 26:260-271

RT 13260 1g

► (DMAE), 2-DimethylaminoethanolC₄H₁₁NO F.W. 89.14 CAS #108-01-0

Specific Gravity: 0.883-0.888 b.p. 132-134°C

A curing agent for epoxy resins.

RT 13300 25ml

► (DMA) N,N-Dimethylaminoethyl MethacrylateC₈H₁₅NO₂ F.W. 157.21 CAS #2867-47-2

Specific Gravity: 0.933 b.p. 76°C

A water soluble monomer.

RT 13350 450ml

► (DMP), 2,2-Dimethoxypropane

(Acetone Dimethyl Acetal)

(CH₃)₂C(OCH₃)₂ F.W. 104.15 CAS #77-76-9

Specific Gravity: 0.849

Used as a dehydration agent.

- Miller, L.L. and Jacks, T.J. (1975). Rapid chemical dehydration of samples for electron microscopic examinations. *J. Histochem. Cytochem.* 23:107
- Thorpe J.R. and Harvey D.M.R. (1979). Optimization and investigation of the use of 2,2-dimethoxypropane as a dehydration agent for plant tissue in TEM. *J. Ultrastrut. Res.* 68:186
- Beckmann H.J. and Dierichs, R. (1982). Lipid extracting properties of 2,2-Dimethoxypropane as revealed by electron microscopy and thin layer chromatography *Histochemistry*, 76:407

RT 13280 450ml

RT 13281 4x450ml

TECHNICAL TIP**The Use of DMP (2,2-Dimethoxy Propane)**

DMP (2,2-Dimethoxypropane, EMS Cat. #13280) is a quick and inexpensive material for processing tissue preparations for SEM. It requires no special equipment as critical point drying does and it is not complicated as with freeze-drying or freeze-substitution. **Please refer to:** Weyda, F. (1992). Simple Dessication Method for Scanning Electron Microscopy Using Dimethoxypropane. *Proc. EMSA/MAS/MSC/SCM* p. 760.

► DMP-30

(2,4,6-Tri (dimethylaminomethyl) phenol)

C₁₅H₂₉N₃OH F.W. 265.0 CAS #90-72-2

Specific Gravity: 0.973 @ 25°C/25°C Refractive Index @25°C :1.514

A tertiary amine, used as an accelerator for anhydride cures. One of the most popular accelerators available! Keep as dry as possible. Short shelf life. Use as fresh as possible.

RT 13600 25ml

► N,N-DimethylanilineC₆H₅N(CH₃)₂ F.W. 121.18 CAS #121-69-7

Specific Gravity: 0.96 g/ml

RT 13360 100ml

► (DMSO), Dimethyl Sulfoxide, Reagent, A.C.S.(CH₃)₂SO FW 78.13 CAS #67-68-5**A.C.S. Specifications:**

AppearanceClear, Colorless

Density (g/ml)@25°Cmin. 1.095

Freezing PointNot below 18.0°C

Residue after evaporation0.01%

Water0.2%

RT 13390 450ml

TECHNICAL TIP**Cryo-Protectants**

Studies have shown that: Glycerol and Dimethyl Sulfoxide give good structural preservation for cryo-protectants, but they also cause gross physical damage to cells, and they should not be used in microanalytical studies. For better results, high-molecular-weight nonpenetrating cryoprotectants such as polyvinylpyrrolidone (PVP) and hydroxyethyl starch (HES) can give good morphological preservation, and only cause minimal perturbation to the functional physiology of the tissue. Sauberman, A.J., Riley, W., and Echlin, p. 1977a *SEM/1977/I,II* T Research Institute, Chicago, Illinois, p.347

► Divinyl Benzene, Mixed IsomersC₆H₄(CH:CH₂)₂ F.W. 130.19 CAS #1321-74-0

A cross-linking monomer. Inhibited with up to 1,500 ppm p-tert-butyl catechol.

Specific Gravity: 0.91

RT 13450 100ml

► D.D.S.A.

(Dodecyl Succinic Anhydride)

C₁₆H₂₆O₃ F.W. 266.38 CAS #25377-73-5

Specific Gravity: 1.005

RT 13700 450ml

RT 13701 Lot 4x450ml

► D.D.S.A., Specially Distilled

(Dodecyl Succinic Anhydride)

Much better than DDSA, we now offer an ultra pure DDSA, distilled by a new, slower process, which has a distinct effect on the color control of embedding resins, and offers complete infiltration of tissues. Produces blocks which are totally transparent.

RT 13710 450ml

RT 13711 Lot 4x450ml

**ULTRA
PURE!****► DPX Mountant for Microscopy**

RT 13510 100ml

RT 13512 500ml

See Adhesives and Mountants, page 18, 515 for more information. >>>>

► DEPEX Mountant

RT 13514 100ml

See Adhesives and Mountants, page 18, 515 for more information. >>>>

➤ **Dulbecco's Phosphate Buffer Saline – D-PBS**

All of our Dulbecco's Phosphate Buffer Saline Solutions contain: Potassium Chloride, Potassium Phosphate Monobasic, Sodium Chloride, Sodium Phosphate Dibasic, and D-Glucose. Some formulations may contain additional components. Use the table below as a quick reference for identifying the one that best suits your application. All of the solutions are prepared 1X strength.

Ingredients	F.W.	Formula I	Formula II	Formula III
KCl	74.56	X	X	X
NaCl	58.44	X	X	X
Na ₂ HPO ₄ · 7H ₂ O	268.07	X	X	X
KH ₂ PO ₄	136.09	X	X	X
CaCl ₂ · 2H ₂ O	147.02	X	X	X
MgCl ₂ · 6H ₂ O	203.31	X	X	X
Phenol Red		—	—	0.2 g/L

RT 11772-05	D-PBS, Formula I, 0.15M	500 ml
RT 11772-10	D-PBS, Formula I, 0.15M	1 L
RT 11773-05	D-PBS, Formula II, 0.19M	500 ml
RT 11773-10	D-PBS, Formula II, 0.19M	1 L
RT 11774-05	D-PBS, Formula III, 0.15M	500 ml
RT 11774-10	D-PBS, Formula III, 0.15M	1 L

➤ **Durcupan (Water Soluble)**

See *Embedding Media Kits page 92* >>>>

RT 14020		kit
RT 14021	Single Component A	each
RT 14022	Single Component B	each

➤ **Durcupan ACM Epoxy**

See *Embedding Media Kits page 92* >>>>

RT 14040		kit
RT 14041	Single Component A/M Epoxy resin	100ml
RT 14042	Single Component B Hardener 964	100ml

➤ **EA Counterstain, Gill's Modified Solution**

For use with Papanicolaou stain; a general tissue stain. Ready-to-use.

RT 26050-05	EA Counterstain, Gill's Modified	500ml
RT 26050-06	EA Counterstain, Gill's Modified	1 L

➤ **EARLE's Balanced Salts Solutions - EBSS**

All of our Earle's Balanced Salt Solution contains: Potassium Chloride, Sodium Chloride, Sodium Phosphate Monobasic, and D-glucose. Some formulations may contain additional components. Use the table below as a quick reference for identifying the one that best suits your application. All of the solutions are prepared 1X strength.

Ingredients	F.W.	Formula I	Formula II	Formula III
KCl	74.56	X	X	X
NaCl	58.44	X	X	X
NaH ₂ PO ₄ · H ₂ O	137.99	X	X	X
D-Glucose	180.16	1 g/L	—	1 g/L
MgSO ₄ · 7H ₂ O	246.48	X	X	X
CaCl ₂ · 2H ₂ O	147.02	X	X	X
NaHCO ₃	84.01	X	X	X
Phenol Red		—	0.015 g/L	0.050 g/L

RT 11765-05	EBSS, Formula I, 0.157M	500 ml
RT 11765-10	EBSS, Formula I, 0.157M	1L
RT 11766-05	EBSS, Formula II, 0.152M	500 ml
RT 11766-10	EBSS, Formula II, 0.152M	1L
RT 11767-05	EBSS, Formula III, 0.157M	500 ml
RT 11767-10	EBSS, Formula III, 0.157M	1L

➤ **EDTA, Disodium Salt, Dihydrate, A.C.S.**

(Ethylenediamine Tetraacetic acid)

Na₂C₁₀H₁₄N₂O₈ · 2H₂O F.W. 372.20 CAS #6381-92-6

A.C.S. Specifications:

Assay.....	99+%
Insoluble matter	max 0.005%
Nitrilotriacetic acid	max 0.1%
Heavy Metal (as Pb)	max 0.005%
Iron	max 0.01%

Organic chelating for staining glutaraldehyde fixed tissues, pre-stained with uranyl acetate, followed by lead citrate. Bernard, W., J. Ultrastruct. Res., 27, 250 (1969)

RT 15200	100g
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➤ **EDTA Buffer pH 8.5 (10x)**

Description: This buffer is intended for heat-induced antigen retrieval on formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. In IHC most commonly used fixative like formalin mask tissue antigens (cellular, membrane and nuclear) by cross-linking process, this results in poor or no staining in IHC. The use of this buffer on FFPE tissue section improves accessibility of antibodies to tissue antigens.

Storage: 2–8°C. **DO NOT FREEZE**

Intended Use: 1X buffer solution is intended for heat-induced antigen retrieval in IHC. Please refer to primary antibody protocol.

Reagent: 10 X, pH 8.5 antigen retriever solution.

Preparation of Working Solution: Dilute this 10X buffer as needed (e.g. 90 ml of deionized or distilled water + 10 ml of this buffer), mix well, 1X buffer can be stored at 2–8°C

Cat. #	Description	Qty.
4-8°C 64142-09	EDTA Buffer pH 8.5	100 ml
4-8°C 62142-10	EDTA Buffer pH 8.50	1000 ml

➤ **Ehrlich's Hematoxylin**

Stain selectivity for nuclei. Ready-to-use.

RT 26040-05	Ehrlich's Hematoxylin	500ml
RT 26040-06	Ehrlich's Hematoxylin	1 L

➤ **EMbed 812**

CAS # N.A. Specific Gravity: 1.08-1.10

EMS
EXCLUSIVE

EMbed 812 has the same characteristics as Epon 812, physically, and provides the same results in preservation, handling, curing and sectioning. EMbed 812 may cause etching on selected plastics. All formulas for mixing and using Epon 812 can be applied to EMbed 812, e.g. Luft's procedure, Mollenhauer's and EPON-ARALDITE mixtures.

RT 14900	450ml
RT 14901	4x450ml

➤ **EMbed 812 Embedding Kit and EMbed 812, Hard Plus Embedding Kit**

See *Embedding Media Kits page 93-94* >>>>

RT 14120	kit
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➤ **EMbed 812 / DER 736 Embedding Kit**

See *Embedding Media Kits page 93* >>>>

RT 14130	kit
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➤ **Entellan®**

For more information, see *Adhesives and Mountants*, page 18, 515 >>>>

RT	14800	100ml
RT	14802	500ml

➤ **Eosin Y, Certified, C.N. #DcE-40**

(Acid Red 87, Eosin Yellowish)
 $C_{20}H_6Br_4Na_2O_5$ F.W. 691.88 CAS #17372-87-1

Solubility: 44.0% Water; 2.0% Alcohol; 25.0% Cellosolve; 27.5% Glycol; 0.0% Xylene.

Used with Hematoxylin for showing cell nuclei in embryos and kidneys. Conn, "Biological Stain" 9th ed., The Williams and Wilkins Co., Baltimore 1977, pg. 7.

Component of Wright's stain for blood corpuscles.

Wright, J. Med. Res., 7, 138 (1902)

For staining bone marrow to show cell morphology. Bech, "Lab. Manual of Hematological Tech.", W. B. Saunders Co., Phila., 1908, p. 233

RT	14850	10g
RT	14851	25g

For our Eosin Y Solutions, see page 472 >>>>

➤ **EPO-Fix Embedding Media**

See *Embedding Media Kits*, page 93, 371 >>>>

➤ **Epon-812 Resin**

See *Embedding Media Kits, EMBED-812*, page 93 >>>>

➤ **Epon-815 Resin**

CAS # NA Specific Gravity: 1.13
 An aromatic resin.

RT	14910	450ml
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TECHNICAL TIP

The Search For The Epon-812 Replacement

Since the discontinuation by Shell of Epon 812 many replacements have been introduced. Many of these replacements have shown much closer characteristics to the original than others. For an in depth study of the work that has been done regarding many of the replacements for the original Epon 812 we highly recommend the following publications:

1. Mascorro, J.A. and Kirby, G.S. Physical Characteristics of "Old" Epon 812 and Various Epon Like Replacements". Proc. 44th Ann. Meet. EMSA., pp. 222-223 (1986)
2. Mascorro, J.A. and Kirby G.S. Novel/ Epoxy/Anhydride Alternatives for Biological Electron Microscopy: Physical and Performance Characteristics of Embed 812 and LX112 in Combination with NSA/NMA/DMAE. Proc. 47th Ann. Meet. EMSA., pp.1000-1001(1989)
3. Mascorro, J.A. and Kirby G.S. Viscosity Characteristics and Hardening Rates For Embed 812 and LX112 With Alternative Anhydride and Catalyst Choices. Proc. 49th Ann. Meet. EMSA., (1991)

➤ **EMS Cured Epoxy Remover**

Studies show that in order to get good results in positive staining of sections, the removal of cured epoxy (embedding material) as well as the reduced-osmium (fixation materials) from the sections is necessary; especially when double fixation with an Aldehyde and Osmium tetroxide is employed to process specimens for E.M. We offer a CURED-EPOXY-REMOVER kit, which removes the polymerized resin as well as the reduced-osmium. The structure of the resin free section will remain unchanged.

RT	14942	kit
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➤ **Epoxy Tissue Stain, Ready-to-use**



Toluidine Blue and Basic Fuchsin. For staining semi thin sections of epoxy embedded tissues.

Spurlock, B.O., (1966) et al., Am. J. of Clin. Path.



RT	14950	100ml
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➤ **ERL 4221-An ERL-4206 Replacement**

Due to the supply shortage of ERL-4206, ERL-4221 has now been specially formulated to replace it. ERL 4206 is one of the main components of the low viscosity (Dr. Spur) embedding resin kit.

Specifications:

ERL-4221 is a Cycloaliphatic Epoxide Resin.
 Specific Gravity ($H_2O=1$): 1.173 @ 20°C/20°C
 Flash Point — Closed Cup: 118°C (245°F)
 Boiling Point (760mm/Hg):>250°C (>482°F)

RT	15004	ERL-4221	225ml
RT	15005	ERL-4221	4 X 225ml

➤ **Erythrosin B, Certified, C.N. #DcEr-5**

(Acid Red 51, Erythrosin extra Bluish; Eosin J; Iodeosin B; Pyrosin B)
 $C_{20}H_6O_5I_4Na_2$ F.W. 879.87 CAS #16423-68-0

Solubility: 10.0% Water; 5.0% Alcohol; 7.0% Cellosolve; 8.25% Glycol; 0.0% Xylene.

RT	15010	10 g
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➤ **Ethyl Alcohol, Specially Denatured**

C_2H_5OH F.W. 46.07 CAS #64-17-5

Blended 95% Ethanol and 5% Methanol
 Suitable for all routine histology/cytology preparations.

Specifications:

Evaporation Residue5ppm max.
 Water0.1%
 Filtered SDA-3A.95%

RT	15050	1 qt (946ml)
RT	15051	4x1qt

➤ **Ethyl Alcohol, Anhydrous**

(Ethanol) - 200 Proof

CH_3CH_2OH F.W. 46.07 CAS # 64-17-5

Specifications:

Specific Gravity<0.7942
 Purity>99.9%
 Acidity<0.002%
 Water (Karl Fisher)<0.1%
 Non-Volatile Matter<0.0025%

RT	15055	450ml
RT	15056	4x450ml
RT	15058	1 liter

*Tax has already been paid.

➤ **Ethylene Dichloride, Reagent, A.C.S. 1,2-Dichloroethane, See Page 33 >>>>**

RT	13250	450ml
RT	13251	4x450ml

TECHNICAL TIP

Re-embedding of Tissue Poorly Embedded in Resin

Refer to: Ogura, H. and Oda (1973). A method for the recovery of inadequately epoxy resin-embedded tissue for electron microscopy. *J. Electron Microsc.*, 22:365

Re-embedding of Thick Resin Sections

Refer to: 1/ McNelly, N.A. and Hinds, J.W. (1975). Rescuing poorly embedded tissue for electron microscopy: A new and simple technique of re-embedding. *Stain Technol.*, 50:209 2/ Johnson, P.C. (1976). A rapidly setting glue for resectioning and remounting epoxy embedded tissue. *Stain Technol.*, 51:275.

➤ Ethylene Glycol Dimethacrylate

(Ethylene dimethacrylate)

C₁₀H₁₄O₄ F.W. 198.22 CAS #97-90-5

Specific Gravity: 1.053

b.p. 66-68°C

Inhibited with 100 ppm HQ. (Hydroquinone)

0-5C 15300 225ml

➤ Ethylene Glycol Monoethyl Ether, Purified

(Cellosolve; 2-Ethoxyethanol; Ethyl Glycol)

HOCH₂CH₂OCH₂CH₃ F.W. 90.12 CAS #110-80-5

bp 133-135°C

Specific Gravity @20°C: 0.931

Assay>99.5%

Water<0.1%

Residue after evaporation.....<0.001%

Suitable for histological use.

RT 15310-01 1L

RT 15310-06 6x1L

➤ Eukitt Mounting Media

See Adhesives and Mountants, page 18, 515 >>>>

➤ Farnesol

(3,7,11-Trimethyl-2,6,10-dodecatrien-1-ol)

C₁₅H₂₆O F.W. 222.57 CAS #4602-84-0

Specific Gravity: 0.886

Mixture of Stereoisomers: Approx. 90% Synthetic

0-5C 15340 10ml

➤ Fast Green FCF, Certified, C.I. 42053

(Food Green 3)

C₃₇H₃₄O₁₀N₂S₃Na₂ F.W.808.86 CAS #2353-45-9

Solubility:4.0% Water; 9.0% Alcohol; 8.0% Cellosolve; 6.25% Glycol; 0.0% Xylene

The main advantage of this dye is its resistance to fading. Mammalian tissue stain for visualizing collagen, muscle, cytoplasm, cells and cornified epithelium. Kornhauser, *Stain Tech.*, 18,95 (1943); 20, 23 (1945); Lillie, *Arch. Path.*, 29, 705 (1940). Modified Feulgen stain for visualizing chromosomes in root tips and other meristematic tissue.

DeTomas, *Stain Tech.*, 11, 137 (1936). Used in plant histology. O. Conn, "Biological Stains" 9th ed., Williams & Wilkens Co., Baltimore, 1977, pp. 252-3; Haynes, *Stain Tech.*, 3, 40 (1928).

RT 15500 5g

➤ Ferric Chloride, Hexahydrate, Reagent, A.C.S.

FeCl₃.6H₂O F.W. 270.30 CAS #10025-77-1

Assay	97.0-102%
Insoluble Matters	0.01%
Nitrate (about 0.001%)	To Pass Test
Phosphorous Compound	0.01%
Sulfate	0.01%
Arsenic	0.002%
Copper	0.003%
Zinc	0.003%

References for use:

Membrane stains

- Gasic, G., Berwick et al (1963). Hale stain for sialic acid containing mucins. *J. Cell Biol.*, 19:223
- Gasic, G., Berwick, et al (1968). Positive and Negative colloidal iron as cell surface electron stains. *Lab. Invest.*, 18:63
- Blanquet, P.R. and Loiez, A. (1974). Colloidal iron used at pHs lower than 1 as electron stain for surface proteins. *J. Histochem. Cytochem.*, 22:368
- Matukafs, V.J., Panner et al (1967). Studies on ultrastructural identification and distribution of protein-polysaccharides in cartilage matrix. *J. Cell Biol.*, 32:365
- Benedetti, E.L. and Emmelot, P. (1967). Studies on plasma membranes IV. The Ultrastructural localization and content of sialic acid in plasma membranes isolated from rat liver and hepatoma. *J. Cell Sci.*, 2:499
- Rowley, J.R. (1971). Resolution of channels in the exine by translocation of colloidal iron. *Pro. 29th Ann. EMSA Meet.*, p.352. Claitor's Pub. Division, Baton Rouge, LA
- Nicolson, G.L. (1973). Anionic sites of human erythrocyte membranes.I. Effects of trypsin, phospholipase C, and pH on the topography of bound positively charged colloidal particles. *J. Cell Biol.*, 57:373
- Hendy, R. (1971). Electron microscopy of lipofuscin pigment stained by the Schmorl and Fontana technique. *Histochemie*, 26:311.

RT 15510 500g

➤ Ferritin

CAS #9007-73-2

Cationized: This polycationic derivative of ferritin is useful in labeling negative charges on cell surfaces and to study membrane structure.

Cationized ferritin is prepared by coupling ferritin from horse spleen with N,N-dimethyl-1,3-propanediamine (DMPA). Sterile filtered solution in 0.15M NaCl.

Ferritin Concentration: 10mg per ml, coupled with DMPA.

A cationic derivative used to label negatively charged cell membranes for visualization by EM.Danon, D et al. (1972), *J. Ultrastruct. Res.*, 38, 500.

0-5C 15550 Cationized 1ml

➤ Fluorophore-Infiltrated Resin Microscopy (FIRM)

Rapid staining technique that provides high-contrast fluorescence microscopy imaging of resin embedded samples, reminiscent of low magnification transmission electron microscopy.

- Works with Epoxy and Acrylic type resins
- Simply mount your sections on glass slides, air dry, and overlay with 100 microliters FIRM for 30 seconds, wash and coverslip with water or an aqueous mountant. View in Rhodamine channel of a standard wide field Fluorescence Microscope.
- FIRM staining is unique in that the brightly fluorescent dye infiltrates the resin, revealing tissue structures in negative relief, with extremely high contrast and resolution.
- Perfect for previewing specimens prior to EM Analysis
- High Throughput, high contrast image phenotyping of model organisms such as *Drosophila*
- Ideal for material and food science analytical microscopy

RT 12780-05 FIRM for Acrylic Resin Sections 10ml

RT 12780-06 FIRM for Epoxy Resin Sections 10ml

For our Fast Green Solutions, see page 472 >>>>

FIXATIVES, PREPARED

Premixed, prebuffered fixatives, that are pH adjusted for immediate laboratory use. They are freshly prepared upon receipt of order to ensure maximum shelf life. The fixatives are filled in 20ml glass vials (10ml/vial). This allows for the immediate fixation of your specimens without costly and time consuming transfer associated with ampoule contained fixatives. **If you desire any prepared fixative that is not already listed in our catalog or you have special size and packaging requirements, please call us.**



➤ **0.2% Formaldehyde/0.1% Chromic Acid in 0.1M Sodium Cacodylate Buffer, pH 7.4**

0-5°C **15953** 10x10ml

➤ **2% Formaldehyde/0.02% Picric Acid in 0.1M Sodium Phosphate Buffer, pH 7.2**

0-5°C **15956** 10x10ml

➤ **Formaldehyde/Glutaraldehyde, 2.5% each in 0.1M Sodium Cacodylate Buffer, pH 7.4**

0-5°C **15949** 10x10ml

➤ **Formaldehyde/Glutaraldehyde, 3% each in 0.1M Sodium Cacodylate Buffer, pH 7.4**

0-5°C **15950** 10x10ml

➤ **2.5% Glutaraldehyde in 0.1M Sodium Cacodylate Buffer, pH7.4**

0-5°C **15960** 10x10ml

➤ **2.5% Glutaraldehyde in 0.1M Millonig's Sodium Phosphate Buffer pH 7.2**

0-5°C **15970** 10x10ml

➤ **2.5% Glutaraldehyde in 0.1M Sorensen's Sodium-Potassium Phosphate Buffer, pH 7.2**

0-5°C **15980** 10x10ml

➤ **B-5 Fixative**

For lymph nodes.

RT **64122-05** B-5 Fixative 500 ml

RT **64122-06** B-5 Fixative 1 lt

RT **64122-10** B-5 Fixative 4 lt

➤ **Bouin's Fixative**

A fixative that is used in light microscopy for the preservation of soft delicate structure.

RT **15990** Bouin's Fixative 10x10ml

➤ **Bouin's Solution**

Bouin's solution can be used as a fixation and a staining fluid. Bouin's fixative is excellent for use on biopsy specimens of the gastrointestinal tract. Tissue from the endocrine system are well fixed and many antibodies react well with tissue fixed in Bouin's. Bouin's solution may be used as a routine fixative or a staining solution, but should not be used as a preservative for tissue. Tissue cannot be held in Bouin's solution for extended periods. The maximum fixation time in this solution should be less than 48 hours and should be transferred to alcohol. Packaged in leak-proof histo-containers, pre-filled and ready-to-use.

Formulated with Picric Acid saturated aqueous solution 75%, Formalin (40% aqueous formaldehyde) 25% and Glacial Acetic acid 5% in de-ionized water

RT **15990-01** Bouin's Fluid 1 L

RT **15990-04** Bouin's Fluid 4 L

Bouin's Fluid in Pre-filled cups:

RT **15990-10** Bouin's Fluid 50 x 10 ml/cs

RT **15990-20** Bouin's Fluid 50 x 20 ml/cs

RT **15990-30** Bouin's Fluid 20 x 30 ml/cs

➤ **Brasil Fixative**

Ethanol, Picric Acid, Formalin, Acetic Acid, Glacial

This fixative is most popular when glycogen is the target. The solution is similar to Bouin's Solution (alcoholic) offering quick hardening and good staining with acid dyes.

RT **15995-10** Brasil Fixative 10x10ml

RT **15995-20** Brasil Fixative 100 ml

➤ **Carnoy's Fixatives**

Stock solution

RT **64130-05** Carnoy's Fluid 500 ml

RT **64130-50** Carnoy's Fluid Without Chloroform 500 ml

➤ **Carson's Phosphate Buffered Formalin**

Millonig's phosphate buffered formalin as modified by Carson, Martin and Lynn, by using 4% formalin in 0.1M sodium phosphate monobasic with sodium hydroxide to pH 7.2

RT **15732-05** Carson's Phosphate Buffered Formalin 500 ml

RT **15732-10** Carson's Phosphate Buffered Formalin 1 L

➤ **Carson's Phosphate Buffered Paraformaldehyde**

For some tissues, the use of formalin (contains 10 – 15% Methanol) is not suitable, we offer the alternative formaldehyde (prepared from paraformaldehyde – contains no methanol) for your convenience.

RT **15733-05** Carson's Phosphate Buffered Paraformaldehyde 500 ml

RT **15733-10** Carson's Phosphate Buffered Paraformaldehyde 1 L

➤ **CytoPrep Fixative**

CytoPrep Fixative forms a clear protective coating over specimens while fixing cells. It is ideal for cytological smears and it dries within 4 to 6 minutes. Good for safe storage and transportation of slides. It is water soluble and contains no chlorofluorocarbons. Comes in a 4 oz. spray can.

RT **64145-01** CytoPrep Fixative 4 oz.

RT **64145-12** CytoPrep Fixative 12 x 4 oz.

FIXATIVES, PREPARED

➤ Davidson's Fixative (Hartmann's/ Davidson's Fixative)

This is rapid fixative. Results with good nuclear detail and minimal formalin pigment. Hatmann's (Davidson's) Fixative is useful for preparing tumors, bone marrow, gynecologic specimen, fatty breast, medical biopsies. Fixation of small specimen is rapid. Exposure to the fixative should be limited to 24 hours (tissue may then be transferred to neutral buffered formalin or 70% alcohol for storage).

Based on the volume of 1125 ml solution, there is 2 part Formalin (35-39%), 3 part Ethanol, 1 part Glacial Acetic acid, and 3 part of tap water.

RT	64133-10	Hartmann's (Davidson's Fixative)	1 L
RT	64133-14	Hartmann's (Davidson's Fixative)	4 L

➤ Modified Davidson's Fixative

(14% Ethyl Alcohol, Denatured, 37.5% Formalin 37-39%, 6.25% Glacial Acetic Acid, and D.I. Water)

RT	64133-50	Modified Davidson's Fixative	1 L
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➤ Dietrich's Fixative

Ethanol, formalin, glacial acetic acid, distilled water

RT	15958-10	Dietrich's Fixative	10x10ml
RT	15958-20	Dietrich's Fixative	100 ml

➤ Fast Frozen Fix

Prepared fixative – This is one step quick fix for frozen sectioned tissue. Fixes tissue to slide to allow for staining procedures. Apply to most tissue types.

RT	15280-01	Fast Frozen Fix™	100 ml
RT	15280-05	Fast Frozen Fix™	500 ml

➤ Fixative/Decalcifier

- A solution that fixes and decalcifies in one step.
- Prevents loss of cellular structure.
- Enhances hematoxylin staining.

RT	64148-01	Fixative/Decalcifier	1 L
RT	64148-06	Fixative/Decalcifier	6 x 1 L

For our RDO Rapid Decalcifier, see the Histology section, page 450-451 >>>>

➤ Formalde-Fresh Low Odor Solution; Histology Grade

A specially formulated odor-mask which neutralizes the formalin odor without affecting subsequent tissue processing, handling, or staining. Low odor, ready-to-use 10% formalin solution. May be used as a fixative or preservative of specimens. Its shelf life is 24 months.

RT	15678-01	Formalde-Fresh	4 L
RT	15678-04	Formalde-Fresh	4 x 4 L

➤ Buffered Formalde-Fresh, Low-Odor 10% Formalin Solution

Low odor, prepared w/v, pH 6.9 to 7.1 at 25°C. 10% formalin in Phosphate buffer according to the A.F.I.P. Manual of Histology. This solution allows for long-term storage of tissue specimens.

RT	15741-01	Low-Odor Formalin 10% Buffered	4 L
RT	15741-04	Low-Odor Formalin 10% Buffered	4 x 4 L

➤ Formalin, Neutral, Buffered 10% w/v in Acetate Buffer

Buffered with Sodium Acetate in accordance with the A.F.I.P. Manual of Histology. pH 6.0 to ph 7.1 at 20°C. Filtered and ready-to-use.

RT	15738-01	Formalin 10% Buffered in Acetate	1 L
RT	15738-04	Formalin 10% Buffered in Acetate	4 L

➤ Formalin, Neutral, Buffered 10% w/v in Phosphate Buffer

Buffered with phosphate in accordance with the A.F.I.P. Manual of Histology. pH 6.9 to 7.1 at 25°C. Filtered and ready-to-use.

RT	15740	Formalin 10% Buffered in Phosphate	450 ml
RT	15740-01	Formalin 10% Buffered in Phosphate	1 L
RT	15740-04	Formalin 10% Buffered in Phosphate	4 L

➤ TissuePrep Buffered 10% Formalin

Prefilled with 10% formalin Cat# 15740. Ready-to-use in pre-filled cups. Labeled in accordance to OSHA requirements, which gives you immediate information regarding handling and first aid procedures. Pre-measured in wide-mouth, leak-proof, opaque polypropylene containers which limits your exposure to formaldehyde and saves you time.

Cat.#	Cup Size	Filled	Pack/cs
RT 15742-10	15 ml	10 ml	50/cs
RT 15742-20	30 ml	20 ml	50/cs
RT 15742-30	60 ml	30 ml	20/cs
RT 15742-60	120 ml	60 ml	20/cs

➤ Formalin Prefilled HistoTainer™

The HistoTainer™ (Empty Vials, see page 482) is half filled with 10% Neutral Buffered Formalin as a fixative. These ready-to-use prefilled containers are timer saving and make your work more efficient.

EMS #	Description	Vial Size	Prefilled	Qty
RT 15743-20	Formalin Prefilled HistoTainer	20 ml	10 ml	24
RT 15743-40	Formalin Prefilled HistoTainer	40 ml	20 ml	24
RT 15743-60	Formalin Prefilled HistoTainer	60 ml	30 ml	24
RT 15743-90	Formalin Prefilled HistoTainer	90 ml	45 ml	24
RT 15743-120	Formalin Prefilled HistoTainer	120 ml	60 ml	24

➤ Formalin 1% Non Buffered

RT	15734-01	Formalin 1% Non-Buffered	1L
RT	15734-04	Formalin 1% Non-Buffered	4L

➤ Formalin 2%, Non-Buffered

RT	15735-01	Formalin 2% Non-Buffered	1L
RT	15735-04	Formalin 2% Non-Buffered	4L

➤ Formalin 3%, Non-Buffered

RT	15735-10	Formalin 3% Non-Buffered	1L
RT	15735-20	Formalin 3% Non-Buffered	4L

➤ Formalin 4%, Non-Buffered

RT	15735-30	Formalin 4% Non-Buffered	1L
RT	15735-40	Formalin 4% Non-Buffered	4L

➤ Formalin 5%, Non-Buffered

RT	15735-50	Formalin 5% Non-Buffered	1L
RT	15735-60	Formalin 5% Non-Buffered	4L

FIXATIVES, PREPARED

➤ Hollande's Fixative

Please see *Hollande's Fixative*, page 45, 458 >>>>

➤ Karnovsky's Fixative

Please see *Paraformaldehyde-Glutaraldehyde Solution Karnovsky's Fixative*, page 44, 454, 457 >>>>

15720	kit	
15730	box of 5 kits	

➤ Fixative Reagent Grade (Karnovsky's)

This fixative contains 3% glutaraldehyde and 2% formaldehyde in 0.1M phosphate buffer, pH 7.4.

Karnovsky's with formalin 2% and Biological glutaraldehyde 3% in 0.1M Phosphate Buffer.

15731-10	Karnovsky Fixative Reagent Grade	1 L
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➤ Karnovsky's with paraformaldehyde solution and EM grade glutaraldehyde

Please Note: This kit can be formulated to fit your requirements. Please contact us.

15732-10	Karnovsky Fixative EM Grade	1 L
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Handle Your Ampoules Safely...

➤ Break-Safe™ Ampoule Opener

EMS Introduces Break-Safe™ allowing you to safely open up to 3 ampoules at one time

Box style design allows one handed opening of up to 3 ampoules at a time. Gently pressing down on the lid snaps ampule necks clean while keeping them contained within the device and away from fingers. After removing ampoule contents, simply turn the device upside down over a trash receptacle to safely discard ampoules and tops.



Features:

- 4 inserts allow opening of 1ml, 2ml, 5ml and 10 ml ampoules
- Open ampoules easily and safely
- Transparency allows unobstructed viewing of ampoule contents at all times
- Copolyester plastic construction has broad chemical resistance

60607	Break-Safe™ Ampoule Opener	each
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➤ Ampoule Breaker; Soft Silicone

EMS EXCLUSIVE Reusable – Made from soft silicone. It offers a simple way to break pre-scored glass ampoules safely. Accommodates 5, 7, and 10 ml size ampoules. Reduces injury and spillage.



60600	Ampoule Breaker; Soft Silicone	each
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➤ Ampoule Cracker™ Please see page 214 >>>>

➤ Paraformaldehyde, Prepared Fixatives

In addition to our complete line of Formaldehyde solutions we have now added to the line.

➤ Paraformaldehyde 0.5% in 0.1M phosphate buffer pH7.4

0-5°C	15951-10	Paraformaldehyde, 0.5% each in 0.1M Phosphate Buffer	10x10ml
0-5°C	15951-15	Paraformaldehyde, 0.5% each in 0.1M Phosphate Buffer	500 ml

➤ Paraformaldehyde 1% Aqueous

RT	15953-10	Paraformaldehyde, 1% each Aqueous	10x10ml
RT	15953-15	Paraformaldehyde, 1% each Aqueous	500 ml

➤ Paraformaldehyde 1% in 0.1M Phosphate Buffer pH, 7.4

0-5°C	15952-10	Paraformaldehyde, 1.0% each in 0.1M Phosphate Buffer	10x10ml
0-5°C	15952-15	Paraformaldehyde, 1.0% each in 0.1M Phosphate Buffer	500 ml

➤ Paraformaldehyde 1% Glut 2% in 0.1M Phosphate Buffer, pH 7.4

0-5°C	15949-30	Paraformaldehyde 1 % Glutaraldehyde 2% in 0.1M Phosphate Buffer	10x10ml
0-5°C	15949-35	Paraformaldehyde 1 % Glutaraldehyde 2% in 0.1M Phosphate Buffer	500 ml

➤ Paraformaldehyde 3% Glutaraldehyde 0.35% in 0.1M Sodium Cacodylate, pH 7.4

0-5°C	15949-50	Paraformaldehyde 3 % Glutaraldehyde 0.35% in 0.1M Sodium Cacodylate Buffer	10x10ml
0-5°C	15949-60	Paraformaldehyde 3 % Glutaraldehyde 0.35% in 0.1M Sodium Cacodylate Buffer	500 ml

➤ Paraformaldehyde 4% and Glutaraldehyde 1% in Phosphate Buffer, pH 7.0

0-5°C	15949-70	Paraformaldehyde 4 % Glutaraldehyde 1% in 0.1M Phosphate Buffer	10x10ml
0-5°C	15949-80	Paraformaldehyde 4 % Glutaraldehyde 1% in 0.1M Phosphate Buffer	500 ml

➤ Paraformaldehyde 4% in 0.1M Sodium Cacodylate, pH7.4

0-5°C	15952-10S	Paraformaldehyde 4 % in 0.1M Sodium Cacodylate Buffer	10x10ml
0-5°C	15952-15S	Paraformaldehyde 4 % in 0.1M Sodium Cacodylate Buffer	500 ml

➤ Paraformaldehyde 4% in 0.1M Phosphate Buffer, pH 7.4

0-5°C	15735-10S	Paraformaldehyde 4% in 0.1M Phosphate Buffer	10x10ml
0-5°C	15735-20S	Paraformaldehyde 4% in 0.1M Phosphate Buffer	500 ml

➤ Paraformaldehyde 4% in 0.2M Phosphate Buffer, pH 7.4

0-5°C	15735-30S	Paraformaldehyde 4% in 0.2M Phosphate Buffer	10x10ml
0-5°C	15735-40S	Paraformaldehyde 4% in 0.2M Phosphate Buffer	500 ml

➤ Paraformaldehyde 4% in 0.1M Phosphate Buffer, pH 7.2

0-5°C	15735-50S	Paraformaldehyde 4% in 0.1M Phosphate Buffer	10x10ml
0-5°C	15735-60S	Paraformaldehyde 4% in 0.1M Phosphate Buffer	500 ml

➤ Paraformaldehyde 4% in 0.2M Phosphate Buffer, pH 7.2

0-5°C	15735-70	Paraformaldehyde 4% in 0.2M Phosphate Buffer	10x10ml
0-5°C	15735-80	Paraformaldehyde 4% in 0.2M Phosphate Buffer	500 ml

➤ Paraformaldehyde 4% in 0.1M Phosphate Buffer Saline, pH7.4

0-5°C	15735-85	Paraformaldehyde 4% in 0.1M Phosphate Buffer Saline	10x10ml
0-5°C	15735-90	Paraformaldehyde 4% in 0.1M Phosphate Buffer Saline	500 ml

➤ Paraformaldehyde 4% in 0.2M Phosphate Buffer Saline, pH 7.4

0-5°C	15735-95	Paraformaldehyde 4% in 0.2M Phosphate Buffer	10x10ml
0-5°C	15735-100	Paraformaldehyde 4% in 0.2M Phosphate Buffer	500 ml

FIXATIVES, PREPARED

➤ Formaldehyde (Formalin)

➤ Formaldehyde, Reagent, A.C.S.

HCHO F.W. 30.03 CAS #50-00-0
Specific Gravity1.09

A.C.S. Specifications:

Assay35.5 to 38.0%
Residue after ignition0.005%
Color (A.P.H.A.)10
Sulfate (SO₄)0.002%
Heavy Metal (as Pb)5ppm
Titrate Acid0.006 meq/g
Chloride (Cl)5ppm
Iron (Fe)5ppm

RT	15680	450 ml
RT	15681	4 x 450 ml
RT	15682	1 qt (946 ml)

➤ Formaldehyde, 37%, Microfiltered (Formalin Microfiltered)

HCHO F.W. 30.03 CAS# 50-00-0
Microfiltered with a 0.45 micron membrane; suitable as an EM fixative when a methanol free solution is not necessary.

RT	15686	10 x 10 ml
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➤ Formaldehyde

(Paraformaldehyde) GLUTARALDEHYDE (Karnovskys)

RT	15720	kit
RT	15730	box of 5 kits

➤ Formaldehyde/Zinc Fixative

Prepared: Ready-to-use.

- Preserves fine nuclear details.
- Good for immunostaining.
- Contains no mercury.
- Can be used with automated tissue processors.
- Works well with standard and special stains because zinc is a stain enhancing mordant.

RT	15675-01	Formaldehyde/Zinc Fixative	1 L
RT	15675-04	Formaldehyde/Zinc Fixative	4 L

➤ Formalin Spill Control; F-gard- ER

For the handling and disposing of formaldehyde containing solutions. It immobilizes, cools, and contains spills. As well, it reduces the escape of formaldehyde gas and significantly reduces formalin concentration. F-gard- ER aids in reducing exposure to formaldehyde gases by immobilizing the formalin and transforming it to an easily removed semi-solid mass. The mass cools rapidly minimizing formaldehyde off-gassing.

RT	24140-01	Formalin Spill Control	11 oz.
RT	24140-06	Formalin Spill Control	5 x 11 oz.

➤ Formaldehyde Aqueous Solution, 16% (Paraformaldehyde Aqueous Solution)

EM Grade

Paraformaldehyde - methanol free solution. A more efficient and rapid penetrant fixative used in combination with Glutaraldehyde and Acrolein fixatives. Easy to break, prescored, 10ml ampoules sealed under inert gas, or 100ml bottles.



16% Aqueous Solution

RT	15700	10 ml
RT	15710	10 x 10 ml
RT	15710-S	100 ml
RT	15711	10 box/lot

10% Aqueous Solution

RT	15712	10 x 10 ml
RT	15712-S	100 ml

20% Aqueous Solution

RT	15713	10 x 10 ml
RT	15713-S	100 ml

32% Aqueous Solution

RT	15714	10 x 10 ml
RT	15714-S	100 ml

METHANOL FREE

In addition to our complete line of Formaldehyde solutions shown above we have now added to the line.

Since the DOT (Department of Transportation) has changed the definition of what a non dangerous solution of formaldehyde is to under 10%, we are now offering an 8% and a 4% solution. This will allow us to ship overnight as well as overseas without any hazardous charges saving our customers a good deal of money.

The quality of our 8% and 4% aqueous Paraformaldehyde solution is as good as all of the other concentrations that we offer.

4% Aqueous Solution

RT	157-4	10 x 10 ml
RT	157-4-100	100 ml

8% Aqueous Solution

RT	157-8	10 x 10 ml
RT	157-8-100	100 ml

➤ Perfusion Wash and Perfusion Fixative Ready to use

For all of the best results we offer ready to use Perfusion washes and fixatives which are recommended by the NeuroScience Association. All of our solutions are ready made and are of the highest quality.

We have three groups of solutions commercially available.

Group I : Perfusion wash and Fixative Technical Grade. To be used for Standard stains:

Perfusion Wash (1220SK):
Phosphate Buffered Saline 0.1M
Phosphate Buffer pH 7.2-7.4

Perfusion Fixative (1221SK): 10%
Phosphate Buffered Formaldehyde

Group II: Perfusion wash and Fixative Reagent Grade. To be used for Standard and ImmunoHistochemistry Stains.

Perfusion Wash (1219SK):
Phosphate Buffered Saline 0.1M
Phosphate Buffer pH 7.2-7.4

Group III: Perfusion wash and Fixative Superior Reagent Grade. For the best results use this group. This is Sodium Cacodylate based for NSA'S Disintegrative Degeneration Stain

Perfusion Wash (1222SK): 0.8% NaCl/0.4% Dextrose/0.8% Sucrose/0.023% CaCl₂/Sodium Cacodylate 0.034%

Perfusion Fixative (1223SK): 4% Paraformaldehyde/4% Sucrose/1.4% Sodium Cacodylate

For a complete procedure and protocol for the use of these washes and fixatives please see the following site:
www.neuroscienceassociates.com/perf-solution1 or 2 or 3.htm

1220SK	Perfusion Wash, Technical	1000 ml
1221SK	Perfusion Fixative, Technical	1000 ml
1219SK	Perfusion Wash, Reagent	1000 ml
1224SK	Perfusion Fixative, Reagent	1000 ml
1222SK	Perfusion Wash, Super Reagent	1000 ml
1223SK	Perfusion Fixative, Super reagent	1000 ml

If you want a custom wash or fixative made, please just let us know and we will be happy to make you whatever you require.

FIXATIVES, PREPARED**► CoreDish™ Multiple Biopsy Containers Half Prefilled with 10% Formalin**

Few recommendations concerning how the biopsies should be handled have been published. Performing a large number of biopsies means an increase in the number of containers handled and consequently a technical overload of the transmission network, which occurs without any financial counterpart. A new approach had to be developed in order to increase productivity.

We are proud to offer a multi-compartment container in the shape of a dish and half prefilled with 10% Neutral buffered Formalin, for holding and transporting biopsies. It is supplied with a leak-proof closure with O-ring ensuring total protection of contents. It conforms to OSHA directives. These CoreDish™ measure only 15mm H x 95 mm Diameter. Each compartment is clearly identified to allow proper placement and visualization of the biopsy being inserted. Thanks to CoreDish™ it is no more necessary to use a multiple of individual containers, thereby reducing cost and risks of confusion.

CoreDish™ available in many configurations to serve in different biopsy, such as prostate, upper GI tract and lower GI tract. A label allows recording the related information, patient ID, doctor, date and time.

**► M970-D5B-2 CoreDish™ Breast Biopsy Container
Half Prefilled with 10% Formalin**

This multi-compartment container (out of five compartments, four are labeled: LUQ, RUQ, LLQ, RLQ) in the shape of a dish and half prefilled with 10% Neutral Buffered Formalin, for holding and transporting biopsies. It is supplied with a leak-proof screw closure with O-ring ensuring total protection of contents. It conforms to OSHA directives. The dish measures only 15 x 95 mm in diameter. Each compartment is clearly identified to allow proper placement and visualization of the breast biopsy being inserted. A writing area for patient information is provided.

Cat. #	For	Compartments	Qty
RT 15736-10	Breast	5	10/pk

**► M970-D8P CoreDish™ Prostate Biopsy Container
Half Prefilled with 10% Formalin**

For prostate biopsies. Eight compartments. Leakproof seal with O-ring lid. An area for patient information is provided. Seven labeled compartments: Base, Lateral Base, Medium, Lateral Medium, Apex, Lateral Apex.

Cat. #	For	Compartments	Qty
RT 15736-20	Prostate	8	10/pk

**► M970-D8UGI CoreDish™ Upper GI Biopsy Container
Half Prefilled with 10% Formalin**

For upper GI track biopsies. Eight compartments. Leakproof seal with O-ring lid. An area for patient information is provided. Seven labeled compartments: Gastric Card, Gastric Body, GE Junction, Gastric ATR, Distal Esophage, Pylorus, Duodeum.

Cat. #	For	Compartments	Qty
RT 15736-30	Upper GI	8	10/pk

**► M970-D8LGI CoreDish™ Lower Gi Biopsy Container
Half Prefilled with 10% Formalin**

For lower GI track biopsies. Twelve compartments. Leakproof seal with O-ring lid. An area for patient information is provided. Ten labeled compartments: Proximal Flexure Colon, Hepatic Fleure Colon, Distal Transverse Colon, Ascending Colon, Splenic flexure Colon, Cecum, Descending Colon, Terminal Ileum, Rectum, Sigmoid Colon.

Cat. #	For	Compartments	Qty
RT 15736-40	Lower GI	12	10/pk

**► M970-D12P CoreDish™ Prostate Biopsy Container
Half Prefilled with 10% Formalin**

For prostate biopsies. Twelve compartments. Leakproof seal with O-ring lid. An area for patient information is provided. TWelve labeled compartments: L Base, R Base, L Lateral Base, R Lateral Base, L Medium, R Medium, L Lateral Medium, R Lateral Medium, L Lateral, L Apex, R Apex, R Lateral Apex.

Cat. #	For	Compartments	Qty
RT 15736-50	Prostate	12	10/pk



15736-10



15736-20



15736-30



15736-40



15736-50

FIXATIVES, PREPARED

➤ Glutaraldehyde

OCH₂CH₂CH₂CHO F.W. 100.12
CAS #111-30-8

Specific Gravity @ 20/20°C: 1.131

**THE HIGHEST
PURITY!**

➤ EM Grade Distillation Purified

- The Universal Fixative for Electron Microscopy.
- Purified to EM Grade from commercial grade by "all-glass vacuum-distillation."
- THE HIGHEST PURITY, free from polymers and other contaminants.
- Each lot is tested and assayed in our lab before we ship and guarantee its purity.
- Sealed under dry nitrogen.
- Refrigerated prior to shipment.

After glutaraldehyde has been purified to EM grade, it has a high risk of polymerizing if it is not handled properly. Electron Microscopy Sciences takes special precautions to assure a polymer-free, pure glutaraldehyde.

Every lot of our EM grade glutaraldehyde is assayed prior to shipping assuring you consistent purity and the highest possible quality. If stored properly, our Glutaraldehyde has a very long shelf life.

We package our glutaraldehyde in 10ml, single dose ampoules, sealed under dry nitrogen, and kept refrigerated until it is shipped. We offer our glutaraldehyde in a wide range of percentages to simplify mixing procedures and avoiding waste.

EM grade glutaraldehyde, stored in volumes greater than 100ml, with repeated defrosting and recapping, will polymerize in time, producing an absorption peak of 235nm rather than the 280nm of pure EM grade. The presence of polymerized glutaraldehyde greatly reduces its efficiency as a cross-linking agent, preventing proper fixation. For this reason, we provide 10ml ampoules and 100ml bottle quantities for larger applications.

8% Aqueous Solution

0-5°C	16000	10 ml ampoule	ea
0-5°C	16019	Box 10 x 2 ml	bx
0-5°C	16020	Box 10 x 10 ml ampoules	bx
0-5°C	16021	same as 16020 10 bxs +	bx
0-5°C	16022	same as 16020 20 bxs +	bx
0-5°C	16010	100 ml bottle	ea

10% Aqueous Solution

0-5°C	16100	10 ml ampoule	ea
0-5°C	16120	Box 10 x 10 ml ampoules	bx
0-5°C	16121	same as 16120 10 bxs +	bx
0-5°C	16122	same as 16120 20 bxs +	bx
0-5°C	16110	100 ml bottle	ea

25% Aqueous Solution

0-5°C	16200	10 ml ampoule	ea
0-5°C	16220	Box 10 x 10 ml ampoules	bx
0-5°C	16221	same as 16220 10 bxs +	bx
0-5°C	16222	same as 16220 20 bxs +	bx
0-5°C	16210	100 ml bottle	ea

50% Aqueous Solution

0-5°C	16300	10 ml ampoule	ea
0-5°C	16320	Box 10 x 10 ml ampoules	bx
0-5°C	16321	same as 16320 10 bxs +	bx
0-5°C	16322	same as 16320 20 bxs +	bx
0-5°C	16310	100 ml bottle	ea

70% Aqueous Solution

0-5°C	16350	10 ml ampoule	ea
0-5°C	16360	box 10 x 10 ml ampoules	bx
0-5°C	16365	box 10 x 2 ml ampoules	bx



For any special concentration, or packaging requirements other than those already listed, please call us today. We will manufacture in accordance to your specifications.

➤ Biological Grade

0-5°C	16400	25% Solution	450 ml	ea
0-5°C	16401	25% Solution	4 x 450 ml	bx
0-5°C	16410	25% Solution	1 gal.	ea
0-5°C	16411	25% Solution	4 x 1 gal.	bx
0-5°C	16500	50% Solution	450 ml	ea
0-5°C	16501	50% Solution	4 x 450 ml	bx
0-5°C	16520	50% Solution	1 liter	ea
0-5°C	16521	50% Solution	4 x 1 liter	bx

➤ Serum Vial Glutaraldehyde

Over the years, many of our valued customers have requested purchasing our Glutaraldehyde in serum vials. This packaging allows the user to puncture the special non-reactive seal with a hypodermic syringe and draw out the exact quantity of Glutaraldehyde needed without opening the container. This packaging assures freshness and purity of the Glutaraldehyde at all times

0-5°C	16216	25% Aqueous EM Grade	10 x 10 ml
0-5°C	16214	Glutaraldehyde in serum Vial	100 ml
0-5°C	16316	50% Aqueous EM Grade	10 x 10 ml
0-5°C	16314	Glutaraldehyde in serum Vial	100 ml

* All other concentrations are available in serum vials upon request.

➤ Anhydrous EM Grade Glutaraldehyde:

Specially Prepared-10% Solution

Rapid-Freezing on a polished metal surface, at the temp. of liquid helium or liquid nitrogen, followed by freeze-substitution in osmium-acetone, has been shown to be a very useful technique for capturing rapid cellular events and for preserving cell ultrastructure.

■ John M. Robinson and Morris J. Karnovsky, 1991. "Rapid-freezing Cytochemistry: Preservation of Tubular Lysosomes and Enzyme Activity". J. of Histochem., Cytochem. Vol. 39, No. 6, pp 787-792

Ordering Information: (please call for additional information)

0-5°C	16530	10% in Acetone	10 x 10 ml	bx
0-5°C	16531	10% in Ethanol	10 x 10 ml	bx
0-5°C	16532	10% in Methanol	10 x 10 ml	bx
0-5°C	16533	10% in Solvent of your choice	10 x 10 ml	bx

We would be pleased to fill your specific glutaraldehyde needs. Please call for prices on special concentrations or size requirements.

TECHNICAL TIP

The Fixative for Use in Fixing Cornea

To fix cornea, one should use the following fixative: 2% Glutaraldehyde, 1% Paraformaldehyde (Formaldehyde) in a 0.1M Sodium Cacodylate buffer; pH 7.4 containing 0.02% Picric Acid. (Assouline, et al 1992)

FIXATIVES, PREPARED**► Glutaraldehyde, Pre-Made, Ready-to-Use, in Buffer****Glutaraldehyde 0.625% in 0.1M Phosphate Buffer, pH 7.4**

0-5°C	16535-05	Glutaraldehyde 0.625% in Phosphate Buffer, pH 7.4	500 ml
0-5°C	16535-10	Glutaraldehyde 0.625% in Phosphate Buffer, pH 7.4	1 L

Glutaraldehyde 2% in 0.1M Phosphate Buffer, pH 7.4

0-5°C	16536-05	Glutaraldehyde 2% in Phosphate Buffer, pH 7.4	500 ml
0-5°C	16536-10	Glutaraldehyde 2% in Phosphate Buffer, pH 7.4	1 L

Glutaraldehyde 2% in 0.1M Sodium Cacodylate Buffer, pH 7.4

0-5°C	16536-15	Glutaraldehyde 2% in Sodium Cacodylate Buffer, pH 7.4	500 ml
0-5°C	16536-20	Glutaraldehyde 2% in Sodium Cacodylate Buffer, pH 7.4	1 L

Glutaraldehyde 2.5% in 0.1M Phosphate Buffer, pH 7.4

0-5°C	16537-05	Glutaraldehyde 2.5% in Phosphate Buffer, pH 7.4	500 ml
0-5°C	16537-10	Glutaraldehyde 2.5% in Phosphate Buffer, pH 7.4	1 L

Glutaraldehyde 2.5% in 0.1M Sodium Cacodylate Buffer, pH 7.4

0-5°C	16537-15	Glutaraldehyde 2.5% in Sodium Cacodylate Buffer, pH 7.4	500 ml
0-5°C	16537-20	Glutaraldehyde 2.5% in Sodium Cacodylate Buffer, pH 7.4	1 L

Glutaraldehyde 3% in 0.1M Phosphate Buffer, pH 7.4

0-5°C	16538-05	Glutaraldehyde 3% in Phosphate Buffer, pH 7.4	500 ml
0-5°C	16538-10	Glutaraldehyde 3% in Phosphate Buffer, pH 7.4	1 L

Glutaraldehyde 3% in 0.1M Sodium Cacodylate Buffer, pH 7.4

0-5°C	16538-15	Glutaraldehyde 3% in Sodium Cacodylate Buffer, pH 7.4	500 ml
0-5°C	16538-20	Glutaraldehyde 3% in Sodium Cacodylate Buffer, pH 7.4	1 L

Glutaraldehyde 3% Sodium Phosphate Buffer, pH 7.2

0-5°C	16539-45	Glutaraldehyde 3% in Sodium Phosphate Buffer, pH 7.2	10x10 ml
0-5°C	16539-50	Glutaraldehyde 3% in Sodium Phosphate Buffer, pH 7.2	500 ml
0-5°C	16539-55	Glutaraldehyde 3% in Sodium Phosphate Buffer, pH 7.2	1 L

Glutaraldehyde 4% in 0.1m Phosphate Buffer, pH 7.3

0-5°C	16539-60	Glutaraldehyde 4% in 0.1m Phosphate Buffer, pH 7.3	10x10 ml
0-5°C	16539-65	Glutaraldehyde 4% in 0.1m Phosphate Buffer, pH 7.3	500 ml
0-5°C	16539-70	Glutaraldehyde 4% in 0.1m Phosphate Buffer, pH 7.3	1 L

Glutaraldehyde 2% Paraformaldehyde 2% in Phosphate Buffer, pH 7.4

0-5°C	16536-06	Glutaraldehyde 2% Paraformaldehyde 2% in Phosphate Buffer, pH 7.4	100ml
0-5°C	16536-07	Glutaraldehyde 2% Paraformaldehyde 2% in Phosphate Buffer, pH 7.4	500ml
0-5°C	16536-08	Glutaraldehyde 2% Paraformaldehyde 2% in Phosphate Buffer, pH 7.4	1 Liter

Glutaraldehyde 2.5% Paraformaldehyde 1% in Phosphate Buffer, pH 7.4

0-5°C	16537-06	Glutaraldehyde 2.5% Paraformaldehyde 1% in Phosphate Buffer, pH 7.4	100ml
0-5°C	16537-07	Glutaraldehyde 2.5% Paraformaldehyde 1% in Phosphate Buffer, pH 7.4	500ml
0-5°C	16537-08	Glutaraldehyde 2.5% Paraformaldehyde 1% in Phosphate Buffer, pH 7.4	1 Liter

Glutaraldehyde 2.5% Aqueous

0-5°C	16537-16	Glutaraldehyde 2.5% , Aqueous	10x10ml
0-5°C	16537-17	Glutaraldehyde 2.5% Aqueous	500ml
0-5°C	16537-18	Glutaraldehyde 2.5% Aqueous	1 Liter

Glutaraldehyde 3.0% Aqueous

0-5°C	16537-19	Glutaraldehyde 3% Aqueous	100ml
0-5°C	16537-20-S	Glutaraldehyde 3% Aqueous	500ml
0-5°C	16537-21	Glutaraldehyde 3% Aqueous	1 Liter

Glutaraldehyde 3.0% Paraformaldehyde 3% in 0.1M Phosphate Buffer, pH 7.4

0-5°C	16538-06	Glutaraldehyde 3% Paraformaldehyde 3% in Phosphate Buffer, pH 7.4	10x10ml
0-5°C	16538-07	Glutaraldehyde 3% Paraformaldehyde 3% in Phosphate Buffer, pH 7.4	500ml
0-5°C	16538-08	Glutaraldehyde 3% Paraformaldehyde 3% in Phosphate Buffer, pH 7.4	1 Liter

Glutaraldehyde 4% in 0.1M in Sodium Cacodylate Buffer, pH 7.4

0-5°C	16539-06	Glutaraldehyde 4% in 0.1M Sodium Cacodylate Buffer, pH 7.4	10x10ml
0-5°C	16539-07	Glutaraldehyde 4% in 0.1M Sodium Cacodylate Buffer, pH 7.4	500ml
0-5°C	16539-08	Glutaraldehyde 4% in 0.1M Sodium Cacodylate Buffer, pH 7.4	1 Liter

Glutaraldehyde 5.0% Aqueous

0-5°C	16539-15	Glutaraldehyde 5% Aqueous	10x10ml
0-5°C	16539-20	Glutaraldehyde 5% Aqueous	500ml
0-5°C	16539-25	Glutaraldehyde 5% Aqueous	1 Liter

Glutaraldehyde 5% in 0.1M Phosphate Buffer, pH 7.4

0-5°C	16539-30	Glutaraldehyde 5% in 0.1M Phosphate Buffer, pH 7.4	10x10ml
0-5°C	16539-35	Glutaraldehyde 5% in 0.1M Phosphate Buffer, pH 7.4	500ml
0-5°C	16539-40	Glutaraldehyde 5% in 0.1M Phosphate Buffer, pH 7.4	1 Liter

► Glutaraldehyde/Formaldehyde Fixative (Karnovsky's)

This fixative contains 3% glutaraldehyde and 2% formaldehyde in 0.1M phosphate buffer, pH 7.4

Karnovsky's with formalin 2% and Biological glutaraldehyde 3% in 0.1m Phosphate Buffer

0-5°C	15731-10	Karnovsky Fixative Reagent Grade	1 L
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Karnovsky's with paraformaldehyde solution and EM grade glutaraldehyde

0-5°C	15732-10	Karnovsky Fixative EM Grade	1 L
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Please Note: This kit can be formulated to fit your requirements. Please contact us.**► Glutaraldehyde Spill Control; G-gard-ER**

Transforms glutaraldehyde to a nearly neutral solution and renders the solution acceptable for sewer disposal. Prepares glutaraldehyde for biodegradation. Reduces biocidal activity and odor. 65g G-gard pre-treats one gallon of 1% solution.

RT	24142-01	Glutaraldehyde Spill Control	64 g
RT	24142-10	Glutaraldehyde Spill Control	10 x 64 g

TECHNICAL TIP**The Use of Glutaraldehyde, Acrolein, and Paraformaldehyde Buffer**

2.5% Glutaraldehyde, 1.0% Acrolein, 0.1% Para-formaldehyde, 20mM MgCl₂ buffer with 0.09M Sodium Cacodylate to pH 7.4. This fixative preserves the structure of both hair cells and neurons of the organ of corti. (Siegel and Brownell 1986)

FIXATIVES, PREPARED

➤ HISTOCHOICE™ MB® *

The Molecular Biology Fixative

- **SAFE** - Contains no Formaldehyde, Glutaraldehyde or Mercury
- **NON-TOXIC** – Is completely odorless and can be safely disposed of down the drain

HISTOCHOICE™ MB® Tissue Fixative is the first fixative designed for the molecular biologist. It is specialty formulated to preserve antigenic sites for antibody probes and nucleic acid sites for immunohistochemistry. HISTOCHOICE™ MB® replaces formaldehyde based, alcohol based, Zenkers, B-5, B-3, Bouin's and other fixatives with superior results. Tissue fixed in HISTOCHOICE™ MB® exhibit vibrant staining, better nuclear and cytoplasmic detail, and will retain a crisp appearance even after long-term fixation.

Because this formula is designed specially for molecular biology applications, HISTOCHOICE™ MB® fixed sections do not require pre-digestion or other recovery procedures to make important sites available. This means you spend less time preparing slides and more time doing research.

More than a fixative, HISTOCHOICE™ MB® is a preservative that leaves antigens and nucleic acids in their native state, allowing binding for specific probes. Primary antibodies can often be diluted several-fold due to the increased number of preserved antigenic sites, saving cost on every slide you process.

HISTOCHOICE™ MB® fixed tissue retains a much more natural look and feel than formalin fixed tissue. It is important to remember that these tissues are not fixed by formalin, but rather preserved by HISTOCHOICE™ MB®.

RT	64115-01	HISTOCHOICE™ MB® Fixative	1 L
RT	64115-04	HISTOCHOICE™ MB® Fixative	4 L
RT	64115-44	HISTOCHOICE™ MB® Fixative	4 x 4 L

* HISTOCHOICE™ is registered name of Amresco

➤ Hollande's Fixative

A modification of Bouin's solution. It is stable and will decalcify small bone specimens. Tissue that is fixed with Hollande's can be stained successfully with most stains, and the cupric acetate in the solution stabilizes red blood cell membranes and eosinophil and endocrine cell granules so that less lysis occurs than with Bouin's solution. Hollande's is widely used as a fixative for biopsy specimens of the gastrointestinal tract.

Thorough washing of the fixative prior to placing the specimen in a phosphate buffered formalin solution is necessary because the salts present in the solution will form an insoluble phosphate precipitate. Packaged in leak-proof histo-containers; prefilled ready-to-use.

Cat.#	Cup Size	Filled	Pack/cs
RT 64120-10	15 ml	10 ml	50/cs
RT 64120-20	30 ml	20 ml	50/cs
RT 64120-30	60 ml	30 ml	20/cs

Bulk packaging is available:

RT 64120-01	Hollande's Fixative	1 L
RT 64120-04	Hollande's Fixative	4 L

➤ McDowell Trumps Fixative

RT 18030-05	McDowell Trumps Fixative	500 ml
RT 18030-10	McDowell Trumps Fixative	1 L

➤ Michel's Fixative, pH 7.0 – 7.4

RT 18040-05	Michel's Fixative	500 ml
RT 18040-10	Michel's Fixative	1 L
RT 18040-20	Michel's Fixative Pre-filled	20 x 10 ml

TECHNICAL TIP

Tissue Biopsy in Michel's Fixative

Place tissue biopsy in Michel's fixative for 24-48 hours and then wash the tissue with Michel's Buffer three changes a minimum of 10 minutes each change and freeze at -70°C.

➤ Mirsky's Fixative™

- **Saponin/Glyoxylate Fixative**
- **Preserves Immunohistological activity**
- **Contains no formaldehyde**
- **Fast-acting**



Mirsky's Fixative™ is a superior fixing agent for use in immunohistological and immunological protocols. Mirsky's contains no formaldehyde or glutaraldehyde. Therefore, it has considerably reduced toxicity and virtually no odor. Mirsky's Fixative is neutral, buffered, and isotonic (308 mOsmol). Additionally, Mirsky's Fixative does not contain toxic or hazardous buffers such as cacodylate or barbital. Hardening or shrinkage of tissue is considerably reduced.

Double reactive sites afford excellent cross-linking properties while maintaining sample enzyme activity. Samples processed in Mirsky's Fixative for light microscopy can subsequently be used in electron microscopy procedures. Special buffer systems may be used in place of the buffer provided.

Use as replacement for formalin and/or glutaraldehyde fixatives in immunohistological and immunocytological staining protocols. Tissue size is unlimited, as long as the sample is no thicker than 0.5cm in at least one plane to assure uniformity of tissue penetration. The gross visual appearance will be different than in formaldehyde and tissue may seem "raw". This is due to double site binding of the fixative with a resultant reduction in tissue shrinkage. Microscopic examination of tissue morphology will be noticeably improved. This material is intended to maintain enzyme and antibody activity. For best results, tissue section of high digestive enzyme content should be thoroughly rinsed in saline solution before fixation (e.g. trypsin in intestinal samples). Once fixed, tissue may be retained in Mirsky's Fixative and ethanol indefinitely.

Mirsky's Fixative is normally distributed as a concentrated two bottle system, although high through-put laboratories often use the single bottle ready-to-use format. The two bottle system is comprised of Mirsky's Fixative 10X Concentrated and Mirsky's Fixative 10X Buffer. To reconstitute to working strength, add 1 part Mirsky's Fixative 10X Buffer to 8 parts distilled or deionized water, mix thoroughly, then add 1 part Mirsky's Fixative 10X Concentrate and mix again.

The two bottle system has a shelf life of 12 months while the ready-to-use format has a shelf life of 30 days.

RT 15560	Mirsky's Fixative System	200 ml
RT 15561-05	Mirsky's Fixative Ready-to-Use	500 ml
RT 15561-10	Mirsky's Fixative Ready-to-Use	1L
RT 15561-20	Mirsky's Fixative Ready-to-Use	2L

➤ Russell's Zenker Fixative (Russell's Modified Zenker)

Due to the hazardous nature of mercury, Zenker's fluid is no longer available however in place of it we are offering Russell's Zenker Fixative, which contains Zinc Chloride, and the staining results produced by this fixative are comparable to those of Zenker's Stock solution. Russell's Modified Zenker's is used in the same manner as Zenker's stock solution.

RT 64123-05	Russell's Modified Zenker's Solution	500 ml
RT 64123-06	Russell's Modified Zenker's Solution	1 L

➤ **Fluorescein Isothiocyanate, Isomer I, Certified**

(FITC)
 $C_{21}H_{11}NO_5S$ F.W. 389.39 CAS #3326-32-7
 Assay >90%
 Water soluble.

0-5°C **15670** 1/2gm

➤ **Fluoromount-G, Slide Mountant**

See *Adhesives and Mountants, page 18, 516* >>>>

➤ **Formamide, Ultra High Purity**

$HCONH_2$ F.W. 45.04 CAS #75-12-7
 Specific Gravity: 1.128-1.132 pH 7.1
 Glass Distilled. Exceeds A.C.S. Specifications

Specifications:

Assay99.9%
 Iron0.5ppm
 Copper0.1ppm
 Lead0.5ppm
 Zinc0.5ppm

RT **15745** 100ml
 RT **15746** 500ml
 RT **15747** 4x500ml

➤ **Formic Acid 96%, Reagent, A.C.S.**

$HCOOH$ F.W. 46.03 CAS #64-18-6
 Specific Gravity: 1.22

RT **15750** 225ml
 RT **15760** 1 liter

➤ **Formvar 15/95 Resin, Powder**

CAS #63450-15-7
 Polyvinyl formvar desiccated. Used to prepare Support films.
 Soluble in ethylene dichloride, chloroform or dioxane.

RT **15800** 100g

➤ **Formvar Solution in Ethylene Dichloride**

Microfiltered-ready to use.

RT **15810** 0.25% 100ml
 RT **15820** 0.50% 100ml
 RT **15830** 1.00% 100ml

TECHNICAL TIP: A Full-Proof Method for Mounting Serial Sections on Single Hole Grids. **For a complete description of this method, see page 120** >>>>

➤ **Gach Kit**

See *Embedding Media Kits, page 93* >>>>

RT **15920** kit

TECHNICAL TIP

Preparation of Gelatin Adhesive

To prepare gelatin-chrome alum adhesive: Dissolve 5g gelatin in 1000ml of distilled water. Warm up to 50°C and then add 0.5g of chromium potassium sulphate. To obtain good adherence, slides coated with this solution must be dried before mounting the sections.

➤ **Gelatin, Powder, U.S.P.**

CAS #9000-70-8
 Solubility: 12% in H_2O at 20°C pH (1% in H_2O): 3.5-5.0
 Residue after ignition: <2%

■ **Type A-from Porcine skin (acid cured tissue)**

■ **Type B-from Bovine skin (base cured tissue)**

The strength of the gel is based on the bloom number. The higher the bloom number the stronger the gel.

■ **Used as a combination Acrylamide-Gelatin-Jung resin for cryosectioning of large and soft tissues (eggs, fishes, insects) Hartmann, R. (1984). A new embedding medium for cryosectioning eggs of high yolk and lipid content. Eur. J. Cell Biol., 34:206**

■ **Used to prepare gelatin-chrome alum adhesive to coat glass slides for mounting semi-thin sections for staining.**

RT	16560	Gelatin, Type A; ≈ 60 Bloom	100g
RT	16562	Gelatin, Type A; ≈ 175 Bloom	100g
RT	16564	Gelatin, Type A; ≈ 300 Bloom	100g
RT	16566	Gelatin, Type B; ≈ 75 Bloom	100g
RT	16568	Gelatin, Type B; ≈ 225 Bloom	100g

➤ **Giemsa Solution, C.N.#DcGe-19**

Ingredients:

Glycerin (cas# 56-81-5):61%
 Methyl Alcohol (cas# 67-56-1): 38.3%
 Azur II (cas# 37247-10-2) :0.16%
 Azur II Eosin (cas# 53092-85-6):0.6%

Specific Gravity: 0.89

Differentiates types of leucocytes, bacteria and inclusion bodies.
 Giemsa, Centralbl. F. Publ., Abt. 1,37, 308 (1904) Stain for thick blood films; shows malarial parasites. Barber and Komp, Publ. Health Rep., 44, 2330 (1929) Bone marrow and stain for showing cell morphology; together with May-Grunwald Solution for pap staining. Pappenheim, Folia Haemat., 13, 338 (1912)

RT **15940** Giemsa Stain Solution 100ml

➤ **Giemsa Stain, C.N.#DcGe-19, Powder**

CAS #51811-82-6

RT **15942** 10 g

For our Giemsa Stain Solution, see the Histology Section page 473 >>>>

For our Differential Quick Staining Kit (Modified Giesma) Stain Solution, see the Histology Section, page 473 >>>>

➤ **Gill's Hematoxylin Staining Solution**

Gill's Hematoxylin is a specially formulated solution for use as a biological stain for the nuclei and nuclear chromatin of normal and abnormal cells whether in whole or sliced cells. Our Gill's Hematoxylin is designed to use at its full strength. It is microfiltered prior to shipment; therefore, filtration before use is not required. For repeated use further filtration is recommended. At the discretion of the user, the Gill's Hematoxylin No. 2 and No. 3 may be diluted with ethylene glycol (25% is recommended) to produce a weaker stain solution.

RT	26030-10	Gill's Hematoxylin No. 1	1 L
RT	26030-14	Gill's Hematoxylin No. 1	4 L
RT	26030-20	Gill's Hematoxylin No. 2	1 L
RT	26030-24	Gill's Hematoxylin No. 2	4 L
RT	26030-30	Gill's Hematoxylin No. 3	1 L
RT	26030-34	Gill's Hematoxylin No. 3	4 L

➤ **Glycerine, Reagent, A.C.S.**

(Glycerol) $C_3H_5(OH)_3$ F.W. 92.10 CAS #56-81-5
 Specific Gravity: 1.23
 Assay<99.5%
 Residue after Ignition0.005%
 Chlorinated Compounds(as Cl)0.003%
 SulfateTo Pass Test
 Heavy Metals (as Pb)0.0002%
RT 16550 450ml

➤ **(GMA), Glycol-Methacrylate, Low Acid**
(2-Hydroxyethyl methacrylate monomer, inhibited; HEMA)

$C_6H_{10}O_3$ F.W. 130.14 CAS#868-77-9
 Specific Gravity: 1.07
 b.p. 67°C
 Inhibited with approximately 330ppm MEHQ
 A water soluble monomer
RT 16800 450 ml

ARTICLE OF INTEREST

Preparation of Glycol Methacrylate

Methods for preparing standardized glycol methacrylate (GMA) based embedding media for use in light microscopy in a rational, precise and reproducible manner are described. The application of these procedures resulted in a versatile, low toxicity GMA embedding medium.

Please refer to: P. O. Gerrits, B. Eppinger, H. V. Goor, and R. W. Horobin. (1991). A Versatile, Low Toxicity Glycol Methacrylate Embedding Medium for Use in Biological Research, and for Recovered Biomaterials Prostheses. *Cell & Materials*. 1: 189-198.

➤ **GMA-PEG Embedding Kit**

Polyethylene Glycol- Glycol methacrylate mixture.

See Embedding Media Kits, page 94 >>>>

14250 kit

➤ **GMA Embedding Kit**

See Embedding Media Kits, page 93 >>>>

14200 kit

➤ **Gold Chloride, Hydrate**

(Chlorauric Acid; Hydrogen Tetrachloroaurate)

$H(AuCl_4) \cdot H_2O$ F.W. 357.79 CAS #16961-25-4
 Assay99.9985%
 Gold contents49%+

A highly purified gold compound for the preparation of Colloidal Gold sols. Preweighed to facilitate your work.
 (Preparation instructions for Gold Sols included)

RT 16580	10x1/10g	bx
RT 16582	10x1/2g	bx
RT 16583	1g	g
RT 16584	10x1g	bx

For our Gold Chloride Solutions, see page 459 >>>>

Also see Tannic Acid, used to prepare gold sols, page 65 Cat. #21710 >>>>

➤ **Gram's Iodine Solution**

For use as a bacterial, fungal and inclusion body stain.

RT 26054-05	Gram's Iodine Solution	500ml
RT 26054-06	Gram's Iodine Solution	1 L

➤ **Graphite Adhesives**

See Adhesives and Mountants, page 13 >>>>

For our Gum Mastic, see page 459 >>>>

➤ **Graphene**

For our Graphene products, see page 140-141 >>>>

➤ **Hanks' Balanced Salt Solution (HBSS)**

All of our Hanks' Balanced Salt Solutions contain: Potassium Chloride, Potassium Phosphate Monobasic, Sodium Chloride, Sodium Phosphate Dibasic, and D-Glucose. Some formulations may contain additional components. Use the table below as a quick reference for identifying the one that best suits your application. All solutions are prepared in 1X strength.

Ingredients	F.W.	Formula I	Formula II	Formula III
KCl	74.56	X	X	X
NaCl	58.44	X	X	X
Na ₂ HPO ₄ · 7H ₂ O	268.07	X	X	X
D-Glucose	180.16	2 g/L	1 g/L	—
MgSO ₄ · 7H ₂ O	246.48	X	X	X
CaCl ₂ · 2H ₂ O	147.02	X	X	X
KH ₂ PO ₄	136.09	X	X	X
NaHCO ₃	84.01	X	X	X
Phenol Red		0.02 g/L	0.02 g/L	0.015 g/L

RT 11768-05	HBSS, Formula I, 0.179M	500 ml
RT 11768-10	HBSS, Formula I, 0.179M	1 L
RT 11769-05	HBSS, Formula II, 0.155M	500 ml
RT 11769-10	HBSS, Formula II, 0.155M	1 L
RT 11770-05	HBSS, Formula III, 0.147M	500 ml
RT 11770-10	HBSS, Formula III, 0.147M	1 L

➤ **Harris' Hematoxylin**

Stain selectivity for nuclei, fat and lipids. Ready-to-use.

RT 26041-05	Harris' Hematoxylin	500ml
RT 26041-06	Harris' Hematoxylin	1 L

➤ **Hematoxylin, Certified, C.I.#75290**

(Natural Black I, Hydroxybrasilin)

$C_{16}H_{14}O_6$ F.W. 302.29 CAS #517-28-2

Solubility: 10.0% Water; 10.0% Alcohol; 9.5% Cellosolve; 10% Glycol; 0.0% Xylene. A certified biological stain used in histology and cytology and plastic embedded tissues.

Chen, Chang, S., *J Arch. of Path.*, 93,334 (1972).

RT 16620		10g
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For our Hemotoxylin Solutions, page 473 >>>>

TECHNICAL TIP

Staining Tips With Hematoxylin

1. Check a slide from each batch of slides during times the workload is heavy to insure good staining by the Hematoxylin.
2. Do not allow the slides to dry out at any point during your staining procedure.
3. Increase your staining time in Hematoxylin for tissues that have been in fixative longer than normal.
4. Increase your staining time by at least 1/3 for autopsy tissues.
5. Do not agitate the slides if you are using Ammonia water to Blue. The tissues are more susceptible to washing off if you agitate the slides.
6. Check the pH of the Hematoxylin daily.

➤ **Hepes 0.2M Buffer Solution,**
See page 27 >>>>

RT **11494** 500ml

➤ **Hepes, Crystal, Biological Buffer**

(N-2-Hydroxyethylpiperazine-N'-2-Ethanesulfonic acid)

C₈H₁₈O₄N₂S F.W. 238.30 CAS #7365-45-9

Assay>99%

pKa @20°C7.55

pH Range7.0-8.0

A₂₆₀ (1.0M in H₂O)<0.05

Ash<0.1%

Good's buffer.

RT **16780** 25g

RT **16782** 100g

➤ **(HMDS), Hexamethyldisilazane, Reagent**

(CH₃)₃SiNHSi(CH₃)₃ F.W. 161.40 CAS #999-97-3

b.p. 126.7°C

Assay>97.0%

Specific Gravity @25°C 0.774

Refractive Index @20°C: 1.407

■ For fast preparation of soft insect tissues for SEM. A good substitution for critical point drying. *Int. J. Insect Morph. Embryol.*, 12(4), 201 (1983) *Stain Tech.*, 58(6), 347 (1983)

■ Bray, D.F., Et-al. (1993). *Micros. Res. and Technique*. 26:489-495. A comparison of HMDS, Peldri II, and critical point drying methods for SEM of biological specimens.

RT **16700** 100ml

➤ **Hexamethylenetetramine,**
A.C.S. Reagent, Granular

(Urotropine; Methenamine)

C₆H₁₂N₄ F.W. 140.19 CAS #100-97-0

Assay99.0-100.5%

Residue after Ignition0.1%

Chloride0.014%

SulfateTo Pass Test

Heavy Metals0.001%

Used in silver stains.

Swift, J.A. (1968) *Microsc. Soc.* 88, 449.

RT **16710** 50g

RT **16710-25** 25g

➤ **Hexylene Glycol, Reagent, A.C.S.**

(2-Methyl-2,4-pentanediol)

(CH₃)₂C(OH)CH₂CH(OH)CH₃ F.W. 118.18 CAS #107-41-5

Specific Gravity @25°C-0.923

A.C.S. Specifications:

Assay99%

IR SpectrumTo Pass Test

Refractive Index @20°C0.921-0.923

Mixed with water in all proportions. Used as a dehydrating agent for fat tissues.

RT **16740** 450ml

RT **16750** 4x450ml

For our Histo Choice Fixatives, see page 45, 458 >>>>

➤ **HPMA Embedding Kit**

See Embedding Media Kits, page 94 >>>>

RT **14220** kit

➤ **HRP-Conjugate Diluent**

Specifically designed for preparing solution of your HRP-conjugate used as the detection reagent. **For more information, see page 617.**

Cat. #	Description	Qty.
4-8°C 62716	HRP Conjugate Diluent	50 ml
4-8°C 62717	HRP Conjugate Diluent	125ml
4-8°C 62718	HRP Conjugate Diluent	500 ml

➤ **Hydrochloric Acid Solution 0.1N**

HCl CAS #7647-01-0

Used to adjust the pH of buffers and fixative solutions.

RT **16760** 100ml

➤ **Hydrochloric Acid Solution 1N**

HCl CAS #7647-01-0

Used to adjust the pH of buffers and fixative solutions.

RT **16770** 100ml

For all our Hydrochloric Acid Solutions, see page 460 >>>>

➤ **Hydrogen Peroxide 30% Solution-**
Stabilized, Reagent, A.C.S.

H₂O₂ F.W. 34.01 CAS #7722-84-1

Assay29-32%

Maximum of Impurities:

Chloride(Cl)0.0003%

Nitrate0.0002%

Phosphate0.0002%

Sulfate0.0005%

Heavy Metal0.0001%

Iron0.00005%

Titrateable Acid0.0006meq/g

RT **16790** 100ml

RT **16792** 450ml

➤ **2-Hydroxyethyl Methacrylate**

(GMA) Glycol methacrylate. **See GMA page 47** >>>>

RT **16800** 450ml

For all our Hydroquinone Solutions, see page 460 >>>>

➤ **(HPMA), 2-Hydroxypropyl Methacrylate**

(Propylene glycol monomethacrylate)

C₇H₁₂O₃ F.W. 144.17 CAS #27813-02-1

b.p. 70°C/1mmHg

Specific Gravity @25°C 1.028

Solubility in Water: 13%

Inhibited with approx. 300ppm MEHQ.

A water miscible monomer.

RT **16900** 450ml

RT **16901** 4x450ml

➤ **Imidazole, Reagent**

(Glyoxaline) C₃H₄N₂ F.W. 68.08 CAS #288-32-4

Assaymin 99.5%

Imidazole is a lipid-enhancing buffer agent. When used with 4% osmium tetroxide solution in the post-fixation of tissue blocks, it produces a prominent electron-opaque staining of lipid droplets with no evidence of diffusion.

Reference: Angermuller, S. Fahimi, H., *Histochem. Journal* 14, 823-35 (1982)

RT **16905** 100g

➤ Immersion Oils

Which Type—Which Application?

For Normal Light Microscopy:

Types A & B, with viscosities of 150 and 1250cSt respectively, meet these requirements. The greater the gap between the cover glass and objective, or condenser and slide, the more desirable high viscosity becomes. For extremely large gaps, type NVH should be used. All Cargille Immersion Oils can be blended for intermediate viscosities.

➤ Immersion Oils

Cargille PCB-Free Immersion oils were introduced in 1972. Today, no other immersion oil meets FDA criteria. Now four standard types are available with the introduction of Type NVH, a very high viscosity oil. All Cargille Immersion Oils meet DIN 58 884 (Deutsched Institut Fur Normung e.V.)

➤ 37°C Immersion Oils

A number of research projects require microscopic studies at internal body temperature. Since the index/temperature relationship is inverse, increasing temperature significantly reduces the index of the immersion oil and consequently the imagery deteriorates. This problem has been resolved by the formation of Cargille 37°C immersion Oils, which have an index of 1.515@37°C.

Consideration of these oils is also suggested where stage temperatures are elevated by sub-stage illuminators and high wattage projection equipment.

➤ Immersion Oil Type 300

Automated Hematology Systems: Use Type 300; Automated Hematology Systems depend on accurate, precisely controlled physical and optical properties of immersion oil for successful imaging and mechanical processing. Type 300 is designed and manufactured to meet the stringent requirements of this equipment, which include

specialized viscosity and exacting controls for its consistency.

For Horizontal, Inverted & Inclined Instruments and Project Equipment:

Higher viscosities are generally required. Type NVH meets the requirement, having a viscosity of 21,000cSt.

➤ Immersion Oils NVH and OVH Inverted, Inclined, Projection, and Long Focus

Intruments: Use type NVH or OVH; The greater the gap between the cover glass and objective, or between the slide and condenser, the more desirable high viscosity becomes. The very high viscosities of Type NVH at 21,000 cSt and Type OVH at 46,000 cSt give excellent results for these applications.

For Fluorescence Microscopy:

After years of development and field testing, we now have available two new PCB-Free Immersion Oils for Fluorescence Microscopy.

➤ Immersion Oil Type HF

Type HF provides low fluorescence and the correct optical properties.

➤ Immersion Oil Type FF

Type FF has virtually no background fluorescence which makes it ideal for observing low levels of fluorescence. It is highly stable, water white, and non-hygroscopic. Type FF can be substituted for all other fluorescence microscopy immersion oils in nearly all fluorescence applications.

➤ Immersion Oil LDF:

Extremely low fluorescence is achieved by Type LDF. It is the replacement of choice for the DF which is no longer being manufactured. The LDF possesses the highest resolution of the oils for fluorescence applications



RT	16907-01	Type A	1oz.
RT	16907	Type A	4oz.
RT	16907-16	Type A	16oz.
RT	16908-01	Type B	1oz.
RT	16908	Type B	4oz.
RT	16908-16	Type B	16oz.
RT	16909-01	Type NVH	1oz.
RT	16909	Type NVH	4oz.
RT	16914-01	Type 37	1oz.
RT	16909-04	Type 37	4oz.
RT	16915-01	Type HF	1 oz.*
RT	16915-04	Type HF	4 oz.
RT	16916-01	Type FF	1 oz.*
RT	16916-04	Type FF	4 oz.
RT	16917	Type 300	1oz
RT	16917-01	Type 300	4 oz
RT	16917-16	Type 300	16 oz
RT	16918	Type OVH	1 oz
RT	16918-01	Type OVH	4 oz
RT	16918-16	Type OVH	16 oz
RT	16919	Type LDF	1 oz
RT	16919-01	Type LDF	4 oz
RT	16919-16	Type LDF	16 oz.

* 1 oz. applicator bottles have a glass ball rod in the cap.

Optical and Physical Properties:

Immersion Oil	Standard			Special			Fluorescent			
	Type A	Type B	Type 300	Type NVH	Type 37*	Type OVH	Type LDF	Type HF	Type FF	
Refractive Index:	@23°C	@23°C	@23°C	@23°C	@37°C	@23°C	@23°C	@23°C	@23°C	
F Line (4861 Å)	1.5239	1.5236	1.5238	1.5230	1.5238	1.5230	1.5239	1.5234	1.4850	
E Line (5461 Å)	1.5180	1.5180	1.5180	1.5178	1.5180	1.5178	1.5178	1.5181	1.4810	
D Line (5893 Å)	1.5150	1.5150	1.5150	1.5150	1.5150	1.5150	1.5150	1.5150	1.4790	
C Line (6563 Å)	1.5114	1.5115	1.5116	1.5118	1.5115	1.5118	1.5115	1.5117	1.4766	
Dispersion:	$n_F - n_C$	0.0125	0.0119	0.0123	0.0113	0.0123	0.0111	0.0125	0.0118	0.0084
Abbe V_D	41.3	43.2	41.8	45.7	42.0	46.3	41.3	43.7	45.3	
Abbe V_e	41.0	42.8	41.5	45.4	41.7	46.0	41.0	43.6	45.8	
Temperature Coefficient (15-35°C) - dn_D/dt	-0.00033	-0.00031	-0.00033	-0.00034	-0.00035	-0.00034	-0.00036	-0.00038	-0.00037	
Stability (change in n_D @25°C after 24 hrs at stated temperature) *	60°C: 0 100°C: 0	0 0	0 0	0 0	0 0	0 0	-0.0004 -0.0043	0 +0.0006	0 0	
Fluorescence ^a :	Short UV: low Long UV: low	low low	low low	low low	low low	low low	very low very low	very low very low	none none	
Color: (Gardner)	1	1	1	1	1	<3	<1	<1	<1	
Viscosity: Centistokes +/-10% @ 23°C:	150 low	1250 high	300 medium	21,000 very high	1250 ^b high	46000 very high	500 medium	700 medium	170 low	
Density: @ 23°C g/cc: (US) lb/gal	.923 7.70	.923 7.70	0.923 7.70	.919 7.67	0.917 7.73	0.918 7.66	0.984 8.21	.9306 7.77	0.877 7.32	
Cloud Point:	<-13°C	<-13°C	<-13°C	<-13°C	<-13°C	<-13°C	<-14°C	<-6°C	<-6°C	
Flash Point (Cleveland Open Cup):	325°F	325°F	325°F	325°F	325°F	325°F	171°F	340°F	420°F	
Neutralization: (mg KOH/gm)	0.01 max.	0.01 max.	0.01 max.	0.01 max.	0.01 max.	0.04 max.	<0.01 max.	0.03max	0.01max	

^aRelative to Cedarwood Oil

^bThese values for type 37 are standardized at 37°C

^cType 37 is 3800 cSt at 23°C

► Immuno-Bed™ Embedding Kit

See *Embedding Media Kit, Page 94* >>>>

► ImmunoHistoZyme™, Ready-to-Use

ImmunoHistoZyme is used for proteolytic digestion of formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. **For more information, see page 616.**

2-8°C	64142-13	ImmunoHistoZyme	15 ml
2-8°C	62142-14	ImmunoHistoZyme	100 ml

► Indigo Carmine, Certified, C.I. #73015

(Acid Blue 74; Carmine Blue; Indigotine 1, 1A)

$C_{16}H_8N_2O_6S_2Na_2$ F.W.466.36 CAS #860-22-0

Dye content: approx. 85%

Solubility: 1.3% Water; 0.0% Alcohol; 4.0% Cellosolve; 2.85% Glycol; 0.0% Xylene

Shunway's stain for animal embryos. Used with Acid Fuchsin for staining Negri bodies. *Stain Tech.*, 5, 34 (1928)

Counterstain to Hematoxylin for staining vaginal smears. *Am. J. Anat.*, 61, 505 (1937).

RT	16910		25g
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TECHNICAL TIP

Achieving Maximum Contrast with Stain

When a stain is applied both en-bloc and as a post-stain for thin sections, maximum contrast will be achieved.

► Indium Trichloride, Anhydrous

$InCl_3$ F.W. 221.18 CAS #10025-82-8

Chloride Content: 98%

A metal stain for nucleic acid.

J. Biophys Biochem Cytol., 11,257 (1961)

RT	16920		5g
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► Ingrain Blue, C.I. #74240

See *Alcian Blue 8GX, page 22, 468* >>>>

RT	10350		25g
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► Isopropyl Alcohol, Reagent, A.C.S.

(2-Propanol) $CH_3CH(OH)CH_3$ F.W. 60.10 CAS #67-63-0

A.C.S. Specifications:

Color (APHA)10

Density @ 25°C.....0.781-0.783

Boiling Range (including 82.3°C).....1°C

Titrateable Acid or Base0.0001 meq/g

Residue after Evaporation0.001%

Solubility in waterTo pass test

Water0.2%

RT	16930		1qt
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RT	16931		4x1qt
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► JB-4™ Embedding Kit,

See *Embedding Media Kit, page 94, 495* >>>>

► Karnovsky's Fixative, See page 44, 454, 457 >>>>

0-5°C	15720		1 kit
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0-5°C	15730		5 kit/bx
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TECHNICAL TIP

Elimination of Section Contamination During Staining

To eliminate section contamination during the staining procedure please refer to:

Mollenhauer, H.H. and Morre', D.J. (1978). Contamination of thin sections, cause and elimination. *Proc. 9th Int. Cong. Electron. Microsc.*, Vol.II, p.78

Mollenhauer, H.H. (1986b). Stain contamination and embedding in electron microscopy. *Proc. 44th Ann. Meet. EMSA*, p.50. San Francisco Press, San Francisco

Kuo, J., et al (1981). Forming and removing stain precipitates on ultrathin sections. *Stain Technol.*, 56:199

► Kinyoun's Solution

Kinyoun's carbol fuchsin staining solution for acid-fast bacteria.

RT	26087-05	Kinyoun's Solution	500 ml
RT	26087-06	Kinyoun's Solution	1 L

► Lanthanum Nitrate, Hexahydrate, Reagent

$La(NO_3)_3 \cdot 6H_2O$ F.W. 433.03 CAS #10277-43-7 m.p. 40°C

AssayMin 99.9%

Calcium0.001%

Magnesium.....0.0001%

A metal stain, intracellular tracer.

■ Lane, N.J. and Treherne, J.E. (1970). Lanthanum staining of neurotubules in axons from cockroach ganglia. *J. Cell Sci.*, 7:217

■ Lane, N.J. (1972) Fine structure of a lipodipteran nervous system and its accessibility to peroxidase and lanthanum. *Z. Zellforsch.*, 131:205.

RT	17300		50g
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► Lead Acetate, Trihydrate Reagent, A.C.S.

$Pb(CH_3COO)_2 \cdot 3H_2O$ F.W. 379.33 CAS #6080-56-4

A.C.S. Specifications:

Assay99.0-103.0%

Chloride5ppm

Copper0.002%

Insoluble Matter0.01%

Iron.....0.001%

Nitrate and Nitrite (as NO_3).....To pass test

RT	17600		100g
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RT	17600-25		25g
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► Lead Citrate, Trihydrate

$Pb_3(C_6H_5O_7)_2 \cdot 3H_2O$ FW 1053.82 CAS #512-26-5

Minimum assay99.9%

The most widely used metal stain for ultra thin sections.

■ Reynolds, E.S., *J. Cell Bio.*, 17, 208 (1963)

■ Sato, T., *J. Electron Micro.*, 116, 133 (1976)

■ Venable, J.H. and Coggshall, R. (1965). A simplified lead citrate stain for use in electron microscopy. *J. Cell Biol.*, 25:407

■ Famy, A. (1967). An extemporaneous lead citrate for electron microscopy. *Proc. 25th Ann. EMSA Meet.*, p.148. Claitor's Pub. Division, Baton Rouge, LA.

RT	17800		25g
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RT	17810		100g
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➤ **Lead Nitrate, Reagent, A.C.S.**

Pb(NO₃)₂ F.W. 331.21
 CAS #10099-74-8
 Minimum Assay99.5%
 Insoluble matter0.005%
 ReactionNot less than pH 3.5
 Chloride0.0005%
 Calcium0.01%
 Copper0.0005%
 Iron0.0005%
 Potassium0.002%
 Sodium0.002%
 A metal stain for ultra thin sections.
 Sato, T., (1967) J. Electron Micro., 16, 733

RT 17900 25g

➤ **Light Green SF Yellowish, Certified, C.I. #42095**

(Acid Green 5; Light Green 2G, S or 2GN;
 Acid Green F; Fast Acid Green N)
 C₃₇H₃₄N₂Na₂O₉S₃ F.W. 792.86
 CAS #5141-20-8
 Solubility: 20.35% Water; 4.0% Alcohol;
 5.25% Cellosolve; 12.0% Glycol; 0.0% Xylene

RT 17920 10 g

➤ **Light Green Solution**

Light SF Yellowish, 0.2% in 0.2% acetic acid for use in the GM Method; as a fungal stain.

RT 26085-05 Light Green Solution 500ml
 RT 26085-06 Light Green Solution 1 L

➤ **(SPURR), Low Viscosity, Embedding Kit,**

See Embedding, page 96 >>>>

RT 14300 kit

➤ **Lowicryl, Embedding Kit**

See Embedding, page 96 >>>>

RT 14330 Lowicryl K4M. kit
 RT 14340 Lowicryl HM20 kit
 RT 14350 Lowicryl K11M kit
 RT 14360 Lowicryl HM23 kit

➤ **Lowicryl MonoStep Single Component Embedding Media**

The same as our Lowicryl complete kits but this new formulation allows you one stop embedding without all of the cumbersome preparation and mixing. This pre-mixed, ready to use resin, saves you time and minimizes chemical contact. MonoStep Lowicryl is ideal for use in Immunohistochemistry, and immunolabeling. Store at room temperature.

RT 14335 Lowicryl K4M Polar Embedding Medium; Monostep 225g
 RT 14345 Lowicryl HM-20 Non-Polar Embedding Medium; Monostep 225g

Lead Solutions and Staining

I. Common Lead Stock Solutions

The following are some Lead Stock solutions, which are commonly used:

A. Lead Staining stock solution by Reynold's (1963)

- In a 50 ml volumetric flask add:
 Lead Nitrate Pb(NO₃)₂ 1.33 g
 Sodium Citrate Na₃(C₆H₅O₇)·2H₂O 1.76 g
 Boiled, cooled, CO₂ free dist. water 30 ml
- Cover the flask. Shake vigorously for at least one minute.
- Add 8 ml of 1N NaOH CO₂ free (EMS Cat. #21170).
- Mix until clear.
- Check the pH. It should be 12.0 ±0.1. If the pH is low add more NaOH to the clear solution. If the pH is above 12.1 start over this time adding a smaller amount of NaOH.
- Add CO₂ free water to bring the solution to a final volume of 50 ml.
- Let stand several hours before use.
- Store in amber, tightly covered bottle in refrigerator.

B. Lead Staining Stock Solution by Venable and Coggeshall (1965)

- In 12 ml sample bottles (EMS Cat. #64254) add 0.01g - 0.04g Lead Citrate (EMS Cat. #17800) to 10 ml CO₂ free distilled water.
- Add 0.1 ml 10N NaOH. Cap the bottle and shake well until clear.

To use, draw a small portion up with a syringe and use a syringe filter, or, centrifuge a small covered sample at 6000 rpm for 15 minutes.

NOTE: Removal of heavy metal precipitates (artifacts) Uranyl acetate (small, needle shaped), crystals or lead carbonate (large, spherical) is imperative. The reason being is these precipitates can obscure vital detail and the end result is poor quality micrographs. Kuo, et al (1981), suggested that these artifacts can often be removed by a 30 second dip into freshly prepared 10% glacial acetic acid followed by two rinses in distilled water.

II. A Stable Lead Staining Solution

A Stable Lead by Modification of Sato's Method Lead staining solution: Calcined lead citrate - long term storage lead solution. Since the first introduction by Watson (1958), various lead stains have been developed in order to increase contrast and reduce contamination in sections for electron microscopy. One of the disadvantages of lead stains developed to date is that the staining solution is apt to produce precipitates of lead carbonate, resulting in difficulty for long-term storage of the stains. Now there is a new stable lead solution which is free from precipitates when kept at room temperature for over 1 year.

The stock lead solution is made up as follows:

Calcined Lead Citrate	0.20 g
Lead Nitrate	0.15 g
Lead Acetate	0.15 g
Sodium Citrate	1.00 g
Distilled Water	41.00 ml

The calcined lead citrate is obtained by heating crystal lead citrate for several hours in a melting pot (200°C to 300°C) until the color changes to a light brownish yellow. **NOTE: Overheated Lead Citrate with a dark brownish or black color can't be used.**

The above reagents are placed in a 50 ml volumetric flask and mixed well to produce a yellowish milky solution. Then 9.0 ml of 1N NaOH is added to the solution and mixed well until the solution becomes clear with a light yellowish color. The solution is then transferred to an amber glass with a screw cap bottle for storage. The solution can be stored at room temperature or in the refrigerator for over 1 year. Takamasa Hanaichi et al. (1986) "A Stable Lead by Modification of Sato's Method". J. Electron Microsc., Vol. 35. No. 3. 304-306.

Handling of Lead Solutions

Prepare and store LEAD SOLUTION in plastics rather than glass containers. Avoid breathing on sections during LEAD staining in order to maintain a CO₂-free environment. REASON: Pb + CO₂ in the presence of Oxygen forms PbCO₃ a white precipitate.

III. Lead Staining

Lead stains are very sensitive and will precipitate quickly upon contact with CO₂. To prevent this from happening either during preparation, storage, or staining the following steps should be followed:

- Prepare CO₂ free water: boil double distilled water and store it at once (while still hot) in tightly capped bottles or glass stop-pered bottles. When these bottles are opened you should hear a hissing sound which indicates the bottles were sealed properly. The water bottle should be opened only prior to use. The above procedure needs to be repeated if ample amount of water remains in the bottle and the bottle was left open for an extended period of time (more than 10 minutes).
- Construct a staining apparatus: A sheet of dental wax is placed on top of wetted filter paper (1N NaOH) and it is surrounded with several NaOH pellets inside of a petri dish which serves as the staining chamber. The NaOH will quickly absorb CO₂ in the chamber, giving a CO₂ free area for lead staining.

For a detailed description and explanation of lead staining, please refer to the following book:

Electron Microscopy Principles And Techniques For Biologists
 By John J. Bozzola And Lonnie D. Russell.
 1992 Pp.115-118

ARTICLE OF INTEREST

Flat Embedding with LR-White

A technique for flat embedding of microorganisms on slides with LR White for Immunocytochemistry. Please refer to:

- P.A. Vesik, T.P. Dibbayawan, M. Vesik. (1993). Flat Embedding Of Microorganism On Slides With LR White For Immunocytochemistry. *Microscopy Research and Technique*. 26:352-353.

➤ **LR White And LR Gold Resin,**
See *Embedding Media Kits, page 95* >>>>

RT	14370	LR Gold Complete	kit
RT	14380	LR White Complete	kit

For **PTFE Flat Embedding Molds for LR White,** see page 253 >>>>

➤ **Lucifer Yellow, CH, Dilithium Salt**

C₁₃H₉Li₂N₂O₉S₂ F.W. 457.25 CAS #67769-47-5

A technique producing an electron dense osmiophilic polymer when Lucifer Yellow is injected into cells. Lucifer Yellow also can be viewed in living cells as a dye marker and is more sensitive than any other dye. *Cell Tissue Res.*, 204, 37 (1979) *J. Histochem Cytochem*, 30, 189 (1982) *Science*, 217, 953 (1982); 215, 1641 (1982); 214, 801 (1981); 225, 851 (1984); *Cell*, 14, 741 (1978).

A fluorescent dye. *Nature* 292, 17 (1981)

0-5°C	17950		25mg
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➤ **Lugol's Iodine**

For use as a bacterial, fungal and inclusion body stain.

RT	26055-05	Lugol's Iodine Solution	500ml
RT	26055-06	Lugol's Iodine Solution	1 L

➤ **Magnesium Chloride, Hexahydrate, Reagent, A.C.S.**

MgCl₂·6H₂O F.W. 203.30 CAS #7791-18-6

Assay99.0-102.0%

RT	18010		100g
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➤ **Malachite Green 4, Certified**

Basic Green Oxalate

See page 24, 468 >>>>

RT	18100		25g
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➤ **Maleic Acid, Crystalline, Repurified, A.C.S.**

(Toxic Acid; cis-Butenedioic Acid)

HOOCH:CHCOOH F.W. 116.08 CAS #110-16-7

m.p. 132-134°C

Assay99.5%

Insoluble Matter0.005%

Fumaric Acid0.15%

Chloride0.01%

Sulfate0.001%

RT	18150		250g
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➤ **Mammalian Ringer Solution**

Ingredients: NaCl; KCl; CaCl₂·6H₂O; NaHCO₃; MgCl₂·6H₂O; Glucose and Distilled water.

RT	11763-05	Mammalian Ringer Solution	500ml
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RT	11763-10	Mammalian Ringer Solution	1 L
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TECHNICAL TIP

Embedding Resin Stain Permeability

Polyester embedding resins are more permeable to acid stains. Epoxy embedding resins are more permeable to basic stains.

Reference: Bryant V. and Watson, J.H.L. (1967). A comparison of light microscopy staining methods applied to a polyester and three epoxy resins. *Henry Ford Hosp. Med. Bull.*, 15:65

➤ **May-Grunwald Staining Solution**

A ready-to-use stain for bone marrow staining.

RT	26064-05	May-Grunwald Stain Solution	500ml
RT	26064-06	May-Grunwald Stain Solution	1 L

➤ **Mayer's Hematoxylin**

Stain selectivity for nuclei. Ready-to-use.

RT	26043-05	Mayer's Hematoxylin	500ml
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RT	26043-06	Mayer's Hematoxylin	1 L
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RT	26043-10	Mayer's Hematoxylin	4 L
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➤ **Modified Mayer's Hematoxylin**

Stock Solution, Ready to use.

Ingredients: Hematoxylin 0.4%, Ammonium Aluminum Sulfate 0.5%, Sodium Iodate: 0.03%, Citric Acid 0.1%, Chloral Hydrate 5%

RT	26043-18	Modified Mayer's Hematoxylin	500ml
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McDowells Trumps Fixative, see page 458 >>>>

➤ **Methacrylic Acid, Glacial**

(2-Methylpropenoic Acid)

CH₂C(CH₃)COOH F.W. 86.09 CAS #79-41-4

Assay>98%

Stab. with 0.25% Hydroquinone monomethyl ether

RT	18500		450ml
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➤ **Methanol, Reagent, A.C.S.**

(Methyl Alcohol) CH₃OH F.W. 32.04 CAS #67-56-1

Assay99.8%

Specific Gravity0.79

A.C.S. Specifications:

Residue after Evaporation0.001%

Boiling Range (Boiling point 64.6°C)2°C max

Appearance.....Clear

Color (A.P.H.A.)10 max

Acetone & Aldehydes (0.001%)To pass test

Titrateable Acid.....0.0003 meq/g

Titrateable Base0.0002 meq/g

Water0.2% max

RT	18510		1qt
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RT	18511		4x1qt
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➤ **Methenamine**

See *Hexamethylenetetramine, page 48* >>>>

RT	16710		50g
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➤ **Methenamine Solution**

A stock solution for use in bacterial and fungal stains (Grocott's Method/GMS).

RT	26083-05	Methenamine, 3% Aqueous Solution	500ml
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RT	26083-06	Methenamine, 3% Aqueous Solution	1 L
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➤ **2-Methyl Butane, Reagent**

(Isopropentane)
 $\text{CH}_2\text{H}_5\text{CH}(\text{CH}_3)_2$ F.W. 72.15 CAS #78-78-4
 b.p. 27-31°C
 Specific Gravity @ 20°C: 0.62

RT 18550 450ml

➤ **Methyl Cellulose, 400 cPS, USP/NF**

(Methylcel MC; Cellulose Methyl Ether)
 CAS #9004-67-5
 Methoxyl (-CH₃) content: 27.5-31.5%
 Medium viscosity (2% in water, @20°C): 230-550 cps
 Used with polyethylene glycol in the presence of acidic uranyl acetate to stain cryo sections.

RT 18560 100g

➤ **Methylene Blue Chloride, Certified, C.I. #52015**

(Basic Blue 9; Swiss Blue)
 $\text{C}_{16}\text{H}_{18}\text{N}_3\text{Cl} \cdot 3\text{H}_2\text{O}$ F.W. 373.86 CAS #7220-79-3
 Solubility: 9.5% Water; 6.0% Alcohol; 6.5% Cellosolve; 10.0% Glycerol; 0.0% Xylene.

- Used to distinguish autonomic nerves. Richardson, K.C., (1969) Anat. Rec., 164, 231. General stain for animals, histology.
- A simple rapid staining procedure for methacrylate embedded tissue sections using chromotrope 2R and Methylene Blue. Dougherty, M.M., and King, J.S., (1984) Stain Techn., 59, 149
- An established routine method for differential staining of epoxy-embedded tissue sections. Schroeder, H.E., Rossinsky, K., and Muller, W., (1980) Microsc. Acta 83, 111
- Used with Basic Fuchsin for stain epoxy-embedded tissue. Sato, T. and Shamoto, M. (1973). A simple rapid polychrome stain for epoxy-embedded tissue. Stain Technol., 48:223

RT 18600 25g

For our Methylene Blue Solutions, see page 474 >>>>

TECHNICAL TIP

Superior Methylene Blue-Azure II Stain for Semithin Sections

The most common stain used in the electron microscopy lab for thick sections is toluidine blue. Unfortunately its general lack of polychromasia makes it unsuitable for photomicro-graphy. Much better results are obtained for general work as well as for photomicrography (especially with the use of filters for black and white film) with the methylene blue, azure II combinations.

Hildegard H. Crowley, Dept. of Biological Sciences, University of Denver, Denver, CO. 80208

➤ **Methyl Ethyl Ketone, Reagent**

(2-Butanone)
 $\text{CH}_3\text{COCH}_2\text{CH}_3$ F.W. 72.11 CAS #78-93-3
 Assay>98%
 Specific Gravity (H₂O=1)0.799-0.802
 Acidity (as CH₃COOH)0.003%
 Water0.2%

RT 18650 450ml

TECHNICAL TIP

Storage of Epoxy Resins

To gain the maximum shelf life of Epoxy Resins note the following: Store most epoxy resins in well-capped containers, in the range of 18 - 40°C. Store out of contact with moisture to avoid hydrolysis to a free acid, which contributes to the spoiling of embedding materials

➤ **Methylene Chloride, Reagent, A.C.S.**

(Dichloromethane; Plastisolve)
 CH_2Cl_2 F.W. 84.93 CAS #75-09-2
 Specific Gravity @25°C:1.315-1.321
 Assay>99.5%

Specifications:
 Residue After Evaporation0.002%
 Titratable Acid0.0003 meq/g
 Water0.02%
 Free Halogens.....To Pass Test

RT 19600 1qt (946ml)
 RT 19610 4x1qt.

➤ **Methyl Green, Certified, C.I. #42590**

(Zinc Chloride Salt; Ethyl Green)
 $\text{C}_{27}\text{H}_{35}\text{N}_3\text{Cl}_2 \cdot \text{ZnCl}_2$ F.W. 608.79 CAS #7114-03-6
 Solubility: 8.0% water; 3.0% Alcohol; 1.8% Cellosolve; 3.5% Glycerol; 0.0% Xylene.

- Used as a counterstain in Almann's aniline acid fuchsin technique for mitochondria; used in Kurnick's Methyl Green-Pyronin stain for nuclei and cytoplasmic granules of liver cells. Marker for DNA at acid and neutral conditions. J.B. Boyd, H.R. Mitchell, (1965) Anal. Biochem., 13, 28.
- Used for epoxy-embedded thick sections. Sievers, J. (1971). Basic two-dye stains for epoxy-embedded 0.3-1 micron sections. Stain Technol., 46:195

RT 18700 25g

➤ **Methyl Methacrylate, Monomer**

(Methacrylic Acid Methyl Ester)
 $\text{CH}_2\text{C}(\text{CH}_3)\text{COOCH}_3$ F.W. 100.12 CAS #80-62-6
 b.p. 99-100°C
 Specific Gravity @20°C:.....0.943
 Inhibitor (Hydroquinone):.....0.0025% (25ppm)

0-5C 18800 225ml

➤ **Methyl Methacrylate/Butyl Methacrylate Embedding Kit**

See Embedding Media Kits, page 97 >>>>

➤ **Methyl Violet 2B, Certified, C.I. #42535**

(Basic Violet 1; Dahlia B; Gentian Violet; Paris Violet; Pyoktanium Coeruleum)
 $\text{C}_{24}\text{H}_{28}\text{N}_3\text{Cl}$ F.W. 393.96 CAS #8004-87-3
 Solubility: 9.0% Water; 8.25% Alcohol; 9.0% Cellosolve; 8.5% Glycerol; 0.01% Xylene; Dye content: 75% min.
 Used with Methyl Green to stain Epoxy-embedded sections.

RT 18850 25g

➤ **Michel's Fixative Fixative and Buffer**
 See page 458 >>>>

➤ Microbed Embedding Kit*See Embedding Media Kits, page 97 >>>>***➤ Millonig's Phosphate Buffer***See Buffers Section, page 27, 447 >>>>*

0-5°C	11582-05	500ml
0-5°C	11582-10	1 lit

➤ Molybdic Acid, Ammonium Salt*See Ammonium Molybdate, page 23 >>>>*

RT	10500	100g
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➤ MOPS, Biological Buffer

(3-(N-Morpholino) propanesulfonic acid)

C₇H₁₅NO₄S F.W. 209.26 CAS #1132-61-2

Assay>99.%

pKa @20°C7.20

pH range6.5-7.9

RT	18900	100g
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➤ Mucicarmine/Metanil

For use with hematoxylin and metanil yellow for the determination of carbohydrates and mucosubstances.

RT	26080-05	Mucicarmine Stock Solution	500ml
RT	26080-06	Mucicarmine Stock Solution	1 L
RT	26081-05	Metanil, 0.25% Stock Solution	500ml
RT	26081-06	Metanil, 0.25% Stock Solution	1 L

➤ NMA

(Methyl-5-Norbornene-2,3-Dicarboxylic Anhydride)

C₁₀H₁₀O₃ F.W. 178.19 CAS #25134-21-8

Specific Gravity @20/20°C:1.245

b.p. @ 10mm Hg:140°C

An epoxy hardener.

RT	19000	450ml
RT	19001	4x450ml

➤ Nigrosine, Certified, C.I. #50420, Water Soluble

(Acid Black 2; Gray R, B, BB; Indulin Black; Nigrosin W, WL; Silver Gray; Steel Gray)

CAS #8005-03-06

Solubility: 10.0% Water; 0.0% Alcohol; 1.0% Cellosolve;

11.0% Glycol; 0.0% Xylene

For negative staining of bacteria. With Basic Fuchsin, staining bacteria spores. *Dermer, Le Lait*, 6, 8 (1926).*Biochem. Biophys. Acta* 69,159 (1963).

RT	19010	25g
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➤ Nile Blue A, Certified, C.I. #51180

(Basic Blue 12, Nile Blue Sulfate)

(C₂₀H₂₀N₃O)₂SO₄ F.W. 732.84 CAS #3625-57-8

Solubility: 6.0% Water; 5.0% Alcohol; 5.0% Cellosolve; 5.0% Glycol; 0.25% Xylene. Dye content: approx. 65%

Differentiates melamins and lipofuscins; Used in fat staining.

Lillie, Stain Tech., 31,151 (1956); *J. Histochem.*, 4,377;*Z. Anal. Chem.* 260, 290 (1972).For staining bone sections. *Cytologia*, 11, 261 (1940)

RT	19020	10g
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➤ Ninhydrin, Crystal, Reagent

(1,2,3-Triketohydrindene Monohydrate)

C₉H₆O₄·H₂O.F.W. 178.15 CAS #485-47-2

RT	19030	25g
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➤ Nitro Blue Tetrazolium Chloride

(Nitro, BT, p-Nitrotetrazolium blue; 2, 2'-Di-p-nitrophenyl-5, 5'diphenyl- [3, 3'-dimethoxy-4, 4'-diphenylene] ditetrazolium chloride)

C₄₀H₃₀Cl₂N₁₀O₆ F.W. 817.6 CAS 298-83-9

Approx. 98% (TLC).

Contains up to 10% solvent. A substrate for dehydrogenases and other oxidases.

0-5°C	19035-01	100mg
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0-5°C	19035-05	1gm
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Also available in tablet form. Tablet contains 10mg substrate per tablet.

0-5°C	19035-10	10 tablets/pk
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➤ Nitrocellulose*Methanol Free!**See Parlodion Purified Strips, page 57 >>>>*

RT	19220	10g
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➤ NSA, Nonenyl Succinic Anhydride,**ULTRA PURE!**

Specially Distilled

EM Grade F.W. 227 CAS 28928-97-4

b.p. 325°C

Viscosity:102.8 at 25°C

Density:1.08gm/cm³

An epoxy hardener specially distilled. The special distillation process offers you much clearer blocks than the standard NSA.

RT	19050	450ml
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RT	19051	4x450ml
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➤ Orange II

(Acid Orange 7; Acid Orange II, Y or A; Gold Orange; Mandarin G; Orange A, P or R; Orange Extra; Tropaeolin 000 No.2)

C₁₆H₁₁N₂O₄SNa F.W. 350.33 CAS #633-96-5

Solubility: 3.0% Water; 0.15% Alcohol; 2.5% Cellosolve; 8.0% Glycol; 0.0% Xylene; Dye Content: approx. 75%

A general tissue stain with Eosin and Azur-C. *French, Stain Tech.*, 1, 79 (1926). Counterstain for Heidenhain's Hematoxylin in animal histology. A substitute for Orange G if a stronger yellow is desired for contrast. *J. Lab. Med.*, 28, 995 (1943)

RT	19060	25g
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➤ Orange G, Certified, C.N. #DcO-13

(Acid Orange 10, Wood Orange 2G)

C₁₆H₁₀N₂O₇S₂Na₂ F.W. 452.38 CAS #1936-15-8

Solubility: 8.0% Water; 0.22% Alcohol; 1.7% Cellosolve; 3.0% Glycol; 0.0% Xylene; Dye Content: approx. 60%

Kornhauser's Quad stain for most elementary structures of tissues. *Stain Tech.*, 18, 985 (1943) Mallory's tissue stain for connective tissue.*Mallory, J. Exper. Med.*, 5,15 (1900). Used with safranin and tannic acid for showing shoot apex in plant tissue. *Stain Tech.*, 18, 105 (1943).

RT	19070	25g
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For our Orange G Solutions, see page 474 >>>>

➤ Osmium Tetroxide

➤ Osmium Tetroxide, Crystalline, Highest Purity, 99.95%

(Osmic Acid Anhydride) OsO₄ F.W. 254.20

CAS #20816-12-0

Melting Range:39.5-41.0°C

Boiling Point:.....129.7°C

Vapor Pressure @25°C:9.8 mmHg

Solubility:5.07% in Cold Water; 6.5% in Hot

.....Water; 250% in CCl₄

Osmium Purity:>99.95%

Non-Volatile matter:<0.02%

Small size (2ml), Light-gauge, pre-scored amber glass ampoules.

Ampoules containing OsO₄ Crystal, are pre-cleaned and heat sealed in plastic bags to assure a contaminant-free solution. Ampoules are also free of pressure-sensitive labels and, therefore, do not require cleaning prior to solution preparation.

RT 19100	1g
RT 19110	10x1g
RT 19102	20x1g
RT 19103	30x1g
RT 19104	40x1g
RT 19105	50x1g

Please call us for special prices on all other quantities and package sizes.

RT 19112	5x2g/Ampoule
RT 19114	5x4g/Ampoule
RT 19115	5g/Amp
RT 19116	6g/Amp
RT 19120	1/2g
RT 19130	10x1/2g
RT 19131	Same as 19130 (5 bxs + /lot)
RT 19132	10x1/4g
RT 19134	10x1/10g

➤ Aqueous Solution

To facilitate your work, we now have available a complete line of Osmium Tetroxide Aqueous Solutions with various concentrations. Sealed under dry nitrogen. Prepared in our plant daily. Exact concentrations and volume in pre-scored amber-ampoules.

4% Aqueous Solution:

RT 19140	2ml	ea
RT 19150	10x2ml	bx
RT 19151	Same as 19150 (5 bxs + /lot)	bx
RT 19160	5ml	ea
RT 19170	10x5ml	bx
RT 19171	Same as 19170 (5bxs/lot)	bx
RT 19180	10ml	ea
RT 19190	10x10ml	bx
RT 19191	Same as 19190 (5 bxs + /lot)	bx

2% Aqueous Solution

RT 19152	10x2ml	bx
RT 19153	Same as 19152 (5 bxs + /lot)	bx
RT 19172	10x5ml	bx
RT 19173	Same as 19172 (5 bxs + /lot)	bx
RT 19192	10x10ml	bx
RT 19193	Same as 19192 (5 bxs + /lot)	bx

Special orders are encouraged for different solution concentrations and packaging requirements.



TECHNICAL TIP

Neutralization And Disposal of Osmium Tetroxide

A 2% solution of Osmium Tetroxide can be fully neutralized by twice the volume of oil (corn oil is preferred because of its high percentage of unsaturated bonds).¹ That is to say, for every 10ml of 2% Osmium solution, 20ml of corn oil is required.

Procedure:

1. Do all work under a fume hood.
2. Pour twice the volume of corn oil into used Osmium Tetroxide solution.
3. Wait for the oil to completely turn black.
4. Test to check that complete neutralization has taken place. (To confirm neutralization; take either a glass coverslip coated in corn oil or a piece of filter paper soaked in corn oil and suspend it over the solution. Blackening indicates OsO₄ is still present.)²
5. Dispose in accordance to local regulations. Contact your Disposal Agency or Environmental Health & Safety Office at your Institute to obtain local regulations.

References:

1. Cooper, K. (1988) Neutralization of Osmium Tetroxide in case of accidental spillage and for disposal. Bulletin of The Microscopical Society of Canada. 8:24-28
2. Lunn, G.; Sansone, E.B. Osmium Tetroxide. Destruction of Hazardous Chemicals in the Laboratory; Program Resources, Inc. Frederick, MD; pg. 211-213

- Inadequate dehydration of the specimen.
- Inadequate mixing.
- Inadequate addition of the accelerator to the mixture.

SAFETY TIP

An Air-Tight Container for Small Amounts of Osmium Tetroxide

An Air-Tight Container for Small Amounts of Osmium Tetroxide Osmium vapors readily leak out of many containers as is evidenced by the black precipitates on inside refrigerator walls in many E.M. laboratories. A convenient way to prevent such leakage is to store the osmium solutions in glass vacuum-type blood collection tubes. The osmium vapors will not penetrate past the rubber stopper and contaminate the surrounding area.

Lynn D. Gray, Ph. D., The University of Texas Health Center at Tyler, Dept. of Cell Biology and Env. Sci., P.O. Box 2003, Tyler, TX. 75710

Storage: Room Temperature in a desiccator, kept away from direct sunlight. For our full line of desiccators, see Equipment section, pages 1064-1070. >>>>

➤ **Papanicolaou Stain, OG-6**

RT	26048-05	OG-6 Stain Solution	500ml
RT	26048-06	OG-6 Stain Solution	1 L

➤ **Papanicolaou Stain, EA-50 (EA Counterstain)**

RT	26049-05	EA-50 Stain Solution	500ml
RT	26049-06	EA-50 Stain Solution	1 L

➤ **Paraformaldehyde, EM Grade, Purified**

(Polyoxymethylene)

OH(CH₂O)_nH F.W. Average: 600 CAS #30525-89-4

Paraformaldehyde is the condensation product of methylene glycol, a substance not so far isolated in its pure form; it is a white solid with a formaldehyde content between 78 and 98% and is supplied either as a Prills or Granular. All forms contain more than 95.5% paraformaldehyde content. The Prill and Granular forms are small, free-flowing, dust-free beads, the most desired by EM users. A fast-penetrating EM fixative used in combination with Glutaraldehyde, Acrolein, and Osmium Tetroxide. Karnovsky, M.J., J. Cell Biol., 27, 137A (1965). Hayat, M.A. Principles & Tech., of EM (Univ. Park Press), 68 (1981)

RT	19200	Prills	500g
RT	19202	Prills	kilo
RT	19208	Granular	500g
RT	19210	Granular	kilo

TECHNICAL TIP

Paraformaldehyde Static Jumps

Spray the outside of the container with Anti-Static Spray (EMS #60615) prior to opening the lid and this will help to eliminate static charge and the paraformaldehyde from jumping out of the container.

➤ **Paraformaldehyde Solution -16% (Formaldehyde Solution, 16%)**

CAS #30525-89-4

Prepared from Paraformaldehyde crystal, 16% aqueous solution, methanol free.

Microfiltered and stored in pre-scored ampoules.

METHANOL FREE!

RT	15700	10ml	amp
RT	15710	10x10ml	bx
RT	15711	Same as 15710 (10bxs/lot)	bx

We can prepare in accordance to your special requirements (any concentration desired). Call for more information.

See page 40-41 for other standard concentrations. >>>>

➤ **Paraformaldehyde-Glutaraldehyde Solution**

Karnovsky's Fixative Ready to mix.

Kit consists of:

- 2x10ml ampoules 16% Formaldehyde
- 1x10ml ampoules 50% Glutaraldehyde
- 1x50ml 0.2M Sodium Phosphate Buffer

0-5°C	15720	1 kit
0-5°C	15730	Lot of 5 kits

➤ **Paramat and Paramat Extra, See Histology section, page 492-494 >>>>**

➤ **Tissue-TEK Paraffin, See Histology section page 492 >>>>**

➤ **Paraplast Embedding Medium**



➤ **Paraplast X-tra**

Handy pellet form melts rapidly. Melting Point 53-54°C. Cuts to 2 micron thickness with exceptional ribbon continuity. Extra compression resistance provides total support of tissues.

RT	19214	1 kilo
RT	19215	8 kilo

➤ **Paraplast Plus**

Reduces infiltration time by one-third. Cuts to 2 micron thickness with excellent ribbon continuity. Convenient pellet form melts rapidly. Melting point 56°C. Double filtered. No need for filtration before use.

RT	19216	1 kilo
RT	19217	8 kilo

➤ **Paraplast Medium**

Handy pellet form melts rapidly. Melting Point 56°C. Cuts to 4 micron thickness with excellent ribbon continuity - no crumbling or cracking. Double filtered. No need for filtration before use.

RT	19218	1 kilo
RT	19219	8 kilo

For a continuation of our Paraffin Waxes, See pages 492-494 >>>>

ARTICLE OF INTEREST

Re-Embedding Of Paraffin-Embedded Specimen Tissue In Resin:

- Chien K., et al (1982). A one step method for reembedding paraffin embedded specimens for electron microscopy. Proc. 40th Ann. EMSA Meet., pp. 356. Claitor's Pub. Div., Baton Rouge, LA.
- Lehner, T. et al (1966). Electron microscopy of paraffin embedded material in amyloidois. J. Path. Bact., 91:297
- Johannessen, J.V. (1977). Use of paraffin material for electron microscopy. Pathol. Ann., 12:189
- Bergh Weerman, M.A. v.d. and Dingemans, K.P. (1984). Rapid deparaffinization for electron microscopy. Ultra. struct. Pathol., 5:75

➤ **Peel-A-Way® Disposable Embedding**

Molds, See Histology Section, page 250, 554 >>>>

➤ **For our complete line of Embedding Waxes,**

See Histology section, pages 492-494 >>>>

➤ **PEG - GMA Embedding Kit**

See Embedding Media Kits, page 94 >>>>

RT 14250

kit

➤ **Parlodion (Pyroxylin Purified Strips)**

C₁₂H₁₆N₄O₁₈

F.W. 504.28

CAS #9004-70-0



Highly purified from cellulose nitrate; speembedding tissue for sectioning and for preparing semi-permeable membranes.

RT 19220

10g

➤ **Parlodion 2% in Amyl Acetate**

See Collodion, page 32 >>>>

➤ **Pepsin Reagent, Ready To Use**

Pepsin is used for proteolytic digestion of formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. In IHC most commonly used fixative like formalin mask tissue antigens (cellular, membrane and nuclear) by cross-linking process, this results in poor or no staining in IHC. Pepsin digestion of FFPE tissue section improves accessibility of antibodies to tissue antigens.

Storage: 2-8°C. DO NOT FREEZE

Intended Use: Use as antigen retriever for some antibodies in IHC. Please refer to primary antibody protocol for IHC.

Reagent: Ready-to-use Pepsin reagent available in 2 sizes: 15 and 100 ml

2-8°C 64142-05 Pepsin Reagent 15 ml

2-8°C 64142-06 Pepsin Reagent 100 ml

➤ **Periodic Acid, Reagent**

H₅IO₆

F.W. 227.96

CAS #10450-60-9

Assay	>99.0%
Heavy Metals	0.005%
Insoluble Matters	0.01%
Iron	0.003%
Other Halogen (Cl)	0.01%
Residue after Ignition	0.01%
Sulfate	0.01%

■ Ainsworth, S.K. et al. (1972). Alkaline bismuth reagent for high resolution ultrastructural demonstration of periodic-reactive sites. *J. Histochem. Cytochem.*, 20:995.

■ Mowry, R.W. (1958). Improved procedure for the staining of acid polysaccharides by Muller's colloidal (hydrous) ferric oxide and its combination with the Feulgen and the periodic acid Schiff reaction. *Lab. Invest.*, 7:566

■ Mowry, R.W. (1959). Effect of Periodic Acid used prior to Chromic Acid on the staining of Polysaccharides by Gomori's methenamine silver. *J. Histochem. Cytochem.*, 7:288

■ Tsuchiya, A. and Ogawa, K. (1973). Ultracytochemistry of the Periodic Acid (PA) - Phosphotungstic Acid (PTA) reaction. *J. Electr. Microsc.*, 22:290

■ Hanker, J.S. et al (1964). Osmiophilic reagents: new cytochemical principles for light and electron microscopy. Science New York, 146:1039

■ Derenzini, M. et al (1986). An improved periodic acid-thiosemi-carbazide-osmium technique to reveal glycoconjugates at the molecular level in-situ. *J. Histochem. Cytochem.*, 34:1161

RT 19325

25g

For our Periodic Acid Solutions, see page 461 >>>>

➤ **Permout Mounting Medium**

See Adhesives and Mountants, page 21, 516 >>>>

➤ **Phenol Red**

(Phenolsulfonphthalein)

C₁₉H₁₄O₅S

F.W. 354.38

CAS #143-74-8

A standard indicator for preparing buffers, pH range 6.4-8.2.

RT 19327

5g

➤ **Phenol Red Sodium Salt**

(Phenolsulfonphthalein Sodium Salt)

C₁₉H₁₃NaO₅S

F.W. 376.37

CAS #34487-61-1

A standard indicator for preparing buffers, pH range 6.8-8.2.

RT 19328

5g

➤ **(PMSF), Phenylmethylsulphonyl Fluoride**

C₆H₅CH₂SO₂F

F.W. 174.20

CAS #329-98-6

Assay

>99.0%

Water

<0.1%

RT 19330

1g

RT 19331

5g

➤ Phosphate Mixed Sodium Salts

0.2 M Buffer/0.1 M Buffer

See Buffer Section, pages 27-29, 461 >>>>

0-5°C	11600-05	500ml
0-5°C	11600-10	1 liter

➤ Phloxine B, Certified, C.I. #45410

(Acid Red 92; Cyanosine; Eosin 10B; Phloxine TA, N, BP Super, RB, TB, or BB)
 $C_{20}H_{20}O_3Cl_4Br_4Na_2$ F.W. 829.66 CAS #18472-87-2
 Solubility: 10.5% Water; 5.0% Alcohol; 9.0% Cellosolve; 4.5% Glycol;
 0.0% Xylene

RT	19350	25 g
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➤ Phosphomolybdic Acid,

Crystal, Reagent, A.C.S.
 (Dodeca-Molybdophosphoric Acid)

 $H_3PO_4 \cdot 12(MoO_3) \cdot 24H_2O$ F.W. 2257.6 CAS #51429-74-4

RT	19400	100g
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Phosphomolybdic Acid Solutions, see page 23, 462 >>>>**➤ Phosphotungstic Acid, Crystal, Reagent, Highest Purity**

(Tungstophosphoric Acid)

 $H_3[P(W_3O_{10})_4] \cdot aq$ F.W. 2880.17+aq CAS #12501-23-4
Specifications:

Solubility Practically clear, colorless solution
 Ammonia (NH₃) 0.004%
 Chloride (Cl) 0.03%
 Insoluble Matter 0.02%
 Nitrate (NO₃) 0.004%
 Sulfate (SO₄) 0.005%
 Heavy Metals and Iron No color formation on addition of H₂S

Used as a Fixative: Issidorides, M.R., and Kasorchis, T. (1981).
 Dispersed and compact chromatin demonstrated with a new EM Method:
 phosphotungstic acid-hematoxylin block-staining. Histochemistry 73,21.

Used widely as a Negative Stain:

- As Spray method: Horne, R.W., and Pasquali-Ronchette, I. (1974). A negative staining-carbon film technique for studying viruses in the electron microscope.
- Preparation procedures for examining icosahedral and filamentous viruses. J. Ultrastruct. Res. 47, 361. Locke, M., and Kirhman, N. (1971).
- Hot Alcoholic phosphotungstic acid and uranyl acetate as routine stains for thick and thin sections. J. Cell Biol., 50, 550., Farragiana, T., and Marinozzi, V. (1979).
- Phosphotungstic acid staining of polysaccharides containing structures on epoxy embedded tissues. J. Submicrosc. Cytol. 11, 263. Bloom, E.E., and Aghajanian, G.K. (1968).
- Fine structural and cytochemical analysis of the staining of synaptic junctions with PTA. J. Ultrastruct. Res. 22, 261.

RT	19500	100g
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Phosphotungstic Acid Solutions, see page 462 >>>>**➤ Picric Acid, Reagent, Crystal, A.C.S.**

(2,4,6-Trinitrophenol)

 $C_6H_2(NO_2)_3OH$ FW 229.11 CAS #88-89-1
A.C.S. Specifications:

Water min 30%
 Melting Point (dried) 121-123°C
 Insoluble in Resinous Matter. 0.01%
 Insoluble in benzene 0.1%
 Sulfate 0.01%

RT	19550	100g
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For our Picric Acid Solutions, see page 462 >>>>**➤ Pipes Buffer Solution****See buffer solutions, page 28** >>>>

RT	11610	500ml
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➤ Pipes, 1.5 Sodium Salt, Crystal

[Piperazine-N,N-bis (2-ethanesulfonic acid), 1.5 Sodium]

F.W. 335.3 pK = pH = 6.8 @25°C CAS #10010-67-0

RT	19230	25g
RT	19240	100g

➤ Plastisolve**Methylene Chloride, see page 53** >>>>

For the clean up of epoxy resins.

RT	19600	1qt
RT	19610	4x1qt

➤ Platinum Blue, an EM StainIBI Blue Platinum Stain $Pt_4N_6H_6O_{24}C_{20}$

An EM stain that may have the ability to replace Uranyl Acetate in some instances. If you have issues with having Uranium salts that are radioactive (depleted or not) in the lab this may be the answer for you. An alternative for staining TEM thin sections

RT	22407	Platinum Blue	1 ml
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➤ Poly-L-Lysine Solutions**➤ A/ Poly-L-Lysine Hydrobromide 30,000-70,000**

CAS #25988-63-0

A polycation, which binds to DNA, red cell membranes and any negatively charged proteins. It is useful for promoting cell adhesion; for the preparation of polycationic beads, useful in immobilization techniques; immobilization of membranes; immobilization of plant protoplasts. In cell culture, immobilization by micro encapsulation with the alginate-poly-L-lysine microcapsule system. We offer a prepared 0.1% aqueous solution, micro-filtered, which is ideal for cell culture growth.

RT	19320-A	Poly-L-lysine 0.1% Solution	10ml
RT	19321-A	Poly-L-lysine 0.1% Solution	100ml

➤ B/ Poly-L-Lysine Hydrobromide 70,000-150,000

CAS #25988-63-0

Poly-L-lysine with a molecular weight of >70,000. This solution is useful in promoting cell adhesion to solid substrates. Used for nuclear antigen-coated red cells in homolytic plaque assay. We offer a prepared 0.1% aqueous solution which is micro-filtered and is used to increase tissue adhesion to the glass slide, which is needed for immunohistochemical and immunolabeling techniques, as well as lengthy staining procedures.

RT	19320-B	Poly-L-lysine 0.1% Solution	10ml
RT	19321-B	Poly-L-lysine 0.1% Solution	100ml

➤ **Polyester Wax**

A synthetic polyester wax with a very low melting point (37°C). Invented by Dr. H.F. Steedman, as a ribboning embedding medium. Its main advantage over paraffin and ester waxes is its low melting point, which reduces tissue hardening, shrinkage, and eliminates the need for infiltration ovens.

The wax is soluble in most organic solvents, including alcohol, ethers, esters, ketones and hydrocarbons. The wax is water tolerant, almost opaque, and sections easily. No electrification of ribbons occurs during sectioning. Sections of 2 microns and more may be cut at room temperatures between 10 and 22°C. It is advantageous to keep the wax in its solid state prior to use.

RT **19312** Polyester Wax 500g

➤ **Polyethylene Glycol, Carbowax**

See page 31 >>>>

➤ **Polyvinyl Alcohol 15000**

(CH₂CHOH)_n F.W. 14000-15000 CAS #9002-89-5
Degree of Hydrolyzation: 86-89 mol%

- A water-miscible embedding medium: Munoz-Guerra, S. and Subirana, J.A. (1982).
- A crosslinked polyvinyl alcohol: a water-miscible polymer used as an embedding medium for electron microscopy. *Mikroskopie*, 39:346

RT **19800** 500g

➤ **Ponceau B.S.,**

See *Biebrich Scarlet*, page 24, 469 >>>>

➤ **Potassium Bromide, Reagent, A.C.S.**

KBr F.W. 119.00 CAS #7758-02-3

Specifications:

Insoluble Matters0.005%
BromateTo Pass Test
Chloride0.2%
Iodide0.001%
Nitrogen0.005%
Sulfate0.005%
Barium0.002%
Heavy Metals0.0005%
Sodium0.02%

Used in the preparation for autoradiography

RT **20040** 100g

➤ **Potassium Chloride, Crystal, Reagent, A.C.S.**

KCl F.W. 74.55 CAS #7447-40-7

Specifications:

Insoluble Matters0.005%
Iodide0.002%
Bromide0.01%
Chlorate and Nitrate0.003%
Sulfate0.001%
Phosphate0.0005%
Sodium0.005%

RT **20060** 100g

➤ **Potassium Dichromate, Crystal, Reagent, A.C.S.**

K₂Cr₂O₇ F.W. 294.18 CAS #7778-50-9

A.C.S. Specifications:

Insoluble and NH₄OH ppt.0.005%
Chloride0.001%
Sulfate0.005%
Calcium0.003%
Sodium0.02%
Loss on drying at 105°C0.05%

RT **20100** 250g

For Potassium Dichromate Solutions, see page 462 >>>>

➤ **Potassium Ferricyanide, Reagent, A.C.S.**

K₃Fe(CN)₆ F.W. 329.25 CAS #13746-66-2

A.C.S. Specifications:

Chloride0.01%
Ferro Compounds (Fe(Cn)4)0.05%
Insoluble Matters0.005%
Sulfate0.01%

RT **20150** 100g

For Potassium Ferricyanide Solutions, see page 463 >>>>

➤ **Potassium Hydroxide, Pellets, Reagent, ACS.**

KOH F.W. 56.11 CAS #1310-58-3

Assay>85.0%
Water contains:10-15%

RT **20155** 100g

For Potassium Hydroxide Solutions, see page 463 >>>>

➤ **Potassium Iodide, Granular, Reagent, A.C.S.**

KI F.W. 166.00 CAS #7681-11-0

Refer to Bismuth Carbonate for references on use.

RT **20158** 50g

➤ **Potassium Oxalate, Reagent, A.C.S.**

(CO₂K)₂.H₂O F.W. 184.23 CAS #6487-48-5

Specifications:

Assay98.5-101.0%
NeutralityTo Pass Test
Insoluble Matters0.01%
Chloride0.002%
Sulfate0.01%
Ammonium0.002%
Heavy Metal0.0025%
Iron0.001%
Sodium0.02%

RT **20160** 100g

RT **20162** 500g

➤ **Potassium Permanganate, Reagent, A.C.S.**

KMnO₄ F.W. 158.03 CAS #7722-64-7

A.C.S. Specifications:

Chloride & Chlorate0.005%
Nitrogen Compounds0.005%
Sulfate0.02%
Insoluble Matters0.2%

An EM fixative and a metal stain. *J. Ultrastruct. Res.*, 21,424 (1968)

RT **20200** 250g

For Potassium Permanganate Solutions, see page 463 >>>>

► Potassium Phosphate, Monobasic, Reagent, A.C.S.

KH_2PO_4 F.W. 136.09 CAS #7778-77-0

A.C.S. Specifications:

Insls. and Calcium, and NH_4OH ppt	0.01%
Loss on drying over H_2SO_4	0.2%
pH of 5% Solution @ 25°C	4.1-4.5
Chloride	0.001%
Nitrogen Compounds	0.001%
Sulfate	0.003%
Sodium	0.005%
Iron	0.002%

RT **20250** 500g

► Potassium Pyroantimonate, Trihydrate

Potassium antimonate
 $\text{KSbO}_3 \cdot 3\text{H}_2\text{O}$ F.W. 262.90 CAS #12208-13-8

Minimum assay	94%
Minimum sensitivity to Na	1:430
Insoluble matter	not more than 0.01%

Ultrastructural localization sodium.

J. Histochem Cytochem., 24, 740 (1976)

RT **20220** 25g

► Potassium Sodium Tartrate, Tetrahydrate Reagent, A.C.S.

(Sodium Potassium Tartrate)

$\text{KNaC}_4\text{H}_4\text{O}_6 \cdot 4\text{H}_2\text{O}$ F.W. 282.22 CAS #6381-59-5

Assay	99.0-102.0%
Water	21.0-27.0%

Used with bismuth subnitrate for staining polysaccharides, including glycogen without oxidizing agents.

Shinji, Y., et al (1975). A new electron microscopic histo-cyto chemical staining method: demonstration of glycogen particles.

Acta Histochem., Cytochem., 8:139

RT **20260** 100g

► Pronase Reagent, Ready To Use

Pronase is used for proteolytic digestion of formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. In IHC most commonly used fixative like formalin mask tissue antigens (cellular, membrane and nuclear) by cross-linking process, this results in poor or no staining in IHC. Pronase digestion of FFPE tissue section improves accessibility of antibodies to tissue antigens.

Storage: 2-8°C. DO NOT FREEZE

Intended Use: Use as antigen retriever for some antibodies in IHC. Please refer to primary antibody protocol for IHC.

Reagent: Ready-to-use Pronase reagent available in 2 sizes: 15 and 100 ml.

2-8°C	64142-03	Pronase Reagent	15 ml
2-8°C	64142-04	Pronase Reagent	100 ml

► 2-Propanol, Propyl Alcohol

Iso-propyl Alcohol, See page 50 >>>>

RT	16930	1 qt
RT	16931	4x1qt

► Propylene Glycol, Reagent, A.C.S.

(1,2-Propanediol)

$\text{CH}_3\text{CHOHCH}_2\text{OH}$ FW 76.10 CAS #57-55-6

Specific Gravity ($\text{H}_2\text{O}=1$): 1.04

Assay

Specifications:

Residue after Ignition	0.005%
Chloride	1ppm
Water	0.2%
Titrateable Acid	0.0005meq/g

RT	20350	450ml
RT	20352	4x450ml

► Propylene Oxide, EM Grade

(1,2-Epoxypropane, Methyloxirane)

$\text{CH}_2\text{CHCH}_2\text{O}$ F.W. 58.08 CAS #75-56-9

m.p. -112°C; b.p. 34°C; f.p. -37°C

Specifications:

Specific Gravity @ $\text{H}_2\text{O}=1$	0.831
Vapor pressure @ 33°C:	980 mbar
Acidity, Wt. ppm as Acetic Acid	2
Aldehydes, ppm as Propionaldehyde	3
Water, wt. ppm	35
Total Chloride, wt. ppm as Cl	1
Nonvolatile matter, g/100ml	max 0.001
Color, Platinum-Cobalt	0

A solvent agent for epoxy resins. Used widely for infiltration and gradual replacement of the dehydration agent.

RT	20401	Metal Can	450ml
RT	20411	Metal Can	4 x 450ml
RT	20412	Metal Can*	250ml
RT	20414	Metal Can*	4 x 250ml

*(Glass for International Only)

► Pyronin Y, Certified, C.I. #45005

(Pyronin G) $\text{C}_{17}\text{H}_{19}\text{N}_2\text{OCl}$ F.W. 302.81 CAS #92-32-0

Solubility: 9.0% Water; 0.5% Alcohol; 1.85% Cellosolve; 4.35% Glycerol; 0.0% Xylene

RT **19560** 5g

► Quetol 651, Resin

(Ethylene Glycol Diglycidyl Ether)

$\text{C}_8\text{H}_{14}\text{O}_4$ F.W. 174.20 CAS #2224-15-9

Specific Gravity ($\text{H}_2\text{O}=1$): 1.15

0-5°C **20440** 225ml

► Quetol 651, NSA Kit

See Embedding Media Kits, page 97 >>>>

0-5°C **14640** kit

► Quinolinic Phthalocyanine (Cuprolinic Blue) See page 32 >>>>

RT	12800	0.1gm
RT	12802	0.2gm

➤ **Replicating Materials**

See **Materials Science** section, pages 375 >>>>

➤ **R-UNIVERSAL Epitope Recovery Buffer (10x stock)**

Properties: Clear, non-toxic solution.

Presentation: R-Universal Buffer is supplied as 10x concentrate. For epitope recovery dilute 1 part of stock with 9 parts of deionized water.

Application: For epitope recovery dilute 1 part of stock with 9 parts of deionized water.

Stability and Storage: The preparation is stable for 1 year when stored unopened at +4°C. Every lot is issued with a certificate indicating the expiry date. After opening, store at +4°C in the refrigerator and use within 6 months.

Certification: Each lot is certified for compliance to specifications. The product is produced under DIN EN ISO 9001: 2008 Quality Management system for the products in Immunoassay Development and Measurement, Products for Bioanalytics and Immunoassays.

0-4°C	62719-10	R-UNIVERSAL Epitope Recovery Buffer (10x stock) 125 ml
0-4°C	62719-20	R-UNIVERSAL Epitope Recovery Buffer (10x stock) 500 ml

➤ **Ruthenium Red, 37.5% Ru**

[(NH₃)₅RuORu(NH₃)₄ORu(NH₃)₅]Cl₆·4H₂O F.W.858.42
CAS #11103-72-3

- **Stain for monopolysaccharides and tight junctions.** Luft, J.T., Proc. 6th Int. Cong. Em (1966); J. Cell. Biol., 57, 874 (1973).
- **Stain for pectin and for diverse cell surfaces.** J. Cell Biol., 23, 54A (1964).
- **"Positive Staining for EM"** van Nostrand Reinhold Co., New York, NY (1975) pp 163-165.
- **Electron microscopy of cell extraneous coats as revealed by ruthenium red staining.** Luft, J.H. J. Cell Biol., 23:54A, (1964)
- **Ruthenium Red and Violet II. Fine structural localization in animal tissues.** Luft J.H. Anat. Rec., 171:369, (1971a)
- **Structure and staining characteristics of myofiber external lamina.** Zacks, S.I. et al. J. Histochem. Cytochem., 21:703 (1973)
- **Glycoaminoglycans in developing chick-embryo aorta revealed by ruthenium red: an electron microscopy study.** Kadar, A. et al. J. Pathol., 108:275 (1973)
- **Uptake of marker particles by in vitro ventilated and perfused rat lung.** Vidic, B. Am. J. Anat., 138:521 (1973)

RT	20600	1g
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➤ **Ruthenium Tetroxide**

0.5% Stabilized Aqueous Solution

In Crystal form:

RuO₄ F.W. 165.70 CAS #20427-56-96
m.p. 25.4°C b.p. 40°C

Ruthenium tetroxide is very similar to Osmium Tetroxide, and is used as a fixation/staining agent for electron microscopy. Ruthenium Tetroxide offers excellent staining of saturated and unsaturated polymer materials as well as stabilizing thin sections under the bombardment of the electron beam.

NOTE: Penetration of ruthenium tetroxide into the tissue is poor.

- **Caughey, R.C. and Miller, M.A.,** Proceed. of 44th Ann. Mtg. EMSA (1986), page 256
- **Hayat, M.A.,** Basic Technique for Electron Microscopy, Academic Press, NY, 1986, p 22.
- **Trent, J.S.,** Macromolecules, 17, 2930 (1984); 16, 539 (1983).

Packaged in 10ml ampoules-5 ampoules in a box.

RT	20700-05	Box
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➤ **Safranin O, Certified, C.I. #50240**

(Safranin T, Y or A; Basis Red 2; Cotton Red; Gossypimine)

C₂₀H₁₉N₄Cl F.W. 350.85 CAS #477-73-6
Solubility: 4.5% Water; 3.5% Alcohol; 5.0% Cellosolve; 3.5% Glycol; 0.0% Xylene

RT	20800	25g
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For our **Safranin O Solutions**, see page 471, 474 >>>>

➤ **Schiff's Reagent**

For use in the Periodic Acid Leucofuchsin (PAS) method as a general tissue stain.

0-5°C	26052-05	Schiff's Reagent	500ml
0-5°C	26052-06	Schiff's Reagent	1 L

➤ **Scott's Tap Water Substitute**

Magnesium sulfate buffered with sodium bicarbonate. Ready-to-use.

RT	26070-06	Scott's Tap Water Substitute	1 L
RT	26070-07	Scott's Tap Water Substitute	4 L

➤ **Section Block**

A new class of blocking solutions based on chemically modified and fragmented ultra-pure casein. Effectively reduces unwanted binding of primary antibody and conjugates you use to charged surface of the slide and tissue section. Greatly reduces non-specific binding while preserving the specific reaction, by saturating potential non-specific protein-protein interactions. Moreover, in contrast to BSA-based, IgGm casein or serum -based blocking solutions there is no interaction of specific antibody and blocking protein itself. or oth ls not comparable to other commercially available or home-made blocking solutions. Recommended for research and diagnostic pathology, especially for retrieved sections and polyclonal antibodies..

62710	Section Block	50 ml
62711	Section Block	125 ml
62712	Section Block	500 ml

➤ **Silver, Colloidal**

See **Colloidal Silver**, pages 12-14; 640-641 >>>>

➤ **Silver Lactate, Powder**

CH₃CH(OH)CO₂Ag F.W. 196.94 CAS #128-00-7
Silver content: approx. 90% min.

- **To localize intracellular anions (Cl-).** Komnick, (1962).
- **Elektronemikroskopische Lokalisation von Na+ und Cl- in Zellan und Geweban.** Protoplasma, 55,414.

RT	21000	5g
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➤ **Silver Protein, Strong**

Protargol, 8.3% Ag CAS #9008-42-8 Thiery, (1967).

See **Silver Nitrate**, page 62 >>>>

RT	21100	10g
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➤ Silver Nitrate, Reagent, A.C.S.

AgNO₃ F.W. 169.89 CAS #7761-88-8
 Assay99.9+%

A.C.S. Specifications:

Substances not precipitated by HCl.....max 0.010%
 Sulfatemax 0.0002%
 Coppermax 0.0002%
 Ironmax 0.0002%
 Leadmax 0.001%

References for Silver stain:

- Elektronemikroskopische Swift, J.A. (1968). The electron histochemistry of cystine-containing proteins in thin transverse sections of human hair. *J.R. Microsc. Soc.* 88,449.
- Elektronemikroskopische Thiery, J.P. (1967). Mise en evidence des Polysaccharides sur coupes fines en microscopie electronique. *J. Microsc. (Paris)* 6,987.
- Elektronemikroskopische Rambourg, A. (1967). An improved silver methenamine technique for the detection of periodic acid-reactive complex carbohydrates with the electron microscope. *J. Histochem. Cytochem.* 15, 409.
- Elektronemikroskopische Hernandez et al., (1968). Periodic acid-chromic acid-methenamine silver technique for glycoprotein detection in the electron microscope. *J. Histochem. Cystochem.* 16, 507.
- Elektronemikroskopische Ribí, W.A. (1976). A golgi-electron microscope method for insect nervous tissue. *Stain Technol.* 51,13.
- Elektronemikroskopische Braak, H., and Braak, E. (1982). A simple procedure for electron microscopy of Golgi-impregnated nerve cells. *Neurosci. Lett.* 32,1.

RT	21050	25g
RT	21052	100g

For our Silver Nitrate Solutions, see page 463 >>>>

➤ Sodium Acetate, Trihydrate Reagent, A.C.S.

CH₃COONa·3H₂O F.W. 136.08 CAS #6131-90-4
 A.C.S. Specifications:
 Assay99.0-100.5%
 Ca, Mg and R₂O₃ ppt.....0.01%
 Chloride0.001%
 Insoluble Matter0.005%
 Iron, Heavy metal, Phosphate5ppm/ea
 Sulfate0.002%
 Potassium0.005%
 pH of 5% sol. @ 25°C.....7.5-9.2

RT	21120	500g
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➤ Sodium Bicarbonate, Powder, Reagent, A.C.S.

NaHCO₃ F.W. 84.01 CAS #144-55-8
 Assay97.7-100.3%

Specifications:

Insoluble Matters0.015%
 Chloride0.003%
 Phosphate0.001%
 Sulfur Compounds0.003%
 Ammonium5ppm
 Iron0.001%
 Potassium0.05%

RT	21125	500g
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➤ Sodium Bisulfite Solution

A 1% aqueous stock solution for fungal staining.

RT	26084-05	Sodium Bisulfite Solution	500ml
RT	26084-06	Sodium Bisulfite Solution	1 L

➤ Sodium Borate, Tetra, Granular, Reagent, A.C.S.

See Borax Tetra, page 25 >>>>

➤ Sodium Cacodylate Trihydrate

Sodium dimethyl arsenate

See Cacodylic Acid-Sodium salt, page 30 >>>>

RT	12300	100g
RT	12310	500g

➤ Sodium Cacodylate, Buffer Solution

See Buffer Section, page 28 >>>>

RT	11650	225ml
RT	11652	500ml

➤ Sodium Carbonate, Anhydrous, Reagent, A.C.S.

Na₂CO₃ F.W. 105.99 CAS #497-19-8

Specifications:

Insoluble Matters0.01%
 Loss on Heating at 280°C.....1.0%
 Chloride0.001%
 Phosphate0.001%
 Nitrogen Compounds0.001%
 Sulfur Compounds.0.003%
 Ammonium Hydroxide ppt.0.01%
 Arsenic1ppm
 Ca and Mg0.01%
 Heavy Metals5ppm
 Iron5ppm
 Potassium0.005%
 Silica (SiO₂)0.005%

RT	21135	500g
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➤ Sodium Citrate, Granular, USP Grade

Na₃C₆H₅O₇·2H₂O F.W. 294.11 CAS #6132-04-3

Assay99.9%
 Insoluble Matters0.005%
 Free Acid (as Citric)0.02%
 Free Alkali0.05%
 Chloride0.003%
 Sulfate0.005%
 Calcium0.005%
 Heavy Metals3ppm
 Iron0.001%

RT	21140	500g
----	-------	------

➤ Sodium Ethylate

(Sodium Ethoxide) C₂H₅ONa F.W. 68.05 CAS #141-52-6

Used as an agent for flattening thick sections (0.5-2.0 micron) of epoxy embedded material.

Felix Sierra, Christa Hegele-Hartung and Henning M. Beier (1990).

An improved technique for flattening semithin sections of epoxy-embedded tissues used for high resolution light microscopy.

J. of Microscopy Vol 159, Pt 1, (July 1990), pp. 95-98

RT	21150	25g
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TECHNICAL TIP

An Improved Technique For Flattening Semithin Sections Of Epoxy-Embedded Tissues Used For High-Resolution Light Microscopy

A stock solution (saturated sodium ethoxide in absolute ethanol) is stored in a dark, closed bottle, and is diluted prior to use with an equal volume of absolute ethanol. The exposure time is no longer than 2 minutes, and the section thickness is not more than 0.5 - 1.0 micron. Use with the above solution permits successful flattening of epoxy-embedded sections and therefore improves the staining properties of semithin sections and also offers better immunoreactions in immunocyto-chemistry. As well, it is a useful agent for removing folds and crumbles from semithin epoxy resin sections.

Felix Sierra, et al. (1990) J. of Microscopy, Vol. 159, Pt 1, pg. 95-98.

➤ **Sodium Hydroxide, Pellets, Reagent, A.C.S.**

NaOH F.W. 40.00 CAS #1310-73-2
Assay>97.0%

Specifications:

Sodium Carbonate1%
Nitrogen Compounds0.001%
Chloride0.005%
Phosphate0.001%
Sulfate0.003%
Heavy Metals0.002%
Ammonium Hydroxide ppt.....0.02%
Iron.....0.001%
Potassium0.02%
Nickel0.001%
Mercury0.1ppm

RT	21160	100g
RT	21162	500g

For our Sodium Hydroxide Solutions, see page 464 >>>>

➤ **Sodium Hydroxide, Solution**

CAS #1310-73-2
Carbonate-free. This solution is prepared from ACS Reagent grade sodium hydroxide, and is standardized colorimetrically against potassium biphthalate primary reference material.
Normal Concentration 1.98-2.02

RT	21170	Sodium Hydroxide Solution 2N	225ml
RT	21170-01	Sodium Hydroxide Solution 1N	225ml

➤ **Sodium Methoxide, Anhydrous**

(Sodium Methylate) CH₃ONa F.W. 54.03 CAS #124-41-4
Used in the removal of resin from sections.

RT	21200	25g
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➤ **Sodium Phosphate, Dibasic, Heptahydrate, Reagent, A.C.S.**

Na₂HPO₄·7H₂O F.W. 268.07 CAS #7782-85-6
Assay98.0-102.0%
Loss on Drying @ 105°C43-50%
pH of a 5% solution @25°C.....8.7-9.3

Specifications:

Insoluble Matters<0.005%
Chloride0.001%
Nitrogen Compounds0.001%
Sulfate0.005%
Arsenic0.0005%
Heavy Metals0.001%
Iron.....0.001%

RT	21180	500g
RT	21182	1 kg

➤ **Sodium Phosphate, Monobasic, Hydrate, Reagent, A.C.S.**

NaH₂PO₄·H₂O F.W. 137.99 CAS #10049-21-5
Assay98.0-102%
pH of a 5% solution @25°C.....4.1-4.5

Specifications:

Insoluble Matters<0.01%
Chloride5ppm
Nitrogen Compounds0.001%
Sulfate0.003%
Arsenic0.5ppm
Heavy Metals0.001%
Iron.....0.001%

RT	21190	500g
RT	21192	1 kg

➤ **Sodium Sulfite, Reagent, A.C.S.**

Na₂SO₃ F.W. 126.04 CAS #7757-83-7
Assay>98.0%

Specifications:

Insoluble Matters0.005%
Free AcidTo Pass Test
Titratable Free Base0.03meq/g
Chloride0.02%
Arsenic0.0001%
Heavy Metals0.001%
Iron.....0.001%

RT	21300	1 kg
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For our Sodium Bisulfite Solutions, see page 464 >>>>

TECHNICAL TIP

Temperature Conversion for Your Convenience

Degree Fahrenheit = (1.8 x Degree Celsius) + 32

Degree Celsius = 0.555 (Degree Fahrenheit - 32)

► Sodium Tartrate, Reagent, A.C.S.

$\text{Na}_2\text{C}_4\text{H}_4\text{O}_6 \cdot 2\text{H}_2\text{O}$	F.W. 230.08	CAS #6106-24-7
Assay	99.5%-101.0%	
pH of a 5% solution @25°C	7.0-9.0	
Loss on Drying @150°C	15.61-15.71%	

Specifications:

Insoluble Matters	0.005%
Chloride	0.0005%
Phosphate	0.0005%
Sulfate	0.005%
Ammonium	0.003%
Calcium	0.01%
Heavy Metals	0.0005%
Iron	0.001%

- Used with Bismuth subnitrate to enhance contrast in general. Riva, A. (1974). A simple and rapid staining method for enhancing the contrast of tissues previously treated with uranyl acetate. *J. Microscopie*, (Paris) 19:105
- Ainsworth, S.K., Ito, S. and Karnovsky, M.J. (1972). Alkaline Bismuth reagent for high resolution ultrastructural demonstration of periodic-reactive sites. *J. Histochem. Cytochem.*, 20:995

RT	21350	25g
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For our Sodium Thiosulfate Solutions, see page 464 >>>>**► Sodium Tungstate, Reagent, A.C.S.**

$\text{Na}_2\text{WO}_4 \cdot 2\text{H}_2\text{O}$	FW 329.86	CAS #10213-10-2
Assay	99.0-101.0%	

Specifications:

Insoluble Matters	0.01%
Chloride	0.005%
Molybdenum	0.001%
Nitrogen	0.001%
Sulfate	0.01%
Arsenic	0.0005%
Heavy Metals	0.001%

- Stockert, J.C. (1977). Sodium Tungstate as a stain in electron microscopy. *Biol. Cellul.*, 29:211
- Takeuchi, I.K. (1981). Differential staining of nucleoli and chromatin by sodium tungstate. *J. Electron Microsc.*, 30:150

RT	21400	25g
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► Sorensen's Phosphate Buffers

0-5C	11682-05	500ml
0-5C	11682-10	1L

► (SPURR), Low Viscosity Embedding Kit**See Embedding Media Kits, page 96 >>>>**

RT	14300	kit
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TECHNICAL TIP**Improving the Adhesion of Sections Filmless Grids**

To increase the adhesion of sections to the grids in order to perform a lengthy immunolabeling procedure or with serial sections, refer to: Zelechowska, M.G. and Potworowski, E.F. (1985). Improved adhesion of ultrathin sections to filmless grids. *J. Electron Microsc.* Tech., 2:389

► Staining Solutions

We now offer a complete line of prepared, ready-to-use, high quality staining solutions for all standard staining procedures used by the Biological Staining Commission and the Armed Forces Institute of Pathology.

- All solutions and concentrations are packaged and prepared in convenient and precise quantities.
- Premixed ready-to-use; saves you time and effort
- Consistently uniform results are obtained.

For a complete list and description of all of our stains, please see pages 466-475 >>>>**For Prepared Staining Kits, see pages 476-487 >>>>****► Styrene Embedding Kit****See Embedding Media Kits, page 97 >>>>**

RT	14650	kit
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► Styrene, Reagent

(Vinylbenzene) $\text{C}_6\text{H}_5\text{CH}=\text{CH}_2$	F.W. 104.14	CAS #100-42-5
Specific Gravity ($\text{H}_2\text{O}=1$):	0.909	
Assay	>99.0%	
Stabilizer (p-tert-Butylcatechol)	10-15ppm	

A monomeric styrene used as an embedding media for ultramicrotomy.

- DeLamater, E.D., et al (1971). The use of styrenes as embedding media for electron microscopy. *Pro. 29th Ann. Meet. EMSA*, p. 488. Claitor's Pub. Division, Baton Rouge, LA
- Kushida, H. (1962b). On ultraviolet polymerization of styrene resins in embedding for electron microscopy. *J. Electron Microsc.*, Vol. 2. p.10. Academic Press, New York.
- Kushida, H. (1961a). A styrene-methacrylate resin embedding method for ultrathin sectioning. *J. Electron Micro.*, 10:16

RT	21500	450ml
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► Succinic Acid, Crystal, Reagent, A.C.S.

$(\text{CH}_3\text{COOH})_2$	F.W. 118.09	CAS #110-15-6
m.p. 185-191°C		
Assay	>99.0%	

Specifications:

Insoluble Matters	0.01%
Chloride	0.001%
Sulfate	0.003%
Phosphate	0.001%
Nitrogen Compound	0.001%
Heavy Metals	5ppm
Iron	5ppm

RT	21550	100g
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► Sucrose, Reagent, A.C.S.

$\text{C}_{12}\text{H}_{22}\text{O}_{11}$	F.W. 342.20	CAS #57-50-1
Insoluble Matters	0.005%	
Loss on Drying 105°C	0.03%	
Residue after Ignition	0.01%	
Titrateable acid	0.0008meq/g	
Chloride	0.005%	
Sulfate	0.005%	
Heavy Metals	5ppm	
Iron	5ppm	
Invert Sugar	0.05%	

RT	21600	500g
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➤ **Sudan Black B, Certified, C.I. #26150**

(Solvent Black 3) $C_{29}H_{24}N_6$ M.W. 456.56 CAS #4197-25-5
Solubility: Water-insoluble; Alcohol-soluble; 4.0% Cellosolve; 1.0% Glycerol.

RT 21610 25g

➤ **Sure-cut Surfactant**

Epoxy resins are easier to section with glass, as well as diamond knives, when the embedding medium contains 0.5-1.0% of our SURE-CUT. The life of the diamond knife will be extended with its use because it will reduce the friction of the plastic block during sectioning.

**EMS
EXCLUSIVE**

RT 21630 50g

➤ **Sym-Collidine, Buffer kit**

See Buffers section, page 28 >>>>

RT 11500 one set

RT 11510 box/5 sets

➤ **Sym-Collidine, Reagent**

See page 29 for more information. >>>>

RT 11520 Sym-Collidine 100ml

➤ **Tannic Acid, Reagent, A.C.S: EM Grade**

$C_{76}H_{52}O_{46}$ F.W. 1701.28 CAS #1401-55-4

RT 21700 100g

➤ **Tannic Acid, Reagent, A.C.S.**

Gallotannin; Chiefly $(C_{14}H_{10}O_9)_n$ F.W. range 1000.00-1500.00
CAS #1401-55-4

Low Molecular Weight. Suitable for electron microscopy

■ Takagi, M., Parmley, R.T., Denys, F.R. and Kageyama, M. (1983). Ultrastructural visualization of complex carbohydrates in epiphyseal cartilage with the tannic acid-metal salt methods. *J. Histochem. Cytochem.*, 31:783

■ Simionescu, N. et al., *J. Cell Biol.*, 70:608 (1976) A Combination of Tannic acid - Glutaraldehyde - Osmium Tetroxide (TAGO) Method. improving membranes contrast.

■ Roubos, E. W. and Van DerWal-Divendel, R.M. (1980). Ultrastructural analysis of peptide-hormone released by exocytosis. *Cell Tiss. Res.*, 207:267

■ Buma, P., Roubos, E.W. and Buijs, R.M. (1984). Ultrastructural demonstration of exocytosis of neural, neuroendocrine, and endocrine secretions with an in vitro tannic acid (TARI) method. *Histochemistry*, 80:247

■ Buma, P. and Nieuwenhuys, R. (1987). Ultrastructural demonstration of oxytocin and vasopressin release sites in the neural lobe and median eminence of the rat by tannic acid and immunogold methods. *Neurosci. Lett.*, 74:151

■ Brooks, J.C. and Carmichael, S.W. (1987). Ultrastructural demonstration of exocytosis in intact and saponin-permeabilized cultured bovine chromaffin cells. *Am. J. Anat.*, 178:85

RT 21710 100g

For our Tannic Acid Solutions, see page 464 >>>>

Technovit: Glycol Methacrylate Embedding Kits, see Embedding Media Kits, page 98-100 >>>>

➤ **TMB, 3,3',5,5'-Tetramethylbenzidine**

$C_{16}H_{20}N_2$ F.W. 240.35 CAS #54827-17-7
m.p. 166-169°C

Assay >>>>98%

A non-carcinogenic substitute for DAB and DAB-HCl. Used as a sensitive and specific reagent for the detection of blood.

■ Standefer, J.C., Vanderjagt, D. (1977) Assay of Hemoglobin. *Clin. Chem.* 23, 749.

■ Boss, E.S., et al., (1981). Assay of Peroxidases. *J. of Immunoassay.* 2,187.

■ Holland, V.R., et al., (1974) *Tetrahedron*, 30, 3299.

RT 13070 1g

➤ **TMB-HCl, Dihydrochloride TMB**

$C_{16}H_{20}N_2 \cdot 2HCl$ F.W. 313.30 CAS #64285-73-0
m.p. >300°C

Assay >>>>98% (Cl)

0-5C 13074 TMB-HCl 1gm

Also available in tablet form. 1mg/ tablet, ready to use.

0-5C 13075 TMB-HCl tablets 10 tabs/bottle

0-5C 13076 TMB-HCl tablets 50 tabs/bottle

➤ **(TMA), Tetramethylene Glycol**

Dimethacrylate (1,4-Butanediol dimethacrylate)
 $[H_2C=C(CH_3)CO_2CH_2CH_2]_2$ F.W. 226.68 CAS #2082-81-7

Specific Gravity ($H_2O=1$): 1.023

b.p. @4 mmHg 132-134°C

Inhibited with 200 ppm hydroquinone monomethyl ether.

RT 21750 100ml

➤ **TMS, Tetramethylsilane, 99.9%**

$Si(CH_3)_4$ M.W. 88.22 CAS #75-76-3

b.p. 26.6-26.7°C

Flashpoint: 28°C

An organo-silicon compound tetramethylsilane (TMS) is used as an internal standard for nuclear magnetic resonance (NMR). It is chemically inert and has a boiling point of 26.6°C which is lower than acetone (53.6°C), and other highly volatile liquids, such as diethyl ether (34.5°C) and 1,2-epoxy propane (36.4°C). It is soluble in most organic solvents but insoluble in water. All of these properties make TMS an ideal solvent for tissue drying, which preserves excellent tissue surface details. Dey, Sudip. et al. (1989). A new rapid method of air-drying for scanning electron microscopy using tetramethylsilane. *J. of Microscopy*, Vol 156, pp. 259-261.

RT 21760 100ml

➤ **(TC-NBT), Thiocarbonyl Nitro-Blue Tetrazolium**

(2,2'-Di[p-nitrophenyl]-5,5'-di[p-thiocarbonylphenyl]-3,3'-[3,3'-dimethoxy-4,4'-biphenylene]ditetrazolium chloride)

$C_{42}H_{32}Cl_2N_{12}O_6S_2$ F.W. 935.8 CAS #36889-43-7

RT 21800 100mg

For Nitro-Blue Tetrazolium, see page 54 >>>>

➤ **(TCH), Thiocarbohydrazide, Highest Purity**

$\text{H}_2\text{NNHCSNHNH}_2$ F.W. 106.15 CAS #2231-57-4
b.p. 171°C (decomposed)
Osmiophilic reagent.

An indefinite shelf life due to a special purification process.

- Seligman A.M. et al (1965). Histochemical demonstration of some oxidized macromolecules with thiocarbohydrazide (TCH) or thiosemicarbazide (TSC) and osmium tetroxide. *J. Histochem. Cytochem.*, 13:629
- Seligman, A.M. et al (1966). A new staining method (OTO) for enhancing contrast of lipid-containing membranes and droplets in osmium tetroxide fixed tissue with osmiophilic thiocarbohydrazide (TCH). *J. Cell Biol.*, 30:424
- Thiery, J.P. (1967). Mise en evidence des polysaccharides sur coupes fines en microscopie electronique. *J. Microsc.*, 6:987
- Lo, H.K. et al (1987). A modified periodic acid-thiocarbohydrazide-silver proteinate staining sequence for enhanced contrast and resolution of glycogen depositions by transmission electron microscopy. *J. Histochem. Cytochem.*, 35:393
- Neiss, W.F. (1988). Enhancement of the periodic acid-Schiff (PAS) and periodic acid-thiocarbohydrazide-silver proteinate (PA-TCH-SP) reaction in LR White sections. *Histochemistry*, 88:603
- Hanker, J.S. et al (1964). Osmiophilic reagents: new cytochemical principles for light and electron microscopy. *Science, N.Y.*, 146:1039
- Derenzini, M., et al (1986). An improved periodic acid-thiosemicarbazide-osmium technique to reveal glyco-conjugates at the molecular level in situ. *J. Histochem. Cytochem.*, 34:1161

RT 21900 5g

➤ **Thiosemicarbazide**

$\text{NH}_2\text{CSNHNH}_2$ F.W. 91.14 CAS #79-19-6
m.p. 181-183°C
Assay>99.0%

References for use-see Thiocarbohydrazide above.

RT 22000 25g

➤ **Tissue Marking Dyes**

See Histology section, Page 532 >>>>

➤ **Toluene Reagent, A.C.S.**

$\text{C}_6\text{H}_5\text{CH}_3$ FW 92.14 CAS #108-88-3
Specific Gravity ($\text{H}_2\text{O}=1$): 0.866
b.p. 110-111°C
Assay99.9%
Specifications:
Color (A.P.H.A.)10.
Residue after evaporation0.001%
Subs. darkened by H_2SO_4 To pass test
Sulfur compound (as S)0.003%
Water0.03%

RT 22030 450ml

RT 22032 4x450ml

➤ **Toluidine Blue 0, Certified, C.I. #52040**

(Basic blue; Methylene Blue T50 or T Extra)
 $\text{C}_{15}\text{H}_{16}\text{N}_3\text{SCl}$ FW 305.83 CAS #92-31-9
Dye Content: approx. 85% min.
Solubility: 3.25% Water; 1.75% Alcohol; 3.5% Cellosolve; 5.5% Glycol;
0.0% Xylene

- A general stain for epoxy thick sections. Barajas et al.(1981) Identification of renal neuroeffector junctions by electron microscopy of reembedded light microscopic autoradiograms of semithin sections. *J. Ultrastruct. Res.* 77: 379.Campbell, R.D., And Hermans, C.O. (1972). A rapid method for resectioning 0.5 - 4.0 micron epoxy sections for electron microscopy. *Stain Technol.* 47:115.

RT 22050 50g

TECHNICAL TIP

A Toluidine Blue/Basic Fuchsin Stain For Gma Embedded Tissues

Solution A: Toluidine blue 0 (EMS #22050)/Sodium Borate Tetra (EMS #21130); 1% each in distilled water

Solution B: 1% Basic Fuchsin; 50% Ethanol in distilled water.

Both solutions are stable in amber glass-stoppered bottles for 6 months when stored at room temperature. The working solution is prepared by adding 3ml of Solution B to 60ml distilled water. The section is covered with a few drops of Solution A for 3 to 5 minutes on a hot plate at 55-60°C. Excess stain is washed off in running tap water. After drying on the hot plate, the sections are then stained by covering them with a few drops of Solution B for 1 minute at room temperature. They are washed well in running tap water, dried on a hot plate, and mounted with mounting medium (such as Entellan, EMS #14800; DPX, EMS #13510; Depex, EMS #13514; etc.) The colors that are obtained on human tissue with this staining technique are as follows: nuclei: stained dark-blue; cytoplasm and connective tissue fibers: stained in various shades and intensities of red.

Monica A. Abrew, et al. (1993) *The J. of Histotechnology*, Vol. 16, No. 2.

➤ **Tricresyl Phosphate**

(Tritolyl Phosphate)
 $(\text{CH}_3\text{C}_6\text{H}_4\text{O})_3\text{PO}$ F.W. 368.37 CAS #1330-78-5
Specific Gravity ($\text{H}_2\text{O}=1$): 1.16

A mixture of isomeric Tritolyl Phosphates, usually excluding the very toxic group ortho-isomer. Used to prepare benzoyl peroxide paste, which acts as a catalyst for water miscible resins.

RT 22150 225ml

➤ **2,4,6-Tri(Dimethylaminomethyl)-Phenol**

See DMP-30, page 34 >>>>

RT 13600 50ml

➤ **2,4,6-Trinitrophenol**

See Picric acid, page 58 >>>>

RT 19550 100g

➤ **Tris (Hydroxymethyl) Aminomethane, Free-base, Reagent Grade**

White crystalline powder
 $C_4H_{11}NO_3$ F.W. 121.14 CAS #77-86-1
 A 40% (w/v) aqueous solution. It is clear and colorless.
 Assay>99.9%
 Water<0.2%
 Heavy Metals2ppm

RT	11700	100g
RT	11720	500g

➤ **Tris (Hydroxymethyl) Aminomethane**

For more information, see page 29 >>>>

Tris Maleate Buffer 0.2M pH range 6.4-8.0

0-5°C	11730	250ml
0-5°C	11740	500ml

Tris Buffer 0.2M pH 8.0

0-5°C	11730-05	250ml
0-5°C	11730-06	500ml

Tris Buffered Saline pH 7.4

0-5°C	11730-08	250ml
0-5°C	11730-09	500ml

Tris-HCL Buffer 1M pH range 6-8

0-5°C	11730-12	250ml
0-5°C	11730-15	500ml

Tris HCL Buffer pH range 7.2-9.0

0-5°C	11730-20	250ml
0-5°C	11730-25	500ml

Tris Buffer pH 10 (10x)

2-8°C	64142-11	100 ml
2-8°C	62142-12	1000 ml

➤ **Triton® X-100**

(Polyethylene glycol tert-octylphenyl ether)
 $C_{14}H_{22}O(C_8H_{14}O)$ CAS #9002-93-1
 Specific Gravity ($H_2O=1$): 1.065

RT	22140	100ml
RT	22142	500ml

➤ **Triton® X-100, 1% Aqueous Solution**

Prepared 1% Triton X-100 in Deionized-Distilled water. Used for whole-cell preparations. Marek, L.F., and Kelly, R.O. (1983). A simple technique for the visualization of whole mount cytoskeletons with transmission electron microscopy. Anat. Rec. 207, 365. Pudney, J., and Singer, R.H. (1980). Intracellular filament bundles in whole mounts of chick and human myoblasts extracted with Triton X-100. Tissue cell 12, 595.

RT	22145	500ml
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➤ **Triton® X-100, 0.08% Aqueous Solution**

A prepared solution for the cleaning of diamond knives.

RT	22146	500ml
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➤ **Trypsin 1:100, Powder**

CAS #9002-07-7
 Extract from Porcine Pancreas.
 Activity>100 NF units/mg

Used for whole cell preparations. (see references in Triton X-100) >>>>

RT	22200	25g
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➤ **Trypsin Reagent**

Trypsin is used for proteolytic digestion of formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies.

Reagent: This enzyme is supplied as concentrated form along with buffer. The kit comes in 2 sizes. Small: Reagent B (Buffer) is 15 ml and the Reagent E (Enzyme) is 2 ml

Large: Reagent B (Buffer) is 100 ml and the Reagent E (Enzyme) is 10 ml

For more information, see page 29 >>>>

2-8°C	64142-01	Trypsin Kit Small	Kit
2-8°C	62142-02	Trypsin Kit Large	Kit

➤ **12-Tungstosilicic Acid**

(Silicotungstic acid)

$H_4[SiO_4.(W_3O_{12})_4].xH_2O$ M.W. 2878.29+aq CAS #11130-20-4

RT	22240	25g
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➤ **Tyrode Solution**

Ingredients: NaCl; KCl; $CaCl_2.6H_2O$; $MgCl_2.6H_2O$; $NaHCO_3$; NaH_2PO_4 ; Glucose; and Distilled water.

RT	11760-05	Tyrode Solution	500ml
RT	11760-10	Tyrode Solution	1 L

➤ **Universal Immunoassay Buffer™, 10X**

Immunoassay buffer is used as a 1X in all immunoassays (immunofluorescence, IHC, ELISA, WB etc.) as a washing buffer and it can be used as a dilution buffer for antibodies; however it does not contain any carrier proteins. This buffer also does not contain any phosphate, sodium azide or mercury as preservatives and can be used for dilution of all antibodies, including peroxidase, antibodies to phosphoproteins. It is not suitable for dilution of antibodies to S100 proteins.

■ **Reagent Supplied: 10X Buffer**

■ **Application: Dilute this 10X buffer 10 times with DI water. (90 ml water + 10 ml this buffer – mixed well). Wash 3-5 times with this buffer in between the steps of your immunoassay protocol.**

RT	25880-01	Universal Immunoassay Buffer, 10X	100 ml
RT	25880-10	Universal Immunoassay Buffer, 10X	1 L

➤ **Universal Antibody Dilution Buffer™**

This ready-to-use Universal Antibody Dilution Buffer is designed for dilution of antibodies in all immunoassays, including immunofluorescence, IHC, ELISA, WB. This buffer does not contain any mammalian proteins, phosphate, sodium azide, or mercury preservatives and can be used for dilution of all antibodies, including peroxidase, and antibodies to phosphoproteins. However, it is not suitable for dilution of antibodies to S100 proteins,

■ **Application: Dilute antibodies, primary or secondary as recommended in the protocol by the manufacturer of these products.**

■ **Storage: 2 – 8°C. Diluted antibodies can be stored at 2° – 8°C for several weeks, depending upon the stability of antibodies.**

2-8°C	25885-01	Universal Antibody Dilution Buffer	100 ml
2-8°C	25885-05	Universal Antibody Dilution Buffer	500 ml
2-8°C	25886-01	Antibody Dilution Buffer, free BSA	100 ml
2-8°C	25886-05	Antibody Dilution Buffer, free BSA	500 ml

➤ **Unicryl Embedding and Staining Kit**

See Embedding Media Kits, page 101 >>>>

RT	14960	kit
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URANYL AND URANIUM COMPOUNDS

Here at Electron Microscopy Sciences we have a complete range of Uranyl and Uranium compounds, such as Uranyl Chloride, Uranium Oxide (U₃O₈), Uranium Tri-Oxide (UO₃), Uranium Dioxide (UO₂), just to name a few.

All of our products are manufactured from depleted Uranium.

We also manufacture Uranium Mono Carbide and Uranium Di Carbide products for Ion Beam Research.

For any that are not listed please contact us today.

► Uranyl Acetate, Reagent, A.C.S.

UO₂(OCOCH₃)₂·2H₂O F.W. 424.14 CAS #541-09-3
Assay98.0-102.0%

Specifications:

Insoluble Matters0.01
Chloride0.003%
Sulfate0.01%
Alkalies (as SO₄)0.05%
Heavy Metals0.002%
Iron.....0.001%

A universal EM stain for thin sections, en-block staining, and negative staining.

RT **22400** 25g

► UAR-EMS Uranyl Acetate Replacement Stain

A non-radioactive substitute for uranyl acetate with comparable results. Avoids the tedious authorization, shipping and disposal issues involving uranyl acetate without sacrificing performance. Two lanthanide salts, samarium and gadolinium triacetate, effectively used for staining plastic-embedded animal and plant tissues. Also for negative staining of macromolecules. Not recommended as a fixative.

RT **22405** UAR-EMS Stain 25 ml

TECHNICAL TIP

EMS' UAR-EMS Stain is a new negative stain which may be used as an alternative to Uranyl Acetate

Procedure: The UAR Stain is supplied as a concentrate. Please use the following dilutions:

- For most samples, including but not limited to, virus', dilute by 4x in distilled water
- If you are working with Bacillus, then a dilution of 15-40x is needed.

Staining will take place in 30 minutes at room temperature. For increased contrast of the stain, simply adjust the staining time.

Reference Article: Nakakoshi, Masamichi, Hideo Nishioka and Eisaku Katayama, 2011. New versatile reagents for biological transmission electron microscopy that substitute for uranyl acetate. *Journal of Electron Microscopy*, 60(6): 401-407.

► Platinum Blue, an EM Stain

IBI Blue Platinum Stain Pt₄N₈H₆O₂₄C₂₀

An EM stain that may have the ability to replace Uranyl Acetate in some instances. If you have issues with having Uranium salts that are radioactive (depleted or not) in the lab this may be the answer for you.

An alternative for staining TEM thin sections

RT **22407** Platinum Blue 1 ml

► Uranyl Acetate Solution

We are now offering Uranyl Acetate Pre-Made and ready to use in solution making your work easier. The following Percentages are available off the shelf (1, 2, 3, 4,). All other percentages are available upon request.

RT	22400-1	1% Uranyl Acetate Solution	100ml
RT	22400-2	2% Uranyl Acetate Solution	100ml
RT	22400-3	3% Uranyl Acetate Solution	100ml
RT	22400-4	4% Uranyl Acetate Solution	100ml

TECHNICAL TIP

Contamination Of Ultra Thin Sections

Hilton H. Mollenhauer (JEMT 5:59-63, 1987) suggested two ways to eliminate contamination of ultra thin sections by precipitation when staining with uranyl acetate and/or lead citrate (lead acetate). One of the ways is as follows: Place each nickel or copper grid (with section) on a drop of 0.5N HCl for 0.5 minutes for Lowicryl K4M sections or for 1-2 minutes for Epon 812 (or replacement) sections. Then rinse each grid in deionized water and blot dry on filter paper. Now you can restain with uranyl acetate and/or lead as the HCl does have a tendency to bleach the sections.

- Suzanne J. Botkin. "A Staining Tip" *EMSA Bulletin* 22:3 Nov. 1992.

TECHNICAL TIP

Removal Of Lead Citrate And Uranyl Acetate Precipitates On L.R. White Sections

Pamela Neill, Center of Biotechnology, Baylor College of Medicine, The Woodlands, TX

INTRODUCTION: L.R. White (EMS cat. #14380) is a hydrophilic embedding agent which allows aqueous solutions to easily pass through thin sections. Conventional methods for eliminating uranyl acetate precipitates (Hayat, 1986) suggest treating sections with 0.5% oxalic acid for 12 sec., 10% acetic acid for 1 min., or 2% aqueous (or ethanolic) solution (EMS cat. #22400) of uranyl acetate for 1 min. Lead precipitates are eliminated by treatment with 2% aqueous uranyl acetate 2-8 min. at room temperature or 10% aqueous acetic acid for 1-5 min. Unfortunately, these methods may destroy the continuity of L.R. White sections. Our lab has modified the conventional methods of Hayat to avoid or eliminate stain precipitates on L.R. White sections before and after they have been under the electron beam, while keeping the section intact.

MATERIALS AND DISCUSSION: Our first objective is to prevent stain precipitates from forming during the staining process. Warm distilled water is used for the final rinse of the grid to avoid uranyl acetate precipitate. A 10ml beaker of distilled water is set into the curing oven (50°C) during the staining procedure and taken out for use prior to the rinse step. To avoid lead precipitate during the staining process, add one sodium hydroxide pellet in 10ml distilled water. Stain with lead, dip once in the solution, then wash with distilled water.

We have successfully removed uranyl acetate and lead salts from L.R. White embedded sections by dipping the grid in 0.25% filtered oxalic acid. Retain the section 3-4 times longer than the original stain time. This method has worked in our laboratory on sections that have not been under the electron beam for prolonged exposure (30 min. or longer).

- Hayat, M.A. (1986.) *Basic Techniques for Transmission Electron Microscopy*. pg. 225

URANYL AND URANIUM COMPOUNDS (CONTINUED)

➤ **Uranyl Formate**

UO₂(HCO₂)₂·H₂O F.W. 378.08 CAS #16984-59-1
 Purity99.9-100%
 Specifications:
 Specific Gravity:.....3.695
 AppearanceYellow Crystals
 Melting Point1100C
 For ultra fine grain structure, our Uranyl Formate offers amazing advancement in negative staining for microscopy.

RT	22450	1 gram
RT	22451	5 grams

➤ **Uranyl Magnesium Acetate**

UO₂Mg(CH₃COO)₄ F.W.530.0 CAS # 20596-93-4
 Used as a substitute for uranyl acetate in either double-staining techniques and also as a solo stain.

RT	22500	5 grams
RT	22501	1 gram

➤ **Uranyl Nitrate, Hexahydrate Reagent Grade, A.C.S.**

UO₂(NO₃)₂·6H₂O F.W. 502.13 CAS #13520-83-7
 Purity99.9-100%
 Specifications:
 Density2.807 g/cm3
 Solubility~66g/100g H2O
 Melting Point600C
 Boiling Point1180C
 Insoluble Matter<0.005%
 Chloride (Cl)<0.002%
 Sulfate (SO₄)<0.005%
 Alkalies & Alkaline Earths (Sulfates)<0.1%
 Heavy Metals (as Pb)<0.002%
 Iron (Fe)<0.002%
 Substances Reducing Permanganate (as UIV)<0.06%

A Universal EM Negative Stain used for viruses. In tissue samples it stabilizes nucleic acids and cell membranes. These solutions are more stable than uranyl acetate and they react primarily with negatively charged groups in the absence of phosphate ions.

RT	22600	5 grams
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➤ **Uranyl Oxalate**

(COO)₂UO₂·.3H₂O M.W.412.2
 To adjust the pH of Uranyl compounds as well as a negative stain for electron microscopy.

RT	22510	1 gram
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➤ **Uranyl Zinc Acetate**

ZnUO₄(CH₃COO)₂ CAS # 33959-50-1
 Used as a laboratory reagent in the determination of sodium concentrations of solutions.

RT	22610	5 grams
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➤ **Van Gieson's Solution**

To use with Weigert's Iodine or Weigert's Iron as a connective tissue stain.

RT	26046-05	Van Gieson's Solution	500ml
RT	26046-06	Van Gieson's Solution	1 L

➤ **Water Deionized, Reagent Grade A.C.S.**

H₂O F.W. 18.02 CAS #7732-18-5
 EMS Reagent Grade Water is typically prepared at 18 megohm/cm specific resistance using a reverse osmosis, mixed deionization, activated filtration and final filtration at 0.2 microns.
 Color (APHA)<+/-5
 Bacteriological purity0 CFUs/L
 Residue after evaporation10ppm
 Coliformnegative

RT	22800-01	Deionized Water	1 gal
RT	22800-05	Deionized Water	5 gal

➤ **Weigert's Iodine Solution**

A histological stain. Demonstration of connective tissue is useful in cases of emphysema, arteriosclerosis and other vascular diseases.

RT	26045-05	Weigert's Iodine Solution	500ml
RT	26045-06	Weigert's Iodine Solution	1 L

➤ **Weigert's Iron Hematoxylin**

Stain selectivity for nuclei, fungal, and general applications. Ready-to-use.

RT	26044-05	Weigert's Iron Hematoxylin A	500ml
RT	26044-06	Weigert's Iron Hematoxylin A	1 L
RT	26044-15	Weigert's Iron Hematoxylin B	500ml
RT	26044-16	Weigert's Iron Hematoxylin B	1 L

➤ **Wright's Stain, Certified**

CAS #68988-92-1
 Solubility: 0.091% Water; 0.23% Alcohol

RT	22720	25g
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➤ **Wright Staining Solution**

For use as a blood stain. Ready-to-use.

RT	26060-05	Wright Stain Solution	500ml
RT	26060-06	Wright Stain Solution	1 L

➤ **Xylenes, Reagent, A.C.S.**

(Xylol, Dimethylbenzene)
 C₆H₄(CH₃)₂ FW 106.27 CAS #1330-20-7
 Specific Gravity (H₂O=1): 0.865
 b.p. 136-140°C
 This reagent is a mixture of isomers (ortho, meta, and para) and may contain Ethylbenzene
 Specifications:
 Color (A.P.H.A.)10
 Subs. darkened by H₂SO₄To pass test
 Sulfur Compounds (as S)0.003%
 Water0.05%
 Residue after evaporation0.002%

RT	23400	450 ml
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➤ **Xylene: Peanut Oil, 2:1**

RT	23402	Xylene:Peanut oil, 2:1	500 ml
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► Xylene Substitute

A xylene substitute for use in histology and cytology. It is safer and a more preferable alternative to xylene. It can be used as a solvent and clearing agent, as well as for dissolving paraffin waxes, glues and adhesives.

PROPERTIES:

- Minimal tissue shrinkage.
- Dries faster with no residue.
- Non-corrosive and far less toxic than xylene.
- Soluble with alcohol, paraffin embedding media, and mounting media. It can be used in all procedures that require xylene. Biodegradable.

RT	23410-01	Xylene Substitute	1 gal
RT	23410-04	Xylene Substitute	4 x 1 gal

► Xylene Substitute – Hemo-De® *

An intensive study from 1992 throughout 2000 has shown that Hemo-De® (d-Limonene) a terpene-based chemical with a pleasant citrus fragrance, was able to replace many of the clinical laboratories toxic reagents, such as carbol-xylene, xylene, ethyl acetate and formalin.

In Parasitology – Hemo-De replaces ethyl acetate in the concentration procedure; Hemo-De replaces carbol-xylene, xylene and formalin in the trichrome procedure.

In Histology – Hemo-De replaces xylene in most all procedures. Hemo-De is a superior solvent and Clearing agent that can be used in all tissue processing, deparaffinating and slide preparation.

Hemo-De Features:

- Soluble with alcohol and mounting media
- Biodegradable, non-corrosive, non-flammable (Combustible)
- Low toxicity levels
- Contains no benzene and no toluene
- Minimal tissue shrinkage
- Reasonably fast drying and leaves no residue

Hemo-De Application:

In Research and Medical – Hematology, Cytology, Pathology, Microbiology, Histology, Pathology, Hospital

In Mechanical Applications – Cleaning of machine parts, cleaning tools, engines etc.

In Electronic Applications – Circuits boards, electronic components, tools.

General Applications – Clean metal and glass surfaces. Dilute with water can be used to clean all plastic surfaces. Removal of adhesives, glues, tars...

Hemo-De Information:

Chemical name:d-Limonene (Terpene Hydrocarbon, n.o.s.)

Composition:d-Limonene, CAS [5989-27-5]

98.0% Butylated Hydroxyanisole (BHA),
CAS [25013-16-5] <0.024%

Flash Point (TCC):121°F (49.4°C)

Boiling Point:349°F (176°C) @ 760mmHg

Freezing Point:-74°C

Shipping:Terpene Hydrocarbons, n.o.s. ID No. 04858003,
Flammable Liquid, Group III

RT	23412-01	Xylene Substitute	1 gal
RT	23412-04	Xylene Substitute	4 x 1 gal
RT	23412-05	Xylene Substitute	5 gal

NOTE: Hemo-De® is a product of Scientific Solvents

► Histo-Clear®/Histo-Clear II® *

Histo-Clear (Distilled essential oils – food grade) and Histo-Clear II (A mixture of Aliphatic Hydrocarbon and Distilled essential oils – food grade, reduced citrus odor) are excellent non-toxic clearing agents replacing Xylene.

RT	64110-01	Histo-Clear	1 L
RT	64110-04	Histo-Clear	1 gal
RT	64110-10	Histo-Clear	5 gal
RT	64111-01	Histo-Clear II	1 L
RT	64111-04	Histo-Clear II	1 gal
RT	64111-10	Histo-Clear II	5 gal

* Histo-Clear® is register name of National Diagnostics

► Histosol™ - Xylene Substitute

Histosol™ is the original high flash point (114°F TCC) histological clearing agent. It is intended to be used as a replacement for xylene where the hazards associated with aromatic hydrocarbon vapors are to be reduced. Museum-quality tissue slides can be prepared with Histosol without change in protocol or procedure. Histosol is manufactured from petrochemical products and is miscible in all proportions with ethanol, isopropanol, and t-butanol. It is also miscible with all paraffin-based tissue embedding media and all permanent mounting materials.

23405-01	Histosol – Xylene Substitute	1 gal
23405-04	Histosol – Xylene Substitute	4 x 1 gal

► Z6040 Embedding Primer

This unique primer affords you better adhesion between your resin and specimen that you are embedding and prevents the sample from pulling away from the resin during sectioning.

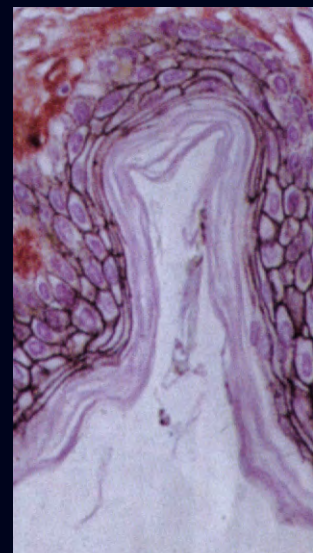
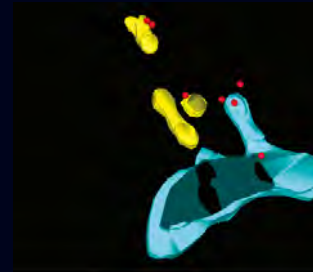
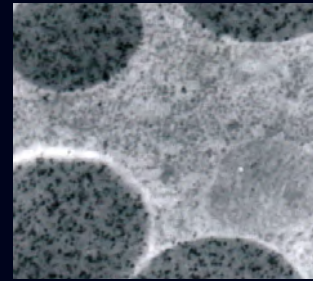
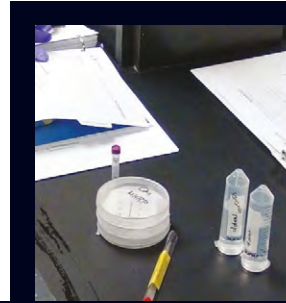
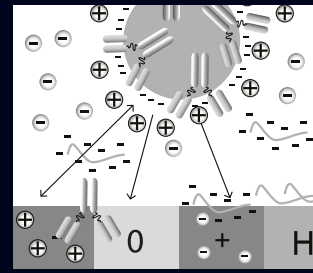
RT	50440-10	Z6040 Primer	100ml
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For our Zenkers Solution, see page 465 >>>>

► Zinc/Formalin – see Formaldehyde/Zinc #15675, page 454 >>>>

ImmunoGold Reagents

- product information
- micrographs
- product listings & ordering
- frequently asked questions
- immunogold and silver staining
- workshops
- custom labeling services
- incubation protocols
- immunogold newsletters & flyers



**Electron
Microscopy
Sciences**

Dear Fellow Researchers,

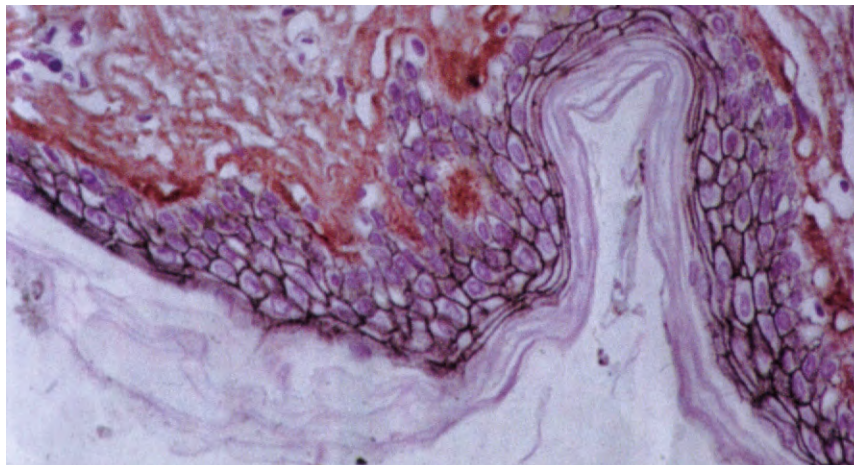
Here at Electron Microscopy Sciences we are very proud to be the exclusive agents of Aurion, the leading manufacturer and developer of a complete line of ImmunoGold Reagents and Accessories in the Netherlands. Aurion is led by the renowned Dr. Jan Leunissen, whom many of you may know through his books that he has written on ImmunoGold labeling as well as the workshops he teaches throughout the world.

Over the years the Aurion line has grown and has been further enhanced to include many unique and exclusive products not available elsewhere. Today their line includes not only the more commonly known reagents for EM and LM but, as well, a newly introduced line of products such as Silver Enhancement specifically for EM, Ultra-Small Fab fragments, Blocking Solutions, and even a line of donkey gold conjugates. With all of the new additions to the line up Aurion and EMS have something for everyone in the ImmunoGold Field.

**Sincerely,
The EMS Team**

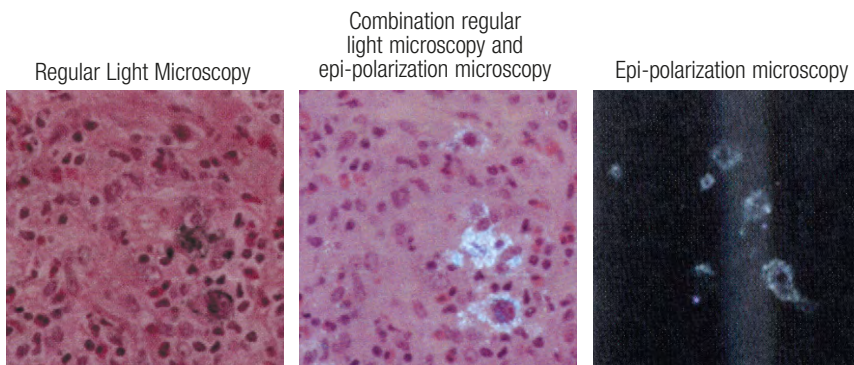
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Immunogold Silver Staining of E-cadherin on a paraffin section of human skin.
Courtesy of R. Moella, Dept. of Exp. Path. EUR, The Netherlands.

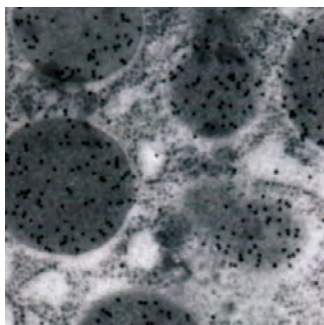
PRODUCTS USED: • Mouse monoclonal anti E-cadherin • GAM IgG UltraSmall • Aurion R-Gent SE-LM



Routine paraffin section of Hodgkin lymphoma stained for CD 15. Reed-Sternberg cells show positive staining in the cytoplasm.

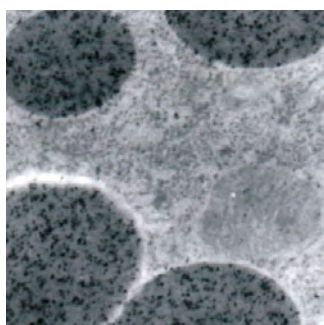
Courtesy of H. Stoop, Laboratory of Pathology and Anatomy, Dordrecht, The Netherlands.

PRODUCTS USED: • Mouse monoclonal CD 15 • GAM IgG UltraSmall • Aurion R-Gent SE-LM



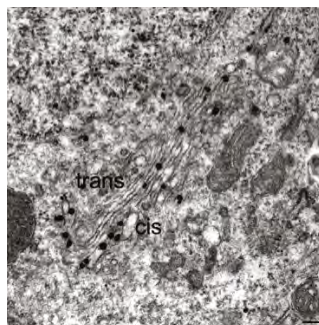
Immunogold silver staining of alpha-amylase on Lowicryl HM20 section of rat pancreas.

• Goat-anti-Rabbit, 15nm

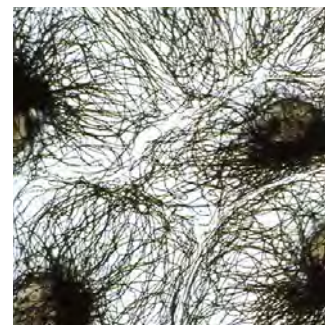


Immunogold silver staining of alpha-amylase on Lowicryl HM20 section of rat pancreas.

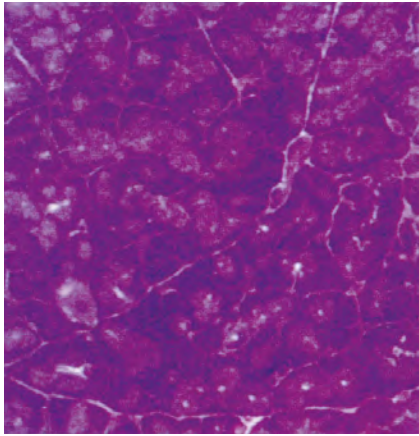
• Goat-anti-Rabbit
• Ultra Small Silver Enhanced (Danscher Method)



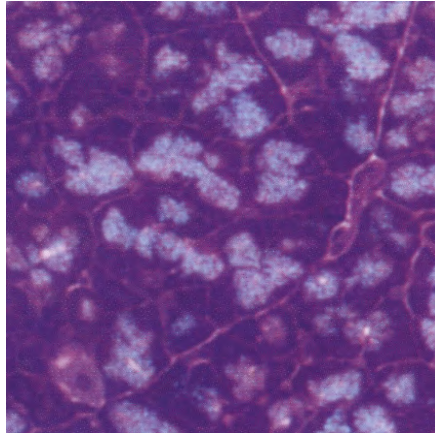
Pre-embedding Immunogold Labeling of Huntingtin Interacting Protein 3 in Mouse Brain using Aurion GAR Fab-US and Aurion SEEM. Courtesy of Ms Hong Yi, Emory University, Atlanta GA



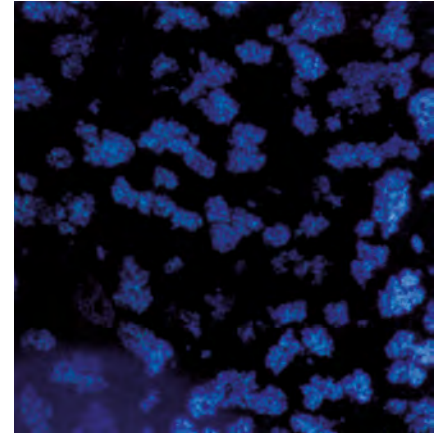
IGSS of tubulin on coverslip culture of PtK2 cells Courtesy of Peter van de Plas, Aurion Costerweg 5, The Netherlands.



Regular light microscopy



Combination regular light microscopy and epi-polarization microscopy



Epi-polarization microscopy

ImmunoGold silver staining of alpha-amylase in light microscopy

Products used: Rabbit polyclonal to alpha-amylase, GAR-GP-Ultrasmall R-Gent

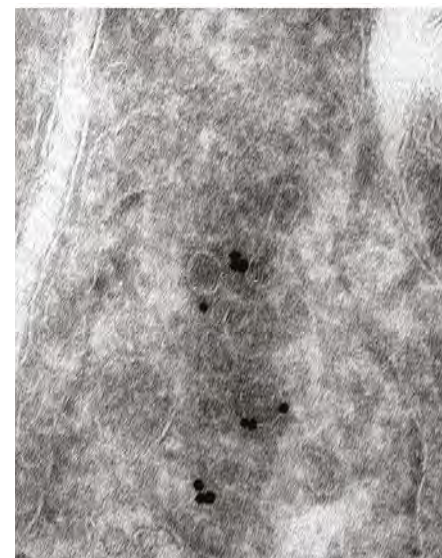
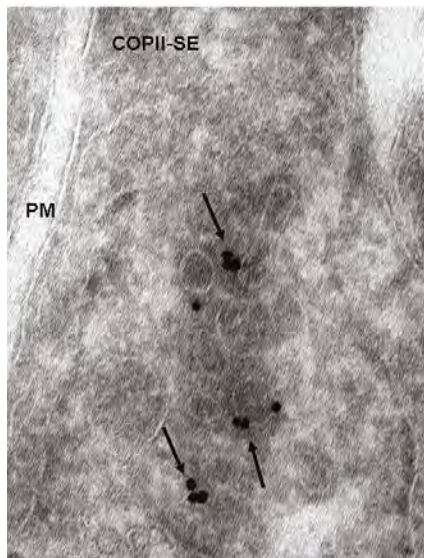
AURION R-Gent SE-EM Application Example

ER exit site in 60 nm-thin cryosection of Hepg2 cells, labeled for COPII (primary antibody against sec23 was obtained by ABR) and detected with Fab-goat-anti-rabbit, conjugated to ultra-small gold, silver enhanced for 30 minutes (from Aurion).

The arrows point to labeled COPII-coats on vesicular and tubular membranes, which are located close to the ER.

The information of a thin section is not sufficient to conclude how the membranes are related to each other- if they are still connected to the ER, or if they are free.

Therefore we performed 3D electron tomography on 400nm thick cryosections, which were labeled similar for COPII. (see next picture).

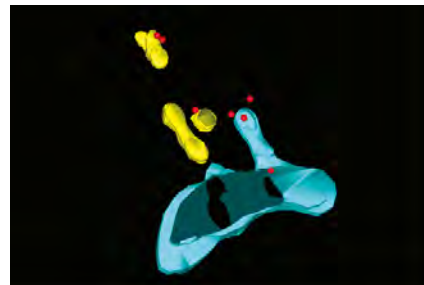


ER = endoplasmic reticulum, PM = plasma membrane, MVB = multi-vesicular body, Bar = 100 micrometer

2 views of a model of a COPII-labeled ER-exit site, resolved from 400nm thick cryo-sections of Hepg2 cells, labeled like described for the ultrathin section before.

Note that the labeling for COPII is assessable throughout the section.

Courtesy of: Dagmar Zeuschner, Judith Klumperman (Department of Cell Biology, UMC Utrecht, The Netherlands) and Willie Geerts, Abraham Koster (Molecular Cell Biology, Utrecht University, The Netherlands)



ER = light blue, Free membrane carriers of vesicular and tubular shape, partially labeled for COPII = yellow, COPII = silver enhanced-red

► Conventional ImmunoGold Reagents

Conventional ImmunoGold Reagents are available in four size classes. The monodisperse size population makes the conjugates suited for multiple labeling with no overlap. The Conventional ImmunoGold Reagents are the classical conjugates in immuno electron microscopy; they are a good choice when the antigen is abundant and the accessibility of the antigen is relatively good.

Introduction

The conventional labeling approach in transmission and scanning electron microscopy utilizes secondary immunogold reagents based on particles that can be observed without enhancement. These conjugates are suited for single and multiple labeling in electron microscopy, when the number of antigens available for binding is such that a relevant signal can be obtained.

The AURION Conventional ImmunoGold Reagents are built around colloidal gold particles with sizes of 6, 10, 15 or 25 nm. The particle population is monodisperse and thus shows minimal size variation and overlap. Typically, the coefficient of variance for the 6 and 25 nm particle size conjugates is less than 12%, whereas the 10 and 15 nm size conjugates show less than 10% variation.

The table below lists a few physical characteristics of gold conjugates.

Particle Diameter	+/- #Au atoms	+/- MWt. (daltons)	+/- #Particles /ml	+/- #Ab (/part)
6	6500	1.3.10 ⁶	2.4.10 ¹³	1-2
10	30.10 ³	6.10 ⁶	5.10 ¹²	7-12
15	100.10 ³	20.10 ⁶	1.5.10 ¹²	25-40
25	470.10 ³	92.10 ⁶	3.3.10 ¹¹	115-180

Features of Conventional Immuno Gold Reagents

- for single and multiple labeling
- gold particle sizes of 6, 10, 15 and 25 nm
- monodisperse particle population
- OD₅₂₀ nm of 1.0 to warrant cluster free storage using a dot-spot test system.
- minimal size variation and overlap
- coefficient of variance: <12% for the 6 and 25 nm conjugates and <10% for the 10 and 15 nm conjugates

Product Description

AURION Conventional ImmunoGold Reagents are tailored to contain 10-20 µg of specific protein/ml. The reagents are supplied in PBS with 1% Bovine Serum Albumin and 15 mM NaN₃ at an OD₅₂₀nm of 1.0 to warrant prolonged cluster free storage. The activity of each lot is determined using a dot-spot test system as described by Moeremans et al., J. Immunol. Methods, 74, (1984), 353. Actual lot specifications (size, variation and expiry date) are indicated on the accompanying package insert.

Regular package: for the labeling of 1000-2000 grids

Small package: for the labeling of 400-800 grids

Specificity

Aurion offers the widest range of Conventional

ImmunoGold Reagents.

AURION Conventional ImmunoGold Reagents are prepared using the highest quality antibodies or binding agents available. All antibodies are immuno affinity purified and immuno cross-adsorbed to reduce non-specific reactions.

Storage

AURION Conventional ImmunoGold Reagents have a guaranteed shelf life of 18 months from the date of quality control analysis.

The products should be stored at 4-8°C. Freezing is not recommended.



TECHNICAL TIP

Application Instructions:

On-Grid Labeling

For most applications grids are floated on top of drops of dilute reagent displayed on a sheet of Parafilm™. The use of gold or nickel grids is recommended.

Whole mount and intact cell labeling

Specimens are kept floating in dilute reagent on a rocking table.

Recommended Incubation Solution:

PBS, (10 mM Phosphate buffer, 150 mM NaCl),

0.1-0.2 % AURION BSA-C™

15 mM NaN₃

pH 7.4

Additional Information

For additional information please see the Aurion ImmunoGold Newsletter and Protocol sections.

TECHNICAL TIP

How to control background in a nutshell

Background Is Controlled by Three Independent Steps

1. Low Molecular Weight Block (before protein block)

Purpose: to inactivate residual fixative e.g. aldehydes, using

- amino acids such as glycine or lysine, or
- aldehyde inactivating compounds such as NaBH₄ and NH₂OH

2. High Molecular Weight Protein Block (before immunolabeling)

Purpose: to prevent stickiness to hydrophobic areas and domains with excessive positive charges based on multiple point interactions (high affinity protein binding capacity), using

- albumin
- normal serum

3. Incubation and Wash solution (during immunolabelling)

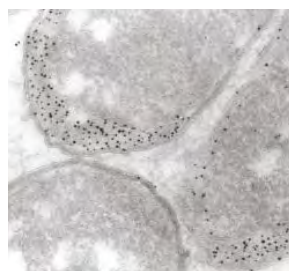
Purpose: to eliminate aspecific binding of immunoconjugates based on hydrophilic interactions ("oligo" point interactions) by competition, using

- acetylated albumin (AURION BSA-c™) in the incubation buffer

Abandoning BSA-c™ molecules compete with antibodies and secondary immuno reagents for aspecific binding to positively charged specimen compounds, thus minimizing background.

Please refer to our Newsletter 1 and Newsflyer 1 for more information on the subject of background.

You can find incubation protocols in "The Aurion method" section.



Immunolabeling of the periplasmic space in ultrathin cryosections of *Escherichia coli* with a protein A gold conjugate. Courtesy M. de Jong

TECHNICAL TIP**Why Ultra-Small Gold Conjugates?**

- More gold particles/secondary antibody instead of more antibodies/gold particle.
- Reduced Steric hindrance.
- More gold particles/surface area in the specimen.
- Maximum penetration.

Reduced Molecular Weight...

- Increased diffusion rates.
- Ultra-Small probes behave similar as uncoupled antibodies.

Reduced Probe Size...

- Reduced overall probe size.
- Reduced hydrodynamic radius.
- Significantly increases penetration into sections and tissues.

The Choice for Ligand Receptor Interactions...

- Each Ligand is separate.
- No capping or patching, each probe unit consists of a single ligand.

Universal Probes...

- Optimally suited for high resolution EM, immuno EM, immunohisto at the LM level, and suited for bio-assays as well.
- One probe for all purposes.

► Ultra Small ImmunoGold Reagents

Aurion Ultra Small Immunogold Reagents are prepared with subnanometer gold particles. These particles have far less influence on the adsorbed antibodies or detecting molecules, and consequently the conjugates behave as though they are uncoupled. In conjunction with the highly efficient and easy-to-use R-Gent SE-LM and SE-EM silver enhancement reagents, the Ultra Small Immunogold Reagents are the best choice for any application.

**Introduction**

Reduction of the gold particle size provides Ultra Small Immunogold Reagents with fundamentally different characteristics when compared with conjugates built around larger particles. While the Conventional Immunogold Reagents can be thought of as particles coated with proteins, Ultra Small Immunogold Reagents are proteins coated with one or more gold particles. With this structure, both the overall size of the conjugates, as well as steric hindrance are decreased.

Gold conjugates physical characteristics.

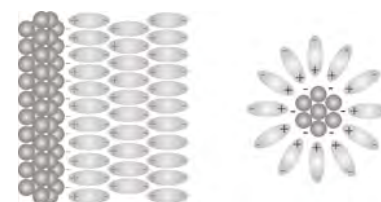
Particle Diameter	+/- #Au atoms	+/- MWt. (daltons)	+/- #Particles /ml	+/- #Ab (/part)
0.8	15	3.10 ³	5.10 ¹⁵	0.1-1
6	6500	1.3.10 ⁶	2.4.10 ¹³	1-2
10	30.10 ³	6.10 ⁶	5.10 ¹²	7-12

The small gold particles also have a tight particle surface curvature which makes it less likely that a structured water dipole layer will build-up around the gold particles. Hence, the hydrodynamic radius of the ultra small gold colloids is reduced. Finally, small gold particles carry less net negative charge; thus, they undergo less charge determined repulsion when approaching the sample surface.

Aurion offers Ultra Small Immunogold Reagents with an average gold particle diameter of 0.8 nm or less. These ultra small gold particles can be visualized directly in high angle annular dark-field-scanning TEM. However, the gold signal is normally visualized after increasing the particle diameter with silver enhancement. The reagents can be used in electron and light microscopy as well as in blotting experiments. The universal applicability makes it easy to compare results obtained with different procedures.

AURION Ultra Small Immunogold Reagents contain 60-80 µg of specific protein/ml for IgG conjugates. F(ab')₂, Fab and biotinylated albumin conjugates contain equimolar amounts of conjugated protein. The average gold cluster diameter is less than 0.8 nm.

AURION Ultra Small Immunogold Reagents are used in conjunction with AURION R-Gent SE-EM or SE-LM silver enhancement reagents, developed for electron microscopy and light microscopy/immunoblotting respectively.



The reagents are supplied in PBS with 1% Bovine Serum Albumin and 15 mM NaN₃.

The activity of each lot is determined using a dot-spot test system as described by Moeremans et al., J. Immunol. Methods, 74, (1984), 353.

The products are available in two package sizes:

Regular package: for 1200 grids or 600 slides

Small package: for 480 grids or 240 slides.

Specificity

Aurion offers the widest range of Ultra Small Immunogold Reagents. The most commonly used reagent types are available as intact IgG, F(ab')₂ and Single Fab conjugates.

AURION Ultra Small Immunogold Reagents are prepared using the highest quality antibodies or binding agents available. All antibodies are immuno affinity purified and immuno cross-adsorbed to reduce non-specific interactions.

Storage

AURION Immunogold Reagents have a guaranteed shelf life of 18 months from the date of quality control analysis.

TECHNICAL TIP**Ultra Small ImmunoGold Reagents Application Instructions****Electron Microscopy Labeling:**

For post-embedding labeling, incubate thin sections by placing grids on drops of reagent arrayed on a sheet of Parafilm™. The use of nickel grids is recommended, especially if silver enhancement procedures are intended. For pre-embedding labeling, float specimens in dilute reagent on a rocking table. For more information on post and pre-embedding labeling see protocols.

Light Microscopy Slide or Coverslip Labeling:

Apply a few drops of dilute reagent to cover the specimen.

Recommended Incubation Solution:

PBS,
(10 mM Phosphate buffer, 150 mM NaCl)
0.1-0.2 % AURION BSA-c™
15 mM NaN₃
pH 7.4

Additional Information

"Ultra Small Gold Reagents and R-Gent SE-EM in Pre-embedding Single and Double Labeling" Hong Yi and Jan L.M. Leunissen

"Optimised Immuno Labelling using AURION BSA-c™ and AURION Blocking Solutions" by J.L.M. Leunissen and P.F.E.M. van de Plas

For additional information please see the Aurion Immunogold Newsletter and Protocol sections.

TECHNICAL TIP**Blocking Solutions Application Instructions**

Detailed information is provided on the package inserts.

Electron Microscopy**On-Grid Labeling**

Placing grids on top of drops of Blocking Solution arrayed on a sheet of Parafilm™ after they have been treated for aldehyde inactivation.

Pre-embedding Labeling

Floating specimens in Blocking Solution, preferably on a rocking table.

Light Microscopy**On-slide or -coverslip Labeling**

Applying a few drops of Blocking Solution to cover the specimen.

Bio Assays

Incubating specimens (e.g. immunoblot strips) in Blocking Solution on a rocking table in screw-cap sealed disposable tubes.

Additional Information

For additional information please see the Aurion ImmunoGold Newsletter and Protocol sections.

N-Cadherin detection in heart muscle cells

Immunofluorescence using Alexa 568 labeled Fab goat antimouse. For reasons of comparability areas of specific labeling are pictured with similar density (arrowheads).

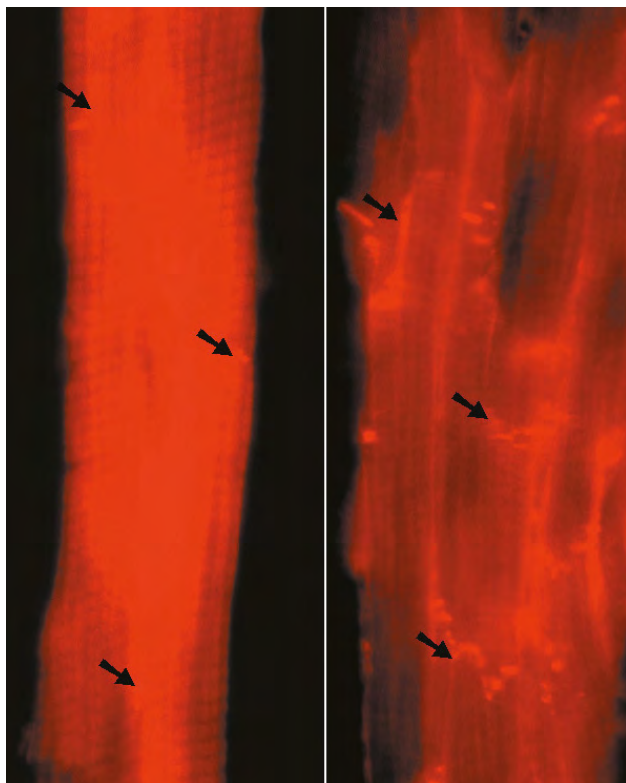
Courtesy of Lauren Hruby and John Harris; Dept. Physiology, University of Otago, Dunedin, New Zealand

Left hand panel:

Background using a commonly used protocol obscures sites of specific labeling.

Right hand panel:

N-Cadherin immunolabelled areas obtained using Aurion Blocking Solution and BSA-c™ stand out with much clearer definition.

**► Blocking Solutions**

The signal-to-noise ratio determines the quality of any detection experiment. This ratio is in principle determined by the characteristics of specimen and detection reagents. With adequate blocking and incubation media, background reactions are minimized whereas specific reactions are not hampered.



Aurion has developed Blocking Solutions which effectively block 'sticky' surfaces by multi-point hydrophobic and charge-based interactions. The Blocking Solutions are specifically designed to meet the characteristics of each type of secondary conjugate.

Introduction

The AURION Blocking Solutions are used to prevent immunoreagents from binding non-specifically to specimens with "sticky" surface properties.

Procedures to eliminate background comprise three main steps:

- **To suppress residual aldehyde activity**
- **To saturate multipoint hydrophobic moieties and positive charges with high molecular weight compounds such as those present in the AURION Blocking Solutions**
- **To reduce aspecific binding of immunoreagents caused by hydrophilic interaction with competing molecules in the incubation and washing solution. AURION BSA-c™ is a particularly effective reagent for this purpose.**

These steps should be balanced for optimum results.

Product Description

AURION Blocking Solutions are prepared using specially selected compounds. All ruminant proteins are obtained from healthy livestock.

AURION Blocking solutions contain Bovine Serum Albumin and Cold Water Fish Skin Gelatine in phosphate buffered saline with sodium azide as preservative. Normal serum may have been added as indicated on the label. The blocking capacity of each lot is determined using a dot-spot test system as described by Moeremans et al., J. Immunol. Methods 74, (1984), 353.

Each package contains 30 ml of solution. It accommodates 300 specimens for light microscopy at 100 µl/specimen (~ 3 drops), or 1000 EM grids at 30 µl/specimen (~ 1 drop).

Specificity

Blocking Solutions are available in the following specificities:

- **serum-free: for use with Protein A and Protein G Gold conjugates.**
- **with Normal Goat serum: for use with reagents based on secondary antibodies raised in Goat.**
- **with Normal Rabbit serum: for use with reagents based on secondary antibodies raised in Rabbit.**
- **with Normal Sheep serum: for use with reagents based on secondary antibodies raised in Sheep.**
- **with Normal Donkey serum: for use with reagents based on secondary antibodies raised in Donkey.**

Storage

AURION Blocking Solutions have a guaranteed shelf life of 18 months from the date of quality control analysis.

The products should be stored at 4-8°C. Freezing is not recommended.

TECHNICAL TIP**Recommended Incubation Solution:**

PBS,
 (10 mM Phosphate buffer, 150 mM NaCl)
 0.1-0.2 % AURION BSA-c™
 15 mM Na₃
 pH 7.4

After addition of the BSA-c™ concentrate the pH should be checked and adjusted to 7.4 if necessary.

This Incubation Solution is used throughout the whole set of reactions and washing steps (i.e. from immediately after the blocking step, through the primary antibody incubations, in-between washing steps, secondary incubation and the final washing steps).

Additional Information

"Optimised Immuno Labelling using AURION BSA-c™ and AURION Blocking Solutions" by J.L.M. Leunissen and P.F.E.M. van de Plas

For additional information please see the Aurion Immunogold Newsletter and Protocol sections.

Storage

AURION BSA-c™ concentrate has a guaranteed shelf life of 18 months from the date of quality control analysis. The products should be stored at 4-8°C. Freezing is not recommended.

➤ Incubation Solution Additive AURION BSA-c™

In the blocking step, hydrophobic moieties causing "stickiness" in the specimen surface are rendered hydrophilic to minimize background. Nevertheless, the more dynamic charge-based interaction between the specimen surface and immunoreagents also needs to be controlled in order to eliminate background.

Aurion has developed BSA-c™, a unique incubation buffer additive with an unparalleled ability to effectively prevent charge based background. BSA-c™ is prepared by acetylation of bovine serum albumin (BSA). Polycationic sites in the specimen interact readily with negatively charged acetylated BSA molecules. This significantly reduces the risk that such sites might bind negatively-charged immunoreagents and immunogold conjugates and thus reduces the risk of background.

**Introduction**

Procedures to eliminate background comprise three main steps:

- **To suppress residual aldehyde activity**
- **To saturate multipoint hydrophobic moieties and positive charges with high molecular weight compounds such as those present in the AURION Blocking Solutions**
- **To reduce non-specific binding of immunoreagents caused by hydrophilic interaction with competing molecules in the incubation and washing solution.**

AURION BSA-c™ is a particularly effective reagent for this purpose.

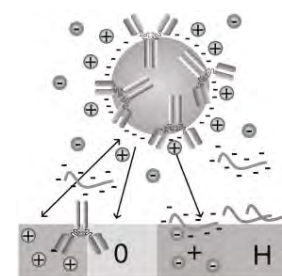
AURION BSA-c™ is a buffer additive that helps prevent immunodetection reagents (i.e. primary antibodies and secondary reagents) from binding nonspecifically to charged moieties within the specimen. Thus, it suppresses background competitively with little or no effect on the specific reaction. Its successful application is not limited to immunogold detections but it is equally efficient in fluorescent and enzyme-based detection systems. AURION BSA-c™ concentrations as low as 0.01-0.1% inhibit binding of gold conjugate to polycationic poly-L-lysine coated grids almost completely (>99%).

The surface properties of the specimen can be simplified by division into four compartments:

- negatively charged (polyanions, proteins, especially after aldehyde fixation, lipids); 0 neutral; + positively charged (histone proteins, polycations) and H hydrophobic (lipids, fat droplets, resins). After an appropriate blocking step these areas are covered with blocking compounds.

In low ionic strength media negatively charged antibodies and gold conjugates are repulsed by negatively charged specimen areas which frequently may contain the antigens to be detected. Background does not likely occur in such areas. The positively charged areas attract antibodies and gold conjugates potentially leading to background.

In a moderate ionic strength incubation solution, repulsion and attraction are diminished due to the presence of ions. The negatively charged BSA-c™ competes with the negatively charged antibodies and gold reagents for non-specific binding to the positively charged specimen compounds, thus reducing background to the greatest possible extent without interfering with antigen detection.

**Product Description**

AURION BSA-c™ concentrated solution contains acetylated bovine serum albumin as the functional constituent. By acetylation of amines on basic amino acids these groups are no longer as easily protonated and the isoelectric point of such molecules is lowered and hydrophobicity is increased. BSA-c™ is a 10% solution of acetylated BSA at slightly alkaline pH with Kathon CG as preservative. The bovine serum albumin that Aurion uses to prepare BSA-c™ is obtained from healthy livestock.

The charge dependent background inhibition capacity of the BSA-c™ in each lot is determined using a dot-spot test system with polycationic compounds.

Two package volumes are available which yield 1.5 - 3 and 5 -10 litres of incubation buffer respectively

TECHNICAL TIP**How to control background in a nutshell**

Background is controlled by three independent steps

1. Low Molecular Weight Block (before protein block)

Purpose: to inactivate residual fixative e.g. aldehydes, using

- amino acids such as glycine or lysine, or
- aldehyde inactivating compounds such as NaBH₄ and NH₂OH

2. High Molecular Weight Protein Block (before immunolabeling)

Purpose: to prevent stickiness to hydrophobic areas and domains with excessive positive charges based on multiple point interactions (high affinity protein binding capacity), using

- albumin
- normal serum

3. Incubation and Wash solution (during immunolabelling)

Purpose: to eliminate aspecific binding of immunoconjugates based on hydrophilic interactions ("oligo" point interactions) by competition, using

- acetylated albumin (AURION BSA-c™) in the incubation buffer

Abandoning BSA-c™ molecules compete with antibodies and secondary immuno reagents for aspecific binding to positively charged specimen compounds, thus minimizing background.

Please refer to our Newsletter 1 and Newsflyer 1 for more information on the subject of background.

You can find incubation protocols in "The Aurion method" section.

► BSA/CWFS/ Tween 20/ Normal Sera

Many compounds have been added empirically to immunolabeling solutions for the purpose of minimizing background staining. Based on years of experience and controlled testing, Aurion has selected a group of compounds that are proven to be the most effective in their background reduction action. Researchers can obtain these items separately from Aurion and prepare blocking and incubation media to suit the needs of their own protocols.



Introduction

The ready-to-use Blocking Solutions and the incubation media additive BSA-c™ are tuned for optimum background prevention and signal-to-noise ratio. In-depth information can be found in the respective product data sheets.

AURION also offers a number of components that allow researchers to formulate blocking, incubation and wash solutions according to the needs of their own experiments.

Product Description

Aurion's Bovine Serum Albumin is obtained from healthy livestock. BSA should be dissolved in an appropriate buffer, such as phosphate buffered saline, taking care not to denature the protein by foaming. The addition of BSA may cause a drop in pH of the final solution and correction may be required. As a preservative the use of NaN₃ or Kathon CG is recommended.

The use of **Cold Water Fish Skin Gelatin** to prevent background reactions has been recommended by e.g. Behnke et al. (J. Cell Biol. 41, [1986], 386). The product is supplied as a liquid concentrate (40%).

Tween-20™ is a non-ionic detergent with a molecular weight of about 600 and a critical micelle concentration (CMC) of 0.06-0.07% in water at room temperature. Its working mechanism may in part be based on its action as a detergent, binding to the hydrophobic moieties of water insoluble compounds, rendering them hydrophilic. In addition, immuno-compounds may become incorporated into micelles when the Tween-20™ concentration is higher than the CMC, for instance at 0.1 % in PBS at pH 7.4.

Normal sera are used to counteract the non-specific interaction between the sample and immunoglobulins. They can be added to the blocking solution and the incubation media.

As a rule the normal serum species should be the same as the secondary antibody species (e.g. use normal goat serum with goat-anti-rabbit conjugates).

Note: normal sera should not be used in combination with Protein A and Protein G gold reagents.

TECHNICAL TIP

Application Instructions

The best results will be obtained with our Blocking reagents and with BSA-c as incubation buffer additive. Alternatively the recipes below may be followed:

Blocking Solution for protein A or G reagents

Phosphate buffered saline
(10mM Phosphate buffer, 150 mM NaCl)
5 % BSA
0.1% CWFS Gelatin
15 mM NaN₃
pH 7.4

Blocking Solution for secondary antibody reagents

Phosphate buffered saline
(10mM Phosphate buffer, 150 mM NaCl)
5 % BSA
0.1% CWFS Gelatin
5-10 % normal serum
(same species as in the secondary antibody reagent)
15 mM NaN₃
pH 7.4

Incubation solution for Conventional Immunogold Reagents

Phosphate buffered saline
(10mM Phosphate buffer, 150 mM NaCl)
0.1-0.2 % BSA
0.1% CWFS Gelatin
1-5 % normal serum
(same species as in the secondary antibody reagent)
15 mM NaN₃
pH 7.4

Incubation solution for Ultra Small Immunogold Reagents

Phosphate buffered saline
(10mM Phosphate buffer, 150 mM NaCl)
0.8 % BSA
0.1% CWFS Gelatin
1-5 % normal serum
(same species as in the secondary antibody reagent)
15 mM NaN₃
pH 7.4

Storage

The products should be stored at 4-8°C.
Freezing is not recommended.

Additional Information

For additional information please see the Aurion Immunogold Newsletter and Protocol sections.

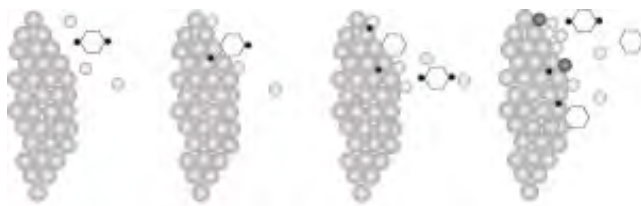
► R-Gent SE-EM Silver Enhancement Reagents

For most applications the detection of ultra small gold particles in electron microscopy requires a particle enhancement procedure. Danscher's method has always been the standard for this purpose and for a long time attempts to improve the features of Danscher's system met with only limited success.

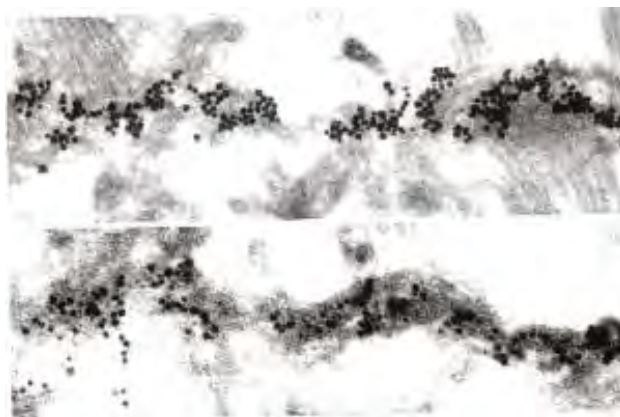
The goal in the development of AURION R-Gent SE-EM was to create a new system with enhancement efficiency and homogeneity at least comparable to Danscher's method, but with reduced acidity and light sensitivity. In addition, the reagents should have low viscosity for the suitability in pre-embedding immunogold labeling.

Introduction

The silver enhancement reaction is a gold particle-catalyzed reduction in which silver ions are reduced to metallic silver with a photographic developing compound as the electron source. In addition in many applications a "protective colloid" is added to the enhancement solution to limit diffusion of reagents to the gold particle surface, thus providing a means for controlling particle growth.



"...silver enhancement reaction is a gold particle-catalyzed reduction in which silver ions are reduced to metallic silver with a photographic developing compound as the electron source.."



Desmin labeling in heart muscle with Ultra Small Gold conjugate and AURION R-Gent SE-EM. Courtesy Prof. Dr. Müller Höcker, University Munich, FRG.



Product Description

AURION R-Gent SE-EM is a high efficiency silver enhancement reagent for electron microscopy. It intensifies the gold particles by homogeneous deposition of metallic silver on the particle surface. The resulting electron dense signal is easily detected and is compatible with heavy metal counterstaining. The reagent has extremely delayed auto-nucleation and can be used under standard laboratory light conditions. It also has low viscosity, which is especially advantageous for pre-embedding immunogold applications. The enhancement mixture has a pH of 8.1-8.2.

AURION R-Gent SE-EM has been tested intensively for the enhancement of AURION Ultra Small Immunogold reagents.

AURION R-Gent SE-EM is available in a kit containing the following:

- 30 ml or 90 ml of ready-to-use ENHANCER,
- 3 ml of concentrated INITIATOR and
- 30 ml of ACTIVATOR.
- a 3 ml empty dropping bottle, labeled "DEVELOPER".

The INITIATOR is a concentrated solution which must be diluted and activated before use, using the ACTIVATOR. This resulting mixture is the DEVELOPER.

The now ready-to-use DEVELOPER has a shelf life of one month. It is suggested to prepare fresh DEVELOPER at least every month.

The undiluted solutions have a shelf life of 10 months when stored at 4°C. INITIATOR can be stored at -20°C for prolonged shelf life.

For enhancement, 1-2 drops of DEVELOPER are mixed with 20 drops of ENHANCER. The typical enhancement time is between 20 and 40 minutes. Specimens may be contrasted according to standard procedures.

The kit with 30 ml of ENHANCER accommodates up to 1000 EM grid specimens. The kit with 90 ml of ENHANCER is suitable for pre-embedding immunogold labeling; the number of specimens it accommodates depends on the volume of reagent used per specimen.

For each lot, the specific enhancement activity and level of auto-nucleation are monitored by spectrophotometric techniques.

TECHNICAL TIP

R-Gent SE-EM for Electron Microscopy Post-embedding enhancement (on-grid)

Place grids on drops of the enhancement mixture arrayed on a sheet of Parafilm™.

Pre-embedding enhancement

Incubate specimens (e.g. vibratome sections) in Petri dishes or Eppendorf tubes containing the enhancement mixture, with agitation. When enhancement is completed, the specimens are washed with distilled water. A fixation step with photographic fixer is not required.

Storage

The AURION R-Gent SE-EM components are stored at 4°C and allowed to reach room temperature before use. SE-EM INITIATOR may be stored at -20°C for prolonged shelf life.

► R-Gent SE-LM Silver Enhancement Reagents

The Immunogold Silver Staining technique (IGSS) finds application both at the electron microscope and the light microscope level. In addition the technique can be equally used to identify proteins or nucleic acids after blotting.

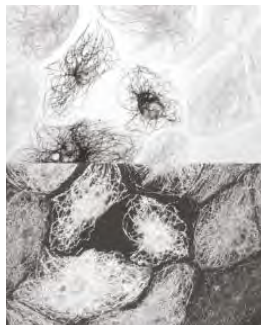
Light microscopical and macroscopical visualization of the latent gold signal requires an enhancement system that renders a high contrast signal. Light insensitivity and negligible auto-nucleation are required for ease of handling and low background. AURION R-Gent SE-LM is a two-component reagent that meets these requirements.

Introduction

The silver enhancement reaction is based on the gold particle catalyzed reduction of Ag⁺ to metallic silver using photographic developing compounds as the electron source. For light microscopy and immunoblotting applications the generated silver signal should be of high contrast. Furthermore the signal should be permanent and compatible with counterstaining.

Product Description

The AURION R-GENT SE-LM components constitute a Silver Enhancement Reagent which increases the average gold cluster or particle size by deposition of metallic silver facilitating detection at the light microscopical level. The generated brown-black signal is also easily detected in bio assays and is compatible with counterstaining in light microscopy. AURION R-GENT SE-LM has been tailored for the enhancement of AURION Ultra Small Immunogold reagents and is equally suited for the larger sized particles in the AURION Conventional Immunogold reagents.



*Light microscopy evaluation of tubulin labeling with Ultra Small Immunogold Reagents and silver enhancement.
Upper panel: bright field mode
Lower panel: epi-polarization mode*

For enhancement, equal amounts of the DEVELOPER and ENHANCER are mixed well and applied to the specimen. The enhancement mixture is easy-to-use, exhibits extremely delayed auto-nucleation and can be used under standard laboratory light conditions. Typical enhancement times are between 15 and 30 minutes. Auto-nucleation becomes visible only after 40-60 minutes. Light microscopical specimens may be counterstained according to standard procedures. The enhancement mixture has a pH value of 8.3-8.5.

AURION R-GENT SE-LM is available as a kit in two unit sizes (2 x 30 ml or 2 x 250 ml) and consists of a separate DEVELOPER and ENHANCER. The supplied amounts accommodate 600 and 5000 LM specimens respectively at 100 µl/specimen, or 60 and 500 bio assay specimens at 1 ml/specimen. The reactivity is tested on dot-spots and the absence of auto-nucleation is monitored by spectrophotometric techniques.

Storage

The AURION R-GENT SE-LM components are stored at 4°C and allowed to reach room temperature before use.

TECHNICAL TIP

R-Gent SE-LM for Light Microscopy Slide or Coverslip Labeling

A few drops of the freshly prepared enhancement mixture are applied to cover the specimen. During enhancement the specimens are kept in a moist chamber. The ongoing enhancement may at intervals be monitored with an inverted light microscope. When enhancement is judged to be complete, the specimens are washed with distilled water. A fixation step with photographic fixer is not required.

Whole Mount Labeling

Specimens like floating (vibratome) sections can be enhanced in Petri dishes or 6-24 well plates.

Bio Assays

Depending on the type of assay the enhancement for bio assays can be performed in sealed plastic bags, Petri dishes or in disposable screw cap sealed tubes.

Additional Information

For additional information please see the Aurion Immunogold Newsletter and Protocol sections.

► COL-AURION: Colloidal Gold Based Protein Stain

Col-Aurion is a colloidal gold particle based total protein stain, developed for the sensitive staining of electrophoretically separated protein bands on nitrocellulose or PVDF[™] blotting membranes. Colloidal gold particles accumulate at the site of the protein bands on the membrane, generating an intense dark red staining pattern. The total protein stain assists in assessing immunoblotting results and to evaluate the effectivity of the blotting procedure.

Introduction

The negative surface charge of colloidal gold particles is responsible for their high affinity for positively charged macromolecules. This characteristic was the basis for the development of a total protein stain based on colloidal gold.

Product Description

Col-Aurion is a total protein stain consisting of a solution of coated gold



particles with an average particle diameter of 15 nm. The staining principle is based on the electrostatic binding of negatively charged gold particles to proteins with a positive charge present at low pH.

A unique feature of Col-Aurion is the use of BSA-c[™] to shield off the surface of the gold particles. Destabilization of gold particles that might occur as a result of interaction with detached protein is thus prevented. The strong negative charge of BSA-c[™] gives an additional increase in sensitivity of the stain.

Col-Aurion total protein stain has a pH of 3.2 and is ready to use. For removal of surplus of weakly bound protein from the membrane, a 10 ml vial of Tween-20[™] is included.

Storage

Col-Aurion has a guaranteed shelf life of 18 months from the date of quality control analysis. Store at 4-8°C. Do not freeze.

► Gold Sols

To prepare a high quality (immuno)gold conjugates it is important to have particles with uniform size and highly adsorptive surfaces.

The Aurion gold sols are prepared according to unique production protocols. This provides for sol particles with the same narrow size distribution and adsorption properties as employed in the Conventional Immunogold Reagents.



Introduction

The preparation of conventional gold reagents is based on gold particles with a diameter suited for direct electron microscopic visualization. Aurion offers a range of Conventional Immunogold Reagents which cover the majority of approaches in transmission and scanning electron microscopy.

Aurion Gold Sols (solutions of high quality unconjugated gold particles) provide opportunities for users to prepare conjugates with primary antibodies, ligands and other binding agents with the same particle characteristics as in the Conventional Immunogold Reagents.

Product Description

AURION Gold Sols are prepared according to a unique protocol, warranting narrow size distribution and reproducible adsorption characteristics.

The AURION gold sols are available in the same size range as the Conventional Immunogold Reagents: 6, 10, 15 and 25 nm. The particle population is monodisperse and thus shows minimal size variation and overlap. Typically, the coefficient of variance for the 6 and 25 nm particle size sols is less than 12%, whereas the 10 and 15 nm size sols show less than 10% variation. Actual lot specifications (size, variation and expiry date) are indicated on the accompanying package insert.

Package size: 100 ml of high quality gold sol at an OD_{520nm} of approximately 1.

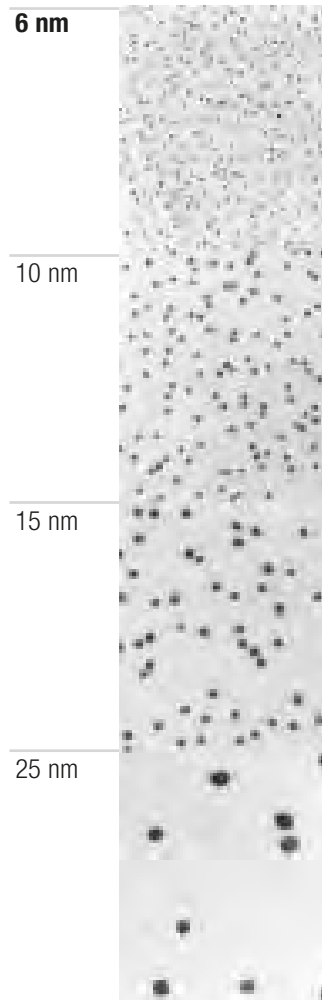
Storage

AURION gold sols have a guaranteed shelf life of 12 months from the date of quality control analysis.

The products should be stored at 4-8°C.

Freezing is not recommended.

Particle size and size distributions of the AURION Gold Sols



► Gold Tracers

Aurion Gold Tracers are used to visualize charged moieties in specimens: anionic tracers bind to polycationic moieties (basic proteins e.g. histones, cationic tracers bind to polyanionic moieties (membranes, acidic proteins). "Neutral" BSA coated gold tracers are useful for detecting open connections and tissue damage. Under proper conditions and with suitable microscopical techniques the tracers can also be used to follow cellular events in time.



Introduction

The AURION Anionic and Cationic Gold Tracers are designed to detect charged areas; the anionic tracers detecting multiple positive charge moieties, the cationic tracers detecting multiple negative charges.

Product Description

The AURION Gold Tracers are available in the full range of particle sizes: Ultra Small, 6, 10, 15 and 25 nm. Anionic Gold Tracers are prepared with BSA-c™ as particle conjugated protein. Cationic Gold Tracers are prepared with methylated BSA. AURION Gold Tracers are available in 5 and 10 ml volume packages and are supplied at an OD_{520nm} of 2.0 for the conventional particle size range and at equivalent OD for the Ultra Small tracers.

The products are supplied in PBS, with 15 mM NaN_3 .

AURION Gold Tracers are also available in bulk and at different optical density if required.

AURION Gold Tracers are shipped containing NaN_3 as preservative. If they are intended for use in living organisms, the preservative has to be removed prior to use. This can be achieved either by dialysis or by buffer exchange using for instance a GE Healthcare Life Sciences Pharmacia PD-10 column.

Additional Information

For additional information please see the Aurion Immunogold Newsletter and Protocol sections.

Storage

Aurion gold tracers have a guaranteed shelf life of 18 months from the date of quality control analysis.

The products should be stored at 4-8°C.

Freezing is not recommended.

TECHNICAL TIP

In order to obtain a positive reaction when using these tracers the following should be kept in mind:

- 1) charge interactions are influenced by the presence of ions, di- and trivalent ions being of more influence than univalent ions. The influence is concentration dependent. Binding is stronger in low ionic-strength media.
- 2) charge interactions are influenced by pH. The charge of components in the specimen is dependent of their isoelectric point (IEP). Below the IEP the charge is positive, above the IEP negative. Significant binding will only occur at a pH at least one to two pH-units higher or lower than the IEP.

Anionic tracers are negatively charged at pH >5

Cationic tracers are positively charged at pH <10

BSA tracers are intended for tracking fine capillaries or connecting spaces in intact tissues.

► New Cross Adsorbed Products

NEWLY INTRODUCED

Cross reactivity can be a problem when working with primary antibodies sourced from animal species that are evolutionary closely related to the source of tissues or cells that antigens are to be detected in.

An example is using a mouse monoclonal on rat tissue. With many monoclonal antibodies of mouse origin and some of rat, and the prevailing animal cells and tissues being used in studies likewise originating from rat or mouse, it often happens that cross reactivity occurs, leading to false positive results.

A second problem that derives from cross-reactivity occurs in double labeling, when using primary antibodies from closely related animal sources. With this in mind, Aurion has developed two series of new conjugates:

Goat-anti-Mouse IgG (H+L)xRat (cross adsorbed against Rat immunoglobulins)

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C EM-grade Ultra Small	25900	1.5	25901	0.6
4-8°C EM-grade 10nm	25902	2.5	25903	1.0

Goat-anti-Rat IgG (H+L)xMouse (cross adsorbed against Mouse immunoglobulins)

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C EM-grade Ultra Small	25904	1.5	25905	0.6
4-8°C EM-grade 10nm	25906	2.5	25907	1.0

Secondary antibodies have been thoroughly purified using solid phase technique. These purified antibodies allow detection of antigens with mouse monoclonal antibodies in rat tissue or rat monoclonal antibodies in mouse tissue, without causing interfering binding to either endogenous mouse or rat immunoglobulins

The antibodies can be used for double labeling as well when both mouse and rat primary antibodies are used with other than mouse or rat tissue.

Please note:

Cross adsorption against closely related species may result in epitope recognition with reduced binding force and lower labeling density.

EMS and Aurion would like to inform you that the strongest labeling intensity is usually achieved with the least refined antibodies. Users are advised to take this into account when choosing a product from the Aurion range of anti-mouse or anti-rat conjugates. In case of doubt, our technical staff will gladly assist you in making the best choice.

Goat-anti-Mouse IgG (H&L)

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25120	1.5	25121	.6
4-8°C EM-grade 6nm	25123	2.5	25124	1.0
4-8°C EM-grade 10nm	25128	2.5	25129	1.0
4-8°C EM-grade 15nm	25132	3.5	25133	1.4
4-8°C EM-grade 25nm	25135	3.5	25136	1.4

Goat-anti-Mouse IgM (μ-chain)

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25140	1.5	25141	.6
4-8°C EM-grade 6nm	25143	2.5	25144	1.0
4-8°C EM-grade 10nm	25148	2.5	25149	1.0
4-8°C EM-grade 15nm	25152	3.5	25153	1.4
4-8°C EM-grade 25nm	25155	3.5	25156	1.4

Goat-anti-Mouse IgG+IgM

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25160	1.5	25161	.6
4-8°C EM-grade 6nm	25163	2.5	25164	1.0
4-8°C EM-grade 10nm	25168	2.5	25169	1.0
4-8°C EM-grade 15nm	25172	3.5	25173	1.4
4-8°C EM-grade 25nm	25175	3.5	25176	1.4

Goat-anti-Rabbit IgG (H&L)

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25100	1.5	25101	.6
4-8°C EM-grade 6nm	25103	2.5	25104	1.0
4-8°C EM-grade 10nm	25108	2.5	25109	1.0
4-8°C EM-grade 15nm	25112	3.5	25113	1.4
4-8°C EM-grade 25nm	25115	3.5	25116	1.4

Goat-anti-Rat IgG (H&L)

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25180	1.5	25181	.6
4-8°C EM-grade 6nm	25183	2.5	25184	1.0
4-8°C EM-grade 10nm	25188	2.5	25189	1.0
4-8°C EM-grade 15nm	25192	3.5	25193	1.4
4-8°C EM-grade 25nm	25195	3.5	25196	1.4

Goat-anti-Human IgG (H&L)

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25200	1.5	25201	.6
4-8°C EM-grade 6nm	25203	2.5	25204	1.0
4-8°C EM-grade 10nm	25208	2.5	25209	1.0
4-8°C EM-grade 15nm	25212	3.5	25213	1.4
4-8°C EM-grade 25nm	25215	3.5	25216	1.4

Rabbit-anti-Goat IgG (H&L)

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25220	1.5	25221	.6
4-8°C EM-grade 6nm	25223	2.5	25224	1.0
4-8°C EM-grade 10nm	25228	2.5	25229	1.0
4-8°C EM-grade 15nm	25232	3.5	25233	1.4
4-8°C EM-grade 25nm	25235	3.5	25236	1.4

Goat-anti-Biotin

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25240	1.5	25241	.6
4-8°C EM-grade 6nm	25243	2.5	25244	1.0
4-8°C EM-grade 10nm	25248	2.5	25249	1.0
4-8°C EM-grade 15nm	25252	3.5	25253	1.4
4-8°C EM-grade 25nm	25255	3.5	25256	1.4

Streptavidin

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25260	1.5	25261	.6
4-8°C EM-grade 6nm	25263	2.5	25264	1.0
4-8°C EM-grade 10nm	25268	2.5	25269	1.0
4-8°C EM-grade 15nm	25272	3.5	25273	1.4
4-8°C EM-grade 25nm	25275	3.5	25276	1.4

Protein A

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C EM-grade 6nm	25282	2.5	25283	1.0
4-8°C EM-grade 10nm	25284	2.5	25285	1.0
4-8°C EM-grade 15nm	25286	3.5	25287	1.4
4-8°C EM-grade 25nm	25288	3.5	25289	1.4

Biotinylated Albumin

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25290	1.5	25291	.6
4-8°C EM-grade 6nm	25293	2.5	25294	1.0
4-8°C EM-grade 10nm	25298	2.5	25299	1.0
4-8°C EM-grade 15nm	25302	3.5	25303	1.4
4-8°C EM-grade 25nm	25305	3.5	25306	1.4

Mouse Monoclonal anti-FITC

Gold Conjugates:

For the electron microscopic visualization of FITC labels used in light microscopic specimens. For retrieval of faded FITC in DNA/RNA probes, fatty acids, and proteins.

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25580	1.5	25581	.6
4-8°C EM-grade 10nm	25582	2.5	25583	1.0

Goat-anti-Chicken IgG (H&L)

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25584	1.5	25585	.6
4-8°C EM-grade 6nm	25586	2.5	25587	1.0
4-8°C EM-grade 10nm	25588	2.5	25589	1.0
4-8°C EM-grade 15nm	25590	3.5	25591	1.4
4-8°C EM-grade 25nm	25592	3.5	25593	1.4

Protein G

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C EM-grade 6nm	25312	2.5	25313	1.0
4-8°C EM-grade 10nm	25314	2.5	25315	1.0
4-8°C EM-grade 15nm	25316	3.5	25317	1.4
4-8°C EM-grade 25nm	25318	3.5	25319	1.4

Goat-anti-Guinea Pig IgG (H&L)

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25320	1.5	25321	.6
4-8°C EM-grade 6nm	25323	2.5	25324	1.0
4-8°C EM-grade 10nm	25328	2.5	25329	1.0
4-8°C EM-grade 15nm	25332	3.5	25333	1.4
4-8°C EM-grade 25nm	25335	3.5	25336	1.4

Rabbit-anti-Sheep IgG (H&L)

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25340	1.5	25341	.6
4-8°C EM-grade 6nm	25343	2.5	25344	1.0
4-8°C EM-grade 10nm	25348	2.5	25349	1.0
4-8°C EM-grade 15nm	25352	3.5	25353	1.4
4-8°C EM-grade 25nm	25355	3.5	25356	1.4

F(ab')₂ Fragment of Goat-anti-Rabbit IgG (H&L)

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25360	1.5	25361	.6
4-8°C EM-grade 6nm	25363	2.5	25364	1.0
4-8°C EM-grade 10nm	25362	2.5	25365	1.0
4-8°C EM-grade 15nm	25366	3.5	25367	1.4
4-8°C EM-grade 25nm	25368	3.5	25369	1.4

F(ab')₂ Fragment of Goat-anti-Mouse IgG (H&L)

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25370	1.5	25371	.6
4-8°C EM-grade 6nm	25373	2.5	25374	1.0
4-8°C EM-grade 10nm	25372	2.5	25375	1.0
4-8°C EM-grade 15nm	25376	3.5	25377	1.4
4-8°C EM-grade 25nm	25378	3.5	25379	1.4

F(ab')₂ Fragment of Goat-anti-Mouse IgG+IgM

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25380	1.5	25381	.6
4-8°C EM-grade 6nm	25383	2.5	25384	1.0
4-8°C EM-grade 10nm	25382	2.5	25385	1.0
4-8°C EM-grade 15nm	25386	3.5	25387	1.4
4-8°C EM-grade 25nm	25388	3.5	25389	1.4

F(ab) Fragment of Sheep-anti-Digoxigenin

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25410	1.5	25411	.6
4-8°C EM-grade 6nm	25393	2.5	25394	1.0
4-8°C EM-grade 10nm	25398	2.5	25399	1.0
4-8°C EM-grade 15nm	25402	3.5	25403	1.4
4-8°C EM-grade 25nm	25405	3.5	25406	1.4

F(ab') Fragment of Goat-anti-Rabbit IgG (H&L)

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25412	1.5	25413	.6

F(ab') Fragment of Goat-anti-Mouse IgG (H&L)

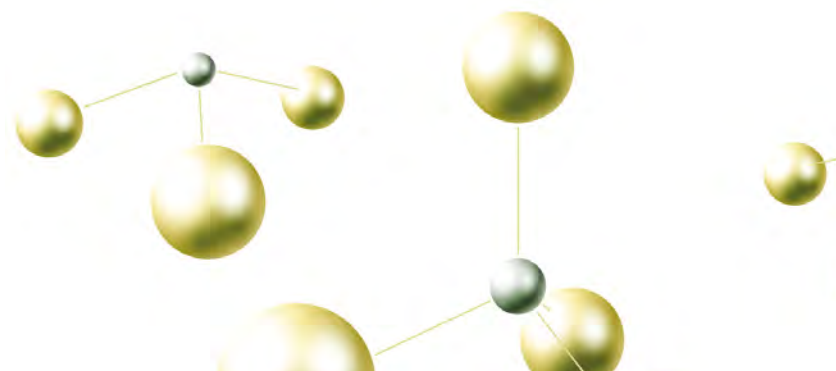
Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25414	1.5	25415	.6

F(ab') Fragment of Goat-anti-Rat IgG (H&L)

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25416	1.5	25417	.6

Rabbit-anti-Chicken IgG (H&L)

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25420	1.5	25421	.6
4-8°C EM-grade 6nm	25423	2.5	25424	1.0
4-8°C EM-grade 10nm	25428	2.5	25429	1.0
4-8°C EM-grade 15nm	25432	3.5	25433	1.4
4-8°C EM-grade 25nm	25435	3.5	25436	1.4



► Donkey Conjugate Line

In many cases double labeling experiments are based on using two primary antibodies from different animal species, for instance mouse and rabbit. Of late, we have noticed an increasing number of users that have primary antibodies developed in goat. It is impossible to perform a double labeling experiment in combination with, for instance, a mouse primary antibody, since applicable secondary antibodies are either raised in rabbit or goat. Hence the Goat-anti-Mouse would be recognized by the Rabbit-anti-Goat, and it would be impossible to get reliable results. In the past, only using directly labeled primary antibodies would solve this. This would require researchers to go through the lengthy procedure of preparing such conjugates and even then with limited success. To overcome this difficulty we are proud to release the Aurion Series of Secondary ImmunoGold conjugates based on antibodies raised in Donkey, including Donkey-anti-Goat. It is then known that mixing Donkey-anti-Goat and Donkey-anti-Mouse provides a successful solution to the above mentioned case.

Donkey-anti-Rabbit IgG (H&L)

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-small	25700	1.5	25701	.6
4-8°C EM-grade 6nm	25702	2.5	25703	1.0
4-8°C EM-grade 10nm	25704	2.5	25705	1.0
4-8°C EM-grade 15nm	25706	3.5	25707	1.4
4-8°C EM-grade 25nm	25708	3.5	25709	1.4

Donkey-anti-Goat IgG (H&L)

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25800	1.5	25801	.6
4-8°C EM-grade 6nm	25802	2.5	25803	1.0
4-8°C EM-grade 10nm	25804	2.5	25805	1.0
4-8°C EM-grade 15nm	25805	3.5	25807	1.4
4-8°C EM-grade 25nm	25808	3.5	25809	1.4

Donkey-anti-Mouse IgG (H&L)

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25810	1.5	25811	.6
4-8°C EM-grade 6nm	25812	2.5	25813	1.0
4-8°C EM-grade 10nm	25814	2.5	25815	1.0
4-8°C EM-grade 15nm	25816	3.5	25817	1.4
4-8°C EM-grade 25nm	25818	3.5	25819	1.4

Donkey-anti-Sheep IgG (H&L)

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25820	1.5	25821	.6
4-8°C EM-grade 6nm	25822	2.5	25823	1.0
4-8°C EM-grade 10nm	25824	2.5	25825	1.0
4-8°C EM-grade 15nm	25826	3.5	25827	1.4
4-8°C EM-grade 25nm	25828	3.5	25829	1.4

Cationic Gold Tracer

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25440	10	25441	5
4-8°C EM-grade 6nm	25443	10	25444	5
4-8°C EM-grade 10nm	25446	10	25447	5
4-8°C EM-grade 15nm	25449	10	25450	5
4-8°C EM-grade 25nm	25452	10	25453	5

Anionic Gold Tracer

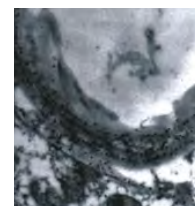
Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25460	10	25461	5
4-8°C EM-grade 6nm	25463	10	25464	5
4-8°C EM-grade 10nm	25466	10	25467	5
4-8°C EM-grade 15nm	25469	10	25470	5
4-8°C EM-grade 25nm	25472	10	25473	5

TECHNICAL TIP

Reactivity of Protein A and Protein G

Membrane labeling with protein A 15 nm gold conjugate.

Courtesy of T.Wakefield, University of Auburn, Alabama



Species	Ig(sub)class	Protein A	Protein G
Rabbit	Ig	++	++
Mouse	IgG1	-	+
	IgG2a	+	+
	IgG2b	+	+
	IgG3	+	++
	IgA	-	?
Rat	IgM	-	?
	IgG1	-	?
	IgG2a	-	++
	IgG2b	-	+
	IgG2c	+	+
Man	IgM	-	?
	IgG1	++	++
	IgG2	++	++
	IgG3	-	++
	IgG4	++	++
Goat	IgA	-	-
	IgM	+	-
	IgD	-	-
Goat	Ig	-	++
Sheep	Ig	-	++
Guinea Pig	Ig	++	+
Chicken	Ig	-	-
Pig	Ig	++	+
Horse	Ig	-	++
Cow	Ig	+	++
Dog	Ig	+	+

BSA Gold Tracer

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25480	10	25481	5
4-8°C EM-grade 6nm	25483	10	25484	5
4-8°C EM-grade 10nm	25486	10	25487	5
4-8°C EM-grade 15nm	25489	10	25490	5
4-8°C EM-grade 25nm	25492	10	25493	5

Aurion BSA-Fragment Stabilized

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
Ultra-Small Gold	25498	20	-	-

Gold Sol

Particle Size	Cat #	Size(ml)	Cat #	Size(ml)
4-8°C Ultra-Small	25509	20	-	-
4-8°C EM-grade 6nm	25510	100	-	-
4-8°C EM-grade 10nm	25512	100	-	-
4-8°C EM-grade 15nm	25514	100	-	-
4-8°C EM-grade 25nm	25516	100	-	-

Blocking Solutions

Particle Size	Cat #	Size(ml)
4-8°C Basic Blocking (For Protein A&G)	25595	30
4-8°C Goat Gold Conjugates	25596	30
4-8°C Rabbit Gold Conjugates	25597	30
4-8°C Sheep Gold Conjugates	25598	30
4-8°C Donkey Gold Conjugates	25599	30

➤ Immunogold Reagent Kits – EM Grade

Complete kits with the following characteristics:

- Two non-overlapping gold particle sizes.
- Coupled to: either Goat-anti-Rabbit and Goat-anti-Mouse IgG/IgM antibodies.
- Affinity purified and cross adsorbed antibodies.
- Unparalleled low background levels.
- For use with rabbit and mouse monoclonal and polyclonal primary antibodies.
- Acetylated serum albumin with increased exposure of negative charges.

Benefits:

- Covering over 90% of all applications in EM.
- For single and double labeling in Electron Microscopy

4-8°C 25540 EM-kit GAR-6/GAM-10/BSA-c™

Kit consists of:

- 1ml Goat-anti-Rabbit 6nm
- 1ml Goat-anti-Mouse IgG/IgM 10nm
- 30ml BSA-c™ background suppressing agent

4-8°C 25544 EM-kit GAM-6/GAR-10/BSA-c™

Kit consists of:

- 1ml Goat-anti-Mouse IgG/IgM 6nm
- 1ml Goat-anti-Rabbit 10nm
- 30ml BSA-c™ background suppressing agent

4-8°C 25548 EM-kit PrA-6/PrA-10/BSA-c™

Kit consists of:

- 1ml Protein A 6nm
- 1ml Protein A 10nm
- 30ml BSA-c™ background suppressing agent

➤ Custom Kits

4-8°C 25540-05 Custom EM Kit

For customization of our EM Kits you get to choose the 2 vials of your EM Grade Reagent. Supplied with the kit as well is 30ml of BSA-c™.

4-8°C 25550-05 Custom Ultra-Small Kit

For customization of our Ultra-Small Kits we now have available a make it yourself kit where you get to choose the two vials of your Ultra-Small Reagent. Also supplied with the kit is 30ml BSA-c™ and 2x30ml SE-LM

4-8°C 25550-06 Custom Ultra-Small Kit

For customization of our Ultra-Small Kits we now have available a make it yourself kit where you get to choose the two vials of your Ultra-Small Reagent. Also supplied with the kit is 30ml BSA-c™ and 30ml SE-EM.

➤ Ultra-Small Kits

Benefits of our US-KIT:

FOR EM:

- For the most sensitive labeling in electron microscopy
- For the penetration in ultra thin cryosections resulting in enhanced detectability and sensitivity
- New possibilities for pre-embedding labeling
- For the labeling of at least 330 on-grid specimens

FOR LM:

- Premium reagents for penetration in hydrated sections (paraffin, cryostat) and in slightly fixed cells
- Permanent, non-fading silver signal
- Most sensitive reagents compatible with counterstaining
- For the immunolabeling of 200 slides

FOR IMMUNOBLOTTING:

- Highest sensitivity
- Black to brown/black signal suited for low level detection where colored precipitates fail
- For the immunogold labeling of 10-20 nitrocellulose immunoblot strips

4-8°C 25550 US-kit GAR/GAM/BSA-c™/R-Gent SE-LM

Kit consists of:

- 0.6ml Goat-anti-Rabbit GP-Ultra-Small
- 0.6ml Goat-anti-Mouse IgG/IgM GP-Ultra-Small
- 30ml BSA-c™ background suppressing agent
- SE-LM Silver Enhancement

4-8°C 25552 US-kit GAR/GAM/BSA-c™/R-Gent SE-EM

Kit consists of:

- 0.6ml Goat-anti-Rabbit GP-Ultra-Small
- 0.6ml Goat-anti-Mouse IgG/IgM GP-Ultra-Small
- 30ml BSA-c™ background suppressing agent
- SE-EM Silver Enhancement

4-8°C 25550-10 Ultra-Small Starter Kit

To give yourself the opportunity to make yourself familiar with our Ultra-Small Gold Conjugates – we have our Starter Kit. These kits are sufficient for approximately 50 specimens.

Kit consists of:

- 100 µl Ultra-Small Conjugate
- 10ml BSA-c™
- 2x2.5ml R-Gent SE-LM and a sample pack R-Gent SE-EM

➤ Blocking Solutions, Background Suppression, R-Gent Silver Enhancement

4-8°C 25520	AURION R-Gent Silver Enhancement Kit	2x30ml	4-8°C 25560	Cold Water Fish Skin Gelatin 40%	10ml
4-8°C 25521	AURION R-Gent Silver Enhancement Kit	2x250ml	4-8°C 25564	Tween-20	10ml
4-8°C 25521	AURION R-Gent SE-EM Kit	30ml	4-8°C 25568	Normal Rabbit Serum	5ml
4-8°C 25521-90	AURION R-Gent SE-EM Kit	90ml	4-8°C 25570	Normal Goat Serum	5ml
4-8°C 25536	COL-AURION Total Protein Stain	500ml	4-8°C 25574	Gum Arabic	20gr
4-8°C 25554	Bovine Serum Albumin	25gr	4-8°C 25578	Normal Sheep Serum	5ml
4-8°C 25558	AURION BSA-c™ (acetylated BSA)	100ml	4-8°C 25572	Normal Donkey Serum	5ml
4-8°C 25557	AURION BSA-c™ (acetylated BSA)	30ml	4-8°C 25830	Enhancement Conditioning Solution	100ml

Frequently Asked Questions

We have collected answers to frequently asked questions from immunogold users. They are listed below. If your question is not listed on this page or you have further queries, please contact us directly by phone or e-mail. We remain at your disposal.

What kind of particle size should I use?

Always use the smallest particle size to fit your application. Conjugates based on smaller particles are more efficient than larger particle based conjugates. If visualization is difficult with smaller particles these can be enlarged with silver enhancement. Very sensitive specimens for SEM observation are best served with a larger particle size conjugate. This prevents ultra structural enhancement reagents.

Is it true that gold conjugates are more background prone than other conjugates?

No! This fairy tale comes from the fact that gold conjugates are based on particles and that visualization is also based on separate particles. Contrary to enzyme and fluorescent markers, gold conjugates are more like a digital system, either they are there and then you will see them, or they are not present. Enzyme and fluorescent markers are sooner to be considered as "analogue" markers, their visibility in detection increases with their local concentration or with the time the enzyme marker can produce a visible reaction product. An unbiased look at controls in fluorescence shows always a low level of light that is inherent to the presence of double bonds in biological compounds and on top of this comes the fluorescence from the labeled antibodies. Likewise will an unbiased look at control specimens incubated only with alkaline phosphatase or peroxidase labeled antibodies usually show a faint overall staining of the specimen. Such faint levels are easily accepted or even filtered out. You cannot do this with gold conjugates since they are based on particles.

Should I use a secondary gold conjugate or Protein A (or G)?

That depends on what your goal is. Using secondary conjugates results in a higher labeling density. Therefore it is often said that secondary conjugates are more sensitive than Protein A conjugates. This is partly true. Protein A (or G) recognizes only one site on a primary antibody molecule. Binding will occur only when this site is available and not obscured by its environment. Secondary conjugates recognize more sites on primaries and therefore the chance that a primary antibody will be detected is greater. Essentially this is the increase in sensitivity.

If all primary antibodies would be available to the same extent for binding to either Protein A or a secondary antibody conjugate, then the use of the latter would only result in more particles. This helps in localizing antigens at low magnifications, in other words this is an increase in detectability.

Is there a training program for immunogold (silver) staining where I can bring my own specimens?

EMS and Aurion organizes wet-workshops in Europe and the USA where you preferably work with your own specimens and primary antibodies. After all, that is where your interest lies. If required, we will expand our activities to additional venues. The workshops last for two days and give an in-depth view in immunogold (silver) staining. Detailed information on the setup of our workshops can be found in this publication.

Is it possible to do pre-embedding labeling of intracellular antigens?

Yes. Single cells are most suited. Plant material with a thick impenetrable wall is not. The Ultra-Small gold conjugates are the conjugates of choice. In many cases a permeabilization step with NaBH₄ suffices to open up the specimens and allow penetration of reagents. Low concentrations of mild detergents like saponin help. One thing should be emphasized: reaction times have to be prolonged since full penetration of the reagents to the internal antigens has to be achieved. To remove unreacted reagents after incubation wash procedures have to be adapted likewise! The Aurion Newsletter #5 deals with this topic.

How can I verify that my conjugates are still active?

There is a simple procedure to check this. It is described in great detail in Aurion's Newsletter #4. In short: you need a nitro-cellulose strip, apply dots from a dilution series of your primary antibody and incubate the strip with the gold reagent. The dots will stain red with the larger conjugates. When testing an Ultra-Small conjugate silver enhancement has to be applied for visualization.

How can I verify that the silver enhancement reagents are still fine?

Again, there is a simple procedure to check this. It is described in great detail in our Newsletter #4. In short: you need a nitro-cellulose strip, apply dots from a dilution series of your gold conjugate and incubate the strip with the silver enhancement reagents. The dots should become brown-black. During this period of time the mix of reagents should remain glass clear without any visible presence of silver caused by auto nucleation.

The activity of the Silver Enhancement reagent SE-EM for Electron microscopy can be tested by adding 10µl of the enhancement mix. The solution should turn yellow in 30-45 minutes.

Is it advisable to use outdated conjugates?

As long as their reactivity is OK and there are not too many clusters formed this is no problem. Gold conjugates are very stable. There may be some release of protein from the particle surface with time, but generally this does not result in reduced reactivity. The reactivity of the conjugate is easily checked with a dot-spot test as described in Newsletter #4. Cluster formation may increase with time, depending on the type of conjugated protein and the particle size. The larger the particles the more clusters. These can be removed by centrifugation of the diluted conjugate before use.

Frequently Asked Questions

Is it possible to double label using two antibodies from the same animal source?

Yes, there are ways to do this. One is by using Protein G or Protein A conjugates with different particle sizes. The procedure would be: first incubate with primary antibody I, detect this with Protein A (or G) with the smaller particle size. Then incorporate an incubation with excess free Protein A or G (50-100 µg/ml). This will block practically all binding sites for Protein A or G. Next, incubate for the second antigen with primary antibody II and detect this with the larger sized Protein A or G gold conjugate.

A second possibility is to use one-step incubations with a mix of primary antibodies, each labeled directly with a different gold particle size. We offer a custom labeling service. Details can be found in the section on custom labeling.

What kind of grids should I use for silver enhancement?

Nickel is the material of choice. Gold grids are out of the question as they will be neatly enhanced as well. The same with copper. Nickel grids are preferred to copper ones for immuno incubations anyway, since nickel is more inert and less poisonous to immuno or enzyme reactions.

Nickel grids can be annoying because of their magnetic properties. This is easily overcome by using either non-magnetic tweezers or by using a flattened loop to transfer grids from droplet to droplet during immuno incubations. We do sell a perfect-loop (70944) for this application.

What about silver enhancement and OsO₄?

OsO₄ fixation can be used before incubation, after incubation or after silver enhancement.

- Because of its destructive effect on antigens OsO₄ fixation is not often used when immuno incubations are intended. However, in general silver enhancing immuno incubated OsO₄ fixed specimens causes no difficulties.
- An Osmium fixation step can be introduced after incubation to improve contrast in specimens. As stated before, applying silver enhancement generally causes no difficulties.
- On occasion in the past, using OsO₄ fixation after silver enhancement used to lead to the removal of part of the deposited silver. However, with the introduction of SE-EM^{plus} this is no longer the case, as the resulting enhanced particles are no longer sensitive to oxidation.

I get no positive results, now what?

When your incubated specimens look as clean as your controls, either (one or more of) the reagents are inactive, or the antigens are destroyed, masked or absent. The cause is easily found by performing tests working backwards through the incubation protocol using dot-spot tests as described in Newsletter #4.

First test the activity of the silver enhancement reagents (if they

were used at all) on the gold conjugate that was used. If silver enhancement is fine, the next step is to test the gold conjugate on the primary antibody used and so on.

If it proves that the problem is not in the reagents, you will have to look into antigen preservation. Is a different fixation due? Or a different embedding medium? Using light microscopical evaluation of the results such questions are answered without tedious EM experimental work.

I am having background problems. Is this due to the gold conjugate?

When specimens are blocked correctly and the right composition and condition of incubation buffer is used, background levels should not be interfering with specific signals. Some background will always exist: to some extent all compounds have a certain affinity for other compounds and depending on availability and concentration an interaction may occur. There is no absolute black and white in this respect.

When you leave out the primary antibody incubation and only use the gold step and your background has become much reduced, then your primary antibody causes background. Remedy: purify the primary antibody by either affinity chromatography (in case of an antiserum) and/or by cross-adsorption. If you have unacceptable levels of background without using a primary incubation, then the specimen has a tendency to bind to gold conjugates.

Background may have many causes which are centered around three different types of interactions:

- Residual fixative activity, which is eliminated by using a NaBH₄ or Glycine block step prior to the protein block step.
- Stickiness to hydrophobic areas (embedding medium, lipid rich specimen compounds). This is reduced by using an adequate protein block step involving a partly hydrophobic protein like BSA or Casein.
- Charge-based interactions causing negatively charged reagents such as antibodies and gold conjugates to adhere to oppositely charged areas in the specimen (notorious are the histone proteins, some collagen types and poly-L-lysine that is sometimes used to make sections stick to surfaces). This type of interaction can only be overcome by adding an excess of negatively charged indifferent molecules to the incubation media. We have developed a chemically modified BSA especially for this purpose. Newsletter #1 gives in-depth information regarding it.

Frequently Asked Questions

Are there any fora which I can address with questions regarding labelling or microscopy?

Feel free to address our HELPDESK by e-mail with questions regarding immunolabeling.

There are a few newsgroups which may be of interest: **bionet.cellbiol**, **bionet.cellbiol.cytonet**, **bionet.molbio.methods-reagents** and **sci.bio.immunocytochem**. There is a microscopy listserver to which you can subscribe and which offers a platform to ask questions regarding light and electron microscopy in all its facets. You can subscribe by sending an e-mail message to **ListServer@MSA.Microscopy.Com**. The message only has to contain the words "subscribe microscopy".

How can I do a controlled silver enhancement with pre-embedding?

With pre-embedding there are 2 possibilities: either the enhancement is done before embedding or on the sections after embedding. We prefer to do the enhancement on sections (on nickel grids) since this gives more control over the degree of enhancement. Using longer enhancement times allows to observe larger (even ultra thin) sections in the light microscope. This facilitates searching for the area in the specimens where a reaction has occurred and allows easy targeting and trimming down to the area of interest for EM sectioning. Shorter enhancement is then used on sections for EM.

Using enhancement before embedding has the disadvantage that once enhancement proves to be too long (resulting in too large particles) this can not be reversed.

In which case should I use a Single Fab or F(ab')₂ conjugate instead of the complete immunoglobulin conjugate?

The size of a conjugate is co-responsible for its efficiency. The overall size is determined by the particle size and by the size of the proteins adsorbed onto the particle surface. That is why we introduced Ultra-Small particles in the first place. Whenever a specimen is relatively dense or intensely cross-linked immuno reagents will be more hindered in their action. If you are already using an Ultra-Small conjugate further improvement may result from using a single Fab or F(ab')₂ fragment of the specific secondary antibody instead of the intact Ig-molecule.

When should I use normal serum in the incubations?

It is a good idea to use normal serum as an additive to the blocking and incubation buffer when using secondary antibody conjugates. The normal serum should be the same species as the secondary antibody conjugate. Its action is similar to the action of BSA. Please be careful when using normal sera to suppress background with Protein A or Protein G conjugates. These conjugates detect several Ig-types from different species which, when used as normal serum additive, would lead to an impressive amount of gold particles all over the specimen. We offer several Blocking Solutions tailored for specific secondary antibody or protein A/G incubations.

What about sensitivity, signal-to-noise ratios and detectability?

Sensitivity can be considered at different levels in the total preparation and incubations. Ideally during preparation one would like to preserve all antigens present. In many cases this is not possible. But at least a representative fraction should be preserved and be available for immuno labeling. It all depends on the preparation procedure (fixation, embedding, temperature, etc.), which leaves you with a specimen or section with a given number of available and recognizable antigens. The ensuing detection protocol has 100% sensitivity if all the remaining antigens are detected, i.e. are represented by at least one gold particle or marker molecule. Again, due to masking and steric hindrance by the specimen composition this will only in exceptional cases be fully attained.

The immuno labeling sensitivity thus expresses the degree to which available antigens can be detected by the employed combination of primary antibody and secondary conjugate.

The quality of the primary antibody is the next important item. Theoretically the K_d-value of an antibody/antigen reaction is a measure for the dilution at which the incubations should be performed and for the stability of the ensuing bond. Sensitivity will go up with more concentrated antibody solutions up to a maximum level. However, when the primary antibody shows cross-reactivity there is not necessarily an improved signal-to-noise ratio. The reliability of the detection by the primary antibody improves in such cases with higher dilutions, probably leading to a smaller amount of antigens detected, but to an improved **signal-to-noise** ratio.

Thus, sensitivity at the level of the primary antibody has to be balanced against the signal-to-noise ratio.

The last step is the quality of the secondary reagent. In fact you will be looking at a number of gold particles which represents a number of secondary antibodies which have detected a number of primary antibodies. For the interaction between the secondary reagent and the primary antibody the same rules apply as indicated for the antigen/primary antibody reaction.

Detectability reflects the degrees to which the final result of all the reactions involved can actually be seen. This is depending on the right match between particle size and magnification. Ultra-Small particle-based conjugates for instances are among the most efficient detection systems, but you will only detect them after silver enhancement (in most applications).

What is epi-polarization microscopy?

Epi-polarization is a technique used for the very sensitive light microscopical observation of metal particles. Where bright field microscopy depends on contrast levels in discriminating signals, epi-polarization works differently: provided particles are large enough individual particles will be observed. So in fact you are evaluating your labeling results on the same basis as with an electron microscope by looking at individual particles. This makes this technique so valuable as it builds a bridge between the light level and the electron microscopical observation.

Frequently Asked Questions

What you need to do is this: a high-quality light microscope equipped with an epi-illumination source, preferably a high pressure Hg-lamp (although a halogen source may also do). Many laboratories have an epi-fluorescence microscope at their disposition with a 40X (or higher) oil objective. Such microscope equipment forms the correct basis. You only need to implement an epi-polarization filter (the so-called epi-block or IGSS filter) in the filter housing. The epi-block contains two polarizers, differing 90 degrees in orientation with respect to each other.

How does it work (in short)? High intensity light passes the first polarizer in the epi-block and becomes polarized. The polarized incident light passes the objective lens and interacts with the specimen. The biological material hardly gives any reflection, and the reflected light is unmodified. The metal particles mirror the polarized light, thereby randomizing the polarization angle.

Reflected light passes up through the objective lens. On its way to the eye pieces or the photo camera the light passes the second polarizer in the epi-block. While doing so, light with the original polarization angle (the way it was polarized in the first place before ever hitting the specimen) is extinguished, whereas light that has become randomly polarized (and which comes from the silver metal particles) passes the epi-block. As a result you will see individual bright stars (the gold/silver particles) against a dark background.

Epi-polarization observation can be combined in real time with bright field imaging, providing for a very sensitive detection of even extremely low amounts of antigen while still having the advantage of full morphological details in the specimen.

My specimens for pre-embedding have a lot more antigens than a corresponding ultrathin section. Should I use more concentrated reagents?

The increased amount of antigens should be balanced by a larger amount of reagent volume at an appropriate dilution (the same as used on sections with low amounts of antigen), and not by more concentrated reagents. The reason is that with increased concentration more cross-reactions may occur and signal-to-noise ratios will decrease.

Incubating specimens for pre-embedding in larger volume quantities is best performed on a rocking table for a prolonged time to warrant penetration to antigenic sites in the specimen.

Custom Labeling

The standard series of AURION ImmunoGold reagents is intended for the two and three step detection of antigens. Although these approaches cover the majority of applications occasionally there may exist a need for a direct label where the gold particles are coupled directly to the primary antibody or, more general, to a protein or peptide with specific binding properties.

To fulfill these needs AURION and EMS offers a custom labeling service for antibodies, antibody fragments, proteins, and peptides with gold particles of any requested size, including ULTRA SMALL gold clusters. AURION designs and manufactures such custom conjugates in close cooperation and in agreement with the principal investigator.

Starting material

As a rule AURION will only accept pure substances as starting material, either lyophilized or dissolved in a medium of known chemical composition. Interfering substances must not be present.

Quality control criteria

The custom prepared product is quality controlled by AURION according to our in-house standards with respect to size distribution and clustering. In agreement with the principal investigator the binding substance's specific quality control criteria are determined. These are tailored for each individual assignment. As a matter of course the custom conjugate is approved only when both sets of quality control criteria have been met.

A FEW EXAMPLES

- AURION successfully conjugated a number of polyclonal antibodies, mouse monoclonal antibodies, F(ab')₂ and F(ab) fragments, high and low density lipoproteins, as well as peptides such as an Angiotensin derivative (octapeptide), Interleukin II, Tumor Necrosis Factor and a number of peptide hormones.
- The efficiency of coupling (recovery of protein) for the above mentioned custom conjugates has been greater than 70% on all occasions, while efficiencies up to 90% are no exception.

No cure, no pay

The custom labeling service is on the basis of "no cure, no pay," with the exception that an intake fee applies to each actual laboratory attempt.

We invite you to contact us directly if you require information which is more tailored to your specific applications.

ImmunoGold Newsletters & Flyers

- **Newsletter 1** "Optimized Immuno labelling using AURION Blocking Solutions and AURION BSA-c™" by Jan L. M. Leunissen and P. van de Plas
- **Newsletter 2** "In Situ Hybridization for Light and Electron Microscopy using Ultra-Small ImmunoGold Detection and Silver Enhancement" by O. Sibon
- **Newsletter 3** "The Dot-Spot Test: a Simple Method to Monitor Immunoreagent Reactivity and Influence of Fixation on Antigen Recognition" by P. van de Plas
- **Newsletter 4** "Ultra-Small gold conjugates and R-Gent SE-EM. Silver Enhancement Reagent in Pre-embedding Single and Double Immuno labeling." by Hong Yi and Jan L. M. Leunissen
- **Newsletter 5** "Ultra Small Gold Reagents and R-Gent SE-EM in Pre-embedding Single and Double Labeling" Hong Yi and Jan L.M. Leunissen
- **Newsflyer 1** "Background Suppression in Immunoperoxidase Cytochemistry using AURION BSA-c™" by Wim Voorhout and Katja Teerds
- **Newsflyer 2a)** "Double Label Immunohistochemistry for the Separate Observation of Two Antigens using Epi-Polarization Microscopy for the ImmunoGold-Silver Technique and Fluorescence Microscopy for the Alkaline Phosphatase Staining" by C.M. van der Loos
- **Newsflyer 2b)** "A Comparison between the Streptavidin-Biotin-Alkaline Phosphatase Method and the ImmunoGold Technique using Ultra-Small Gold Particles and Silver Enhancement" by R. Willemsen

EMS and Aurion ImmunoGold/Silver Staining Workshops

Reactions of Participants

"We are very enthusiastic and will most certainly pursue this method!"

"The time for personal advice was excellent!"

"An abundance of practical info, built on the necessary theoretical background!"

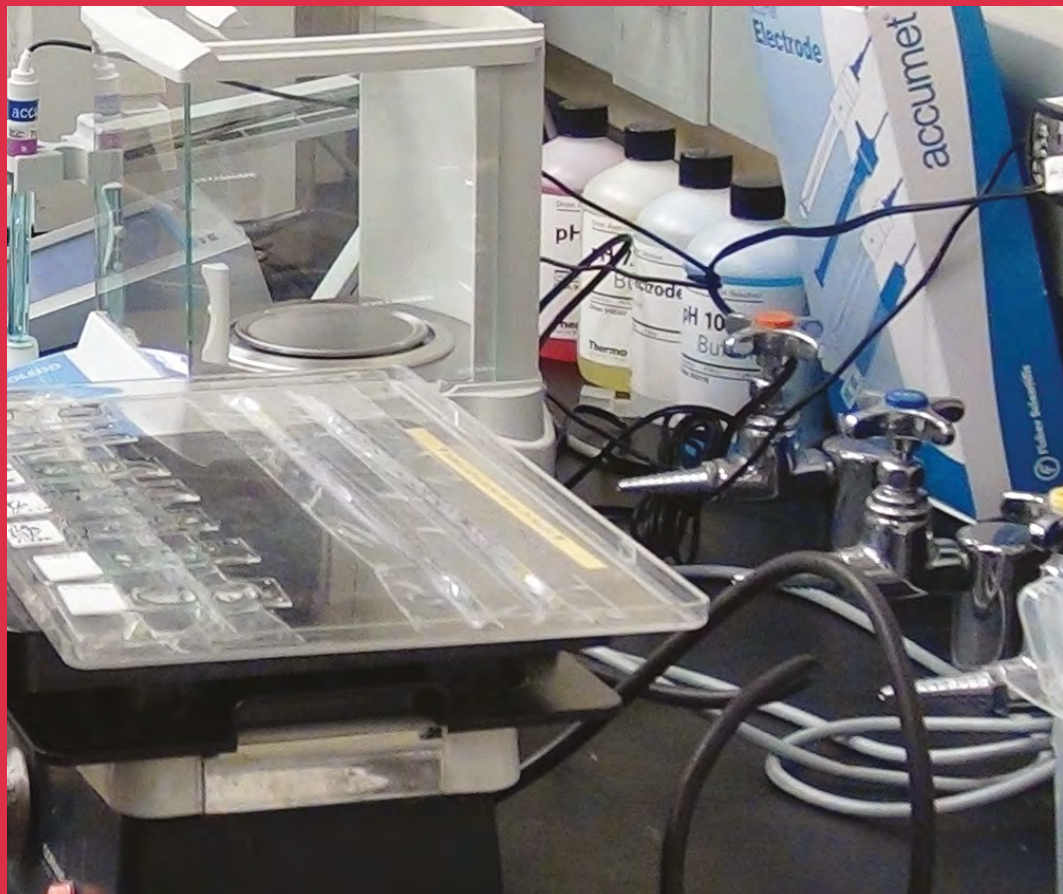
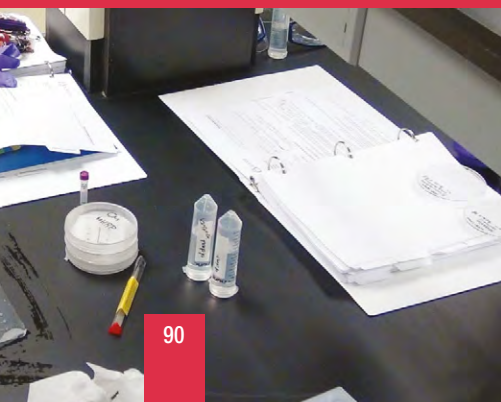
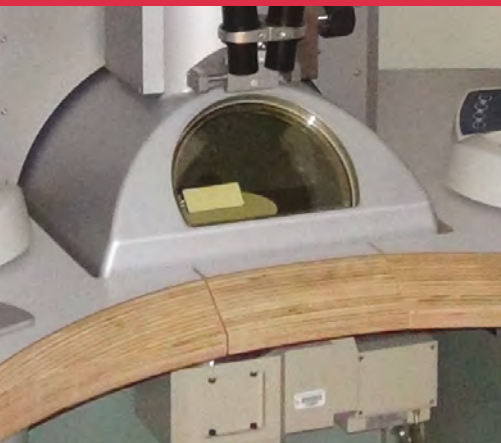
During a 3 day training the theoretical and practical aspects of the most up-to-date methods and applications will be dealt with both for light and electron microscopy.

Preferentially participants work with their own specimens and primary antibodies so that applicability and advantages of the ImmunoGold Silver Staining technique are maximally exploited by each individual participant. Personal attention provides for optimum broadening of knowledge which is of permanent advantage in individual daily work situations in terms of time savings and improvements of results!

ImmunoGold Workshop

SET-UP	Theory and Practice
DURATION	3 days
PRACTICE	<ul style="list-style-type: none"> • labeling of own or Aurion specimens (LM & EM) • incubation methods • testing antigenicity/reactivity • principles of immunogold labeling • preparation of conjugates • LM & EM applications
THEORY	<ul style="list-style-type: none"> • immuno detections • in situ hybridisation • silver enhancement for LM & EM • background problems
TUTORS	<ul style="list-style-type: none"> • Ing. P. van de Plas, Dr. J. Leunissen

If you are interested in attending or sponsoring a workshop please give us a call and ask for Stacie Kirsch.



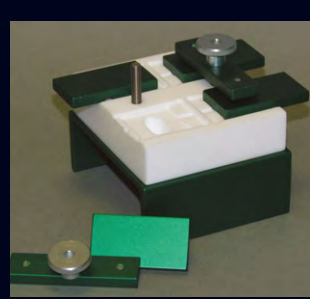
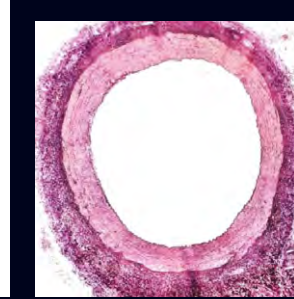
SECTION 3

Embedding Media Kits

Durcupan, Epo-Fix, JB-4,
LR White, Histo-cryl,
and more...

Technovit GMA and MMA
Unicryl

Casting, Potting, and
Encapsulating Resins



Electron Microscopy Sciences

*Please note that wherever DMP-30 is listed as the accelerator in our embedding media kits you have the option to use BDMA in place of it. BDMA is less viscous, has a longer shelf life, and offers better penetration (it should be noted, however, that in order to achieve the optimum results when using BDMA in place of DMP-30 you must vary the amount. DMP-30: 1.5-2%; BDMA: 2.5-3%).

TECHNICAL TIP

DMP-30 and DMAE vs. BDMA

As has been stated in our first issue of NEWS AND VIEWS Issue 1 pg. 3, BDMA proves to be a much better choice for an accelerator than BMP-30. It is much less viscous, has a longer shelf life, and offers better penetration of the tissue. When using BDMA in place of DMP-30 more uniform embedding is obtained. Now it has been shown that the same holds true for BDMA vs. DMAE. It is highly recommended that when choosing and embedding medium and its corresponding accelerator you consider using BDMA in place of DMP-30 and DMAE. Here at ELECTRON MICROSCOPY SCIENCES we have now made available all of our epoxy resin (Araldite and Embed) kits that come with DMP-30 or DMAE., as standard, BDMA as an alternative to them.

PLEASE NOTE THAT IN ORDER TO ACHIEVE OPTIMUM RESULTS WHEN USING BDMA IN PLACE OF DMP-30 THE FOLLOWING PROPORTIONS SHOULD BE USED:
DMP-30: 1.5-2% ADDED TO THE FINAL VOLUME;
BDMA: 2.5-3% ADDED TO THE FINAL VOLUME.

➤ Araldite 502

Luff's Formula Polymerization takes place overnight so blocks can be sectioned the next day. J. Biochem. Biophys. Cytol. 9, 409 (1961)

RT	13900	Araldite 502 Kit consists of:	
		450ml Araldite 502	kit
		450ml DDSA; Specially Distilled	
		*50ml DMP-30	

➤ Araldite 6005

Also known as American Araldite.

The blocks are slightly harder than those produced by Araldite 502.

RT	13920	Araldite 6005 Kit consists of:	
		450ml Araldite 6005	kit
		450ml DDSA; Specially Distilled	
		100ml BDMA	
		225ml DBP	

➤ Araldite, Embed 812 (Epon-812)

Mollenhauer Epon-Araldite Formula. For hard blocks and high image contrast. Blocks are easily sectioned. Stain Tech., 39,11 (1964)

RT	13940	Araldite-EMbed (Mollenhauer's Kit) consists of:	
		450ml EMbed-812	kit
		450ml Araldite 502	
		450ml DDSA; Specially Distilled	
		*50ml DMP-30	

➤ DER 332-732

Three different mixtures: one for relatively soft blocks, one for harder blocks for collagenous tissue, and a tougher one if required. Lockwood, W.R. Anatomical Record, 150, 129 (1964)

RT	14000	DER 332-732 Kit consists of:	
		2x225ml DER 332	kit
		225ml DER 732	
		450ml DDSA; Specially Distilled	
		*50ml DMP-30	

➤ Durcupan, Water Soluble

A water soluble embedding medium for EM based on an aliphatic polyepoxide.
 A Fluka A.G., Buchs.
 Switzerland-Registered
 Trademark.



RT	14020	Kit 260g for a minimum of 10 embeddings	kit
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➤ Durcupan ACM, Epoxy Resin

An aromatic polyepoxide; a colorless resin of relatively low viscosity, with virtually no shrinkage.

RT	14040	Kit 1200ml:	kit
		Single Component A	
		Single Component B	

➤ Diethylene Glycol Distearate (DEGDS/DGD)

DGD is a removable embedding medium (for thin and thick sections) that provides embedment free sections. Good for immunolabeling and high resolution light microscopy.

Advantages:

- Thin or thick embedment free sections can be obtained.
- Sections are easy to cut and ribbons are easily obtainable.
- Enhances the integrity of the specimen as it floats on the water.
- Sections produce interference colors according to its thickness.

Ethanol and n-butyl alcohol are used as dehydrating agents

- Capco, Krockmalnic, & Penman (1984). A New Method of Preparing Embedment Free Sections For TEM: Applications to the Cytoskeletal Framework and Other 3D Networks. JCB Vol. 98, pp. 1878.
- Valdimarsson & Huebner (1989). DEGDS as an Embedding Medium for Immunofluorescence Microscopy. Biochem. Cell Biol. 67:242.
- Nickerson, Krockmalnic, He, & Penman (1990). Immuno-localization in Three Dimensions: Immunogold Staining of Cytoskeletal and Nuclear Matrix Proteins in Resinless Electron Microscopy Sections. PNAS Vol. 87, pp. 2259.

RT	14010	Kit consists of:	
		450ml DGD	kit
		450ml Ethanol	
		450ml n-Butyl alcohol	
		DGD Embedding Kit	

TECHNICAL TIP

Epoxy Resins

Common problems, causes, and solutions

Problems associated with poor embedding in epoxy resins:

- Blocks are difficult to section
- Sections may disintegrate upon contact with water or the electron beam
- Holes in the sections
- Unevenly cured blocks
- Blocks are either too soft or too hard

Factors that cause poor embedding in epoxy resins:

- The presence of water in absolute dehydration solvents and in the ingredients of the embedding mixture

Solutions to the causes:

- Use either fresh or well capped bottles of dehydration solvents.
- Embedding should be carried out at relative humidities below 50%. Dellman, H.D. and Pearson, C.B. (1977). "Better epoxy resin embedding for electron microscopy at a low relative humidity". *Stain Technol.*, 52:5
- Since epoxy resin is hygroscopic, extreme care should be taken to prevent contamination by water.
- Accurate measurement of accelerators.
- Complete mixing without incurring air into the mixture (Use a ptfе or glass rod for at least 20 minutes).

► EMBED-812/ DER 736

This mixture is less viscous than the final embedding mixture of EMBED-812.

RT	14130	Kit consists of:	
		2x225ml DER 736	kit
		450ml EMBED-812	
		450ml NMA	
		*50ml DMP-30	

► EMBED-812

Electron Microscopy Sciences' replacement for the discontinued Epon-812. Produces the same results in terms of preservation, handling, sectioning, and staining as the old Epon-812.



- Hayat, M. A. Principles & Tech. for EM. Second Edition (1981)
- Mascorro, J.A. and Kirby, G.S. Physical characteristics of "old" Epon 812 and various Epon-like replacements. Proc. 44th Ann. Meet. Electron. Microsc. Soc. Am., pp.222-223 (1986)
- Mascorro, J.A. and Kirby, G.S. Novel Epoxy/Anhydride Alternatives for Biological Electron Microscopy: Physical and Performance Characteristics of EMBED 812 and LX 112 in combination with NSA/NMA/DMAE. Proc. 47th Ann. Meet. EMSA., pp. 1000-1001 (1989).
- Mascorro, J.A. and Kirby, G.S. Viscosity Characteristics and Hardening Rates for EMBED 812 and LX 112 with alternative Anhydride and Catalyst Choices. Proc. 49th Ann. Meet. EMSA. (1991).

RT	14120	EMBED-812 Kit consists of:	
		450ml EMBED-812	kit
		450ml DDSA; Specially Distilled	
		450ml NMA	
		*50ml DMP-30	

Especially Formulated for MATERIALS SCIENCE



► Epo-Fix

Epo-Fix is an old product that has existed only in the metallographic field until now. After extensive testing in our labs we have found that it is a perfect embedding media for a majority of material specimens.

Until now, LR White has been the most commonly used embedding media for materials due to the block hardness it offered, but there are difficulties associated with LR White. For instance, the adherence to the specimen is poor and additives are required to improve its adherence. Another major problem is the inability to orient the specimen correctly in order to cut you block afterwards. This is due to the fact that LR White needs to be oxygen starved and gelatin capsules (vertical) are recommended by the manufacturer for use. Another problem is that polymerization time in the oven can take over 24 hours.

Epo-Fix remedies all of these problems. It has very good sectioning properties, good adherence to the sample, very low viscosity, easy curing in molds (no orientation problems), and quick cure times.

Epo-Fix Technical Data: A two component epoxy resin, characterized by negligible shrinkage during curing and good mechanical properties in its hardened state. It is particularly suited for embedding hard samples of complicated shape and for vacuum impregnation. Samples such as paper, silicon, ceramics, metals, wafers, and chips are suitable to be used with Epo-Fix. It has low viscosity, low vapour pressure, good wetting properties, and minimal shrinkage. It hardens at room temperature without significant generation of heat in approximately 8 hours (no damage from heat or pressure), and at increased temperatures, 60°C, the hardening time is reduced to 2 hours. It should be noted that if you place Epo-Fix in a desiccator during curing you will eliminate any air bubbles.

RT	1232	Epo-Fix Kit consists of:	
		1kg resin,	kit
		120gm hardener,	
		15 cups,	
		15 stirrers,	
		1 x 5ml and 20ml syringes	

► Gach (Glutaraldehyde/Carbohydrazide)

A water and lipid-retaining embedding polymer for EM. Excellent preservation of lipids and ultrastructure.

Hechman, C.A. et al. (1973) J. Ultrastruct. Res. 42,156.

RT	15920	Gach Kit consists of:	
		10x10ml 50% EM grade Glutaraldehyde	kit
		10x1.5g Carbohydrazide	

► GMA, Water Soluble

Glycol Methacrylate embedding medium provides excellent preservation (especially enzymatic autoradiographic studies). Good for E.M., L.M., and Histo. Leduc. & Bernard, (1967) J. Ultrastr. Res., 4, 196-99.

RT	14200	GMA Kit consists of:	
		450ml GMA	kit
		225ml n-Butylmethacrylate	
		15g 2,4-Dichlorobenzoyl Peroxide paste	

► GMA/PEG

Polyethylene Glycol - Glycol methacrylate mixture. A water miscible embedding medium for cytochemical studies and enzyme localization when light and electron microscopy need to be correlated.

Spaur, R.C. & Moriarty, G., (1977) J Histochem. Cytochem., 23:163.

RT	14250	GMA/PEG Kit consists of:	
		450ml Glycol methacrylate, GMA	kit
		225ml n-Butyl methacrylate	
		50ml Ethylene glycol dimethacrylate	
		20ml Polyethylene Glycol 400	
		15g Benzoyl Peroxide Paste	

► Hard-Plus Resin-812

A newly formulated resin that enables the processing of specimens that have a tendency to wrinkle and be problematic.

In general, Hard Plus Resin-812 and its WPE numbers (weight per epoxide) do not vary much from batch to batch and it also has good stability under the electron beam and it stains well with heavy metals. Furthermore, the viscosity of the Hard-Plus Resin-812 is lower than the original Epon-812, making infiltration of the tissue more complete. For processing and embedding, it can be used exactly the same way as Epon-812, but normally, it is not necessary to use intermediate solvents, such as propylene oxide, hence, infiltration can immediately follow with absolute alcohol. Polymerization is normally at 60°C for 24 – 48 hours. Longer times or higher temperatures (70°C or more) will give a harder block.

For larger samples (>1x1mm³) the use of an intermediate solvent is recommended.

Hard-Plus Resin-812 is supplied only as a premix kit. All components are pre-measured, and you have to do is combine them in the right order and mix thoroughly. Each kit contains five separate mini-kits, making approximately 100g each.

RT	14115	Hard-Plus Resin-812 Kit consists of:	
		5x50g Hard-Plus Resin-812	kit
		5x50g Hardener Hard-Plus	
		5x 2.5ml Accelerator	
		Hard-Plus Resin-812 Kit	

► HPMA, Water Soluble

HPMA is a water-soluble resin used for cytochemical applications. Infiltration follows fixation of the tissue so there is no extraction of materials caused by dehydration in alcohols. Leduc, E.H. et al., (1965) J. Cell Biol., 26:137.

RT	14220	HPMA Kit consists of:	
		450ml HPM	kit
		15g Benzoyl Peroxide paste	

► Immuno-Bed™ Embedding Resin

■ A low viscosity media for light microscopy and immuno- histochemistry techniques.

■ It allows for the penetration of large immunoglobulins through the plastic sections for demonstration of antigenic sites.

J. Histochem, Cytochem., 35:595 (1987)

	14260-00	Immuno-Bed™ Embedding Resin Kit consists of:	
		7500 ml Solution A	kit
		50 ml Solution B	
		9 g Catalyst Kit	
0-5C	14260-01	Immuno-Bed Solution A only	750 ml
RT	14260-04	Immuno-Bed Solution B only	50 ml
RT	14260-06	Immuno-Bed Catalyst only	9 g

► JB-4™ Embedding Kit

A water soluble embedding media which is based on Glycol Methacrylate (GMA) plastic embedding. It is intended for use in preparing samples for high resolution microscopes (HRLM). The catalyzed monomer acts as a dehydration and infiltration agent; therefore, complete dehydration through 100% ethanol is not necessary (although recommended for large or dense tissues). Conventional paraffin sections have a greater degree of shrinkage and produce inadequate morphology when compared to JB-4.

Features:

- Thin sections (.5-2.0 micron) with excellent morphological structure preservation.
- Water-clear blocks; casts in 90 minutes max. at room temp.
- Good lipid and enzyme retention when processing at low temperatures (4°C).
- Removal of JB-4 resin prior to staining is not necessary.
- Clearing agents such as xylene and chloroform are not needed.
- Higher clarity and contrast than with paraffin sections.
- Easy processing of difficult specimens such as calcified bone and delicate embryonic tissue.
- It produces harder blocks which is ideal for dense samples, such as bone

References:

1. Hofman E.O. & Flores, T.R., High Resolution LM in Renal Path., Amer. J. of Clin. Path., 76:5 (1981)
2. Beckstead, J.H., Blood, 57(6):1008 (1981)
3. Brinn, N & Pickett, P., J. Histotech., 2(5):125-130 (1979)
4. Block, Matthew H., et al., Lab. Med., 13(5)(1982)
5. Helander, K.G., J. Microscopy, 132:223 (1983)
6. Cole, M.B., J. Microscopy, 127:139 (1982)
7. Higuchi, S., et al., Stain Tech., 54(1):5-12 (1979)
8. Van DeVeldt, S., Am. J. Clin. Path., 73:121 (1980)
9. Horton, W.A., J. Histochem. Cytochem., 31:417 (1983)
10. Tacha, D.E. & Richard, T.C., J. Histotech., 4(2):59 (1981)

RT	14270-00	JB-4 Kit Consists of:	
		800 ml Solution A	kit
		30 ml Solution B	
		12 g Catalyst	
RT	14270-01	JB-4 Solution A only	800ml
RT	14270-04	JB-4 Solution B only	30ml
RT	14270-06	JB-4 Catalyst	12g

► JB-4 Plus™ Embedding Kit

JB-4 Plus offers all of the same features as JB-4 with the following additions:

- It produces less of an exothermic reaction than JB4 which is good for temperature sensitive tissues.
- It produces harder blocks which is ideal for dense samples, such as bone.

RT	14272-00	JB-4 Plus Embedding Kit Consists of:	
		500 ml Solution A	kit
		15 ml Solution B	
		8 g Benzoyl Peroxide Catalyst	
RT	14272-01	JB-4 Plus Solution A only	500ml
RT	14272-04	JB-4 Plus Solution B only	15ml
RT	14272-06	JB-4 Plus Catalyst	8g

► Block Holder, Chucks and Molding Cup Trays
See page 250 >>>>

► Tissue-Tack Adhesive for JB-4 >>>> **See page 21, 517**

► UV Mount Medium for JB-4 >>>> **See page 21, 517**

➤ **LR Gold Resin**

The London Resin Company's acrylic "LR Gold" offers the histochemist and immunocytochemist the advantage of working with unfixed tissues at low temperatures, thus allowing many fixation-sensitive procedures to be carried out in 1-4 microns resin sections at -25°C using visible light. It is non-toxic and has a low viscosity.

RT	14370	LR Gold Resin Kit consists of:	
		500ml LR Gold Resin	kit
		100g Polyvinylpyrrolidone	
		50g Benzoyl Peroxide	
		50g Benzil	
RT	14371	LR Gold Resin only;	500ml

TECHNICAL TIP

LR White Technical Tips

1. If you are having difficulty locating your tissue in LR White after it polymerizes due to the fact that the color of your tissue is the same as LR White once polymerized, there is a solution. Dye the LR White using any oil soluble dye. Remember, however, that the intensity of the dye needs to be very high if contrast is to be seen at high magnification. Dyes with phenol or tertiary amine groups should be avoided because they effect the rate of cure of the resin.

It is our experience that Sudan Black (cat. # 21610) is the best dye to use due to its color intensity.

To make up a stock solution, add the dry stain to the resin until a saturated solution is obtained. Then proceed as usual.

2. If you require the pH of LR White to be neutral (the standard is 5) you can adjust it by adding small amounts of caustic soda or a primary amine. The best primary amine to use is Ethanolamine (absolute) for it will mix into the resin very easily. Small amounts are to be titrated into the resin and the pH should be constantly checked until 7 is reached. Do not add more than 50ml.

TECHNICAL TIP

Adherence Of LR White Sections To Glass Slides For Silver Enhancement Immunogold Labeling

A continuing problem in immunogold labeling of 1 micron thick sections from blocks embedded in the hydrophilic acrylic resin LR White for Light Microscopy is the lack of adherence of the sections to the glass slide during the silver enhancement. This problem can be solved by using a 2% formvar solution to coat the glass slide.

- Cleaned glass slides are dipped in a solution of 2% formvar in chloroform and left to dry horizontally.
- Mark the coated surface with a diamond tip scribe and clean the under side of the slide with acetone.
- Transfer the section to the coated slide, which will then be placed in an oven to dry at 50°C.
- Use the Pap-Pen (EMS Cat. #71310) to draw a water repellent circle around the section, which will facilitate the labeling procedures.

Slater, M. (1989) Adherence of LR White Sections to Glass Slides for Silver Enhancement.

Immunogold Labeling. Vol. 65, No. 6 Stain Technology. pp. 297-299

➤ **LR White Resin**

A very low viscosity (8cps), non-toxic resin, suitable for both Light and Electron Microscopy.

LR White is a polar monomer polyhydroxylated aromatic acrylic resin. It can be cured by heat or by UV light. Sections of polymerized LR White resin are hydrophilic. This character allows immuno-cytochemistry reagents to easily penetrate into the sections and etching of the sections is not necessary (etching sections will effect delicate tissue antigens). LR White sections also show minimal non-specific staining. Its low viscosity makes it ideal for infiltrating decalcified bone and teeth as well as plant tissues. It is available in medium and hard grade.



LR White Resins

- Newman, G.R. (1987). Use and abuse of LR White. *Histochem. J.*, 19:118
- Newman, G.R. (1989). LR White embedding medium for colloidal gold methods. In: *Colloidal Gold: Principles, Methods, and Applications, Vol.2* (Hayat, M.A., Ed.). Academic Press. San Diego and London

Note for ordering and using LR White:

LR White supplied by EMS as a standard already is catalyzed to make it convenient for the end user (For those customers overseas, you do have a choice to receive the LR White with the catalyst on the side, with instructions showing you how to catalyze the resin).

For most biological embeddings, the LR-White-resin-only is needed.

When the accelerator is used only 1 drop of accelerator is added to 10 ml of LR White resin. This mixture polymerizes at room temperature in a short period of time (<1 hour) Infiltration with this mixture is poor.

This mixture is mainly intended for one who embeds rocks, metals, minerals etc. where infiltration is not needed.

Kit consists of: 500ml LR White Resin, 10ml UV accelerator

0-5°C	14380	Medium Grade (14381, 14385)	kit
0-5°C	14382	Hard Grade (14383, 14385)	kit
0-5°C	14381	LR White resin only; Med. Grade	500ml
0-5°C	14381-UC	LR White resin only; Med. Grade Uncatalyzed	500ml
0-5°C	14383	LR White resin only; Hard Grade	500ml
0-5°C	14383-UC	LR White resin only; Hard Grade Uncatalyzed	500ml
0-5°C	14384	LR White resin only; Soft Grade	500ml
0-5°C	14384-UC	LR White resin only; Soft Grade Uncatalyzed	500ml
0-5°C	14385	LR White UV accelerator	10ml

➤ **PTFE Flat Embedding Mold 70143 Series**
See page 253 >>>>

➤ **Histocryl Resin**

Histocryl acrylic resin has been specially formulated for light microscopy. It is water clear, and because it is hydrophilic (polar) it permits the use of most routine staining techniques without prior removal or etching.



RT	14390	Histocryl Resin Kit consists of:	
		500ml Histocryl resin	kit
		25g Histocryl Catalyst (B.P.)	
		10ml Histocryl Accelerator	

► Lowicryl Resin

Lowicryl resins are highly cross-linked acrylate-based embedding resins, designed for use over a wide range of embedding conditions. These resins provide low viscosity at low temperatures.



The K4M kit is usable to -35°C and is a polar (hydrophilic) medium, while the HM20 kit can be used down to -70°C and is nonpolar (hydrophobic).

Lowicryl's K11M and HM23 have properties similar to K4M and HM20, but can be used at temperatures 20 degrees lower than others: K11M at -60°C, HM23 at least -80°C. All of these resins are photopolymerized by long wavelength (360nm) ultraviolet light. Since the initiation of the polymerization is largely independent of temperatures, blocks may be polymerized at the same temperatures used for infiltration. The resin may also be chemically polymerized at 60°C.

- Armbruster, B.L. et al, (1982). *J. Microscopy* 126: 77
- Carlemalm, E. et al, (1985). *J. Microscopy* 140:55
- Hayat, M.A. (Ed.). (1989) *Principles and Techniques of Electron Microscopy*, 3rd Edition. CRC Press, Inc. Boca Raton, Florida.

RT	14330	Lowicryl K4M	kit
RT	14340	Lowicryl HM20	kit
RT	14350	Lowicryl K11M	kit
RT	14360	Lowicryl HM23	kit

► Lowicryl MonoStep Single Component Embedding Media

The same as our Lowicryl complete kits but this new formulation allows you one stop embedding without all of the cumbersome preparation and mixing. This pre-mixed, ready to use resin, saves you time and minimizes chemical contact. MonoStep Lowicryl is ideal for use in Immunohistochemistry and immunolabeling.

RT	14335	Lowicryl K4M Polar Embedding Medium; Monostep	225g
RT	14345	Lowicryl HM-20 Non-Polar Embedding Medium; Monostep	225g

TECHNICAL TIP

Improved Polymerization Of Acrylic Resins

Acrylic resins (Lowicryl, LR White, LR Gold, JB4) have become common embedding media for immunocytochemistry. A common problem in handling and disposing of these media is that oxygen inhibits their polymerization. Bubbling dry nitrogen gas through the resin mixture before infiltrating and embedding drives off oxygen and insures consistent polymerization. Specimens embedded in gelatin capsules can be placed in a small chamber or vacuum oven which can be purged with nitrogen to insure complete polymerization of blocks and avoid the tacky block surface and noxious, volatile vapors from incompletely cured blocks.

E. Ann Ellis, Ellis EM Consulting Service, 1316 SW 61st Terrace, Gainesville, FL 32607.

For the polymerization of our UV curing resins, see our UV light sources on page 1100 and our UV Cryo Chamber on page 678. >>>>

► Low Viscosity, as reported by Dr. Spurr

Provides excellent penetration for embedding biological tissues and rapid infiltration. Easy to prepare. The hardness is adjusted by changing the proportion of the flexibilizer (DER 736). The blocks have good trimming and sectioning qualities. Thin sections are tough under the electron beam. Spurr, A.R., (1969) *J. Ultrastruct. Res.* 26, 31-42.



RT	14300	Low Viscosity Kit consists of:	
		450ml NSA	kit
		225ml ERL 4221	
		225ml DER 736	
		25ml DMAE	

ARTICLE OF INTEREST

As many of our valued customers know ERL4206 has been replaced by ERL 4221. Although they should work exactly the same as each other we have found the following recommendations help to obtain much higher quality results. Please feel free to contact us regarding these tips or any of the tips in our catalog

Mixing Directions :

ERL 4221	18ml
DER 736	14ml
NSA	48 ml
DMAE	0.6ml

For Biopsies from Kidney/Liver/GI/Esophagus Dehydration:

50%, 70%, 95% ETOH for 20-30 minutes each change
2 x 100% ETOH for 30 minutes

Infiltration*:

1 part Spurr to 2 parts ETOH for 3 hours
1 TO 1 overnight/over weekend
3 to 1 (Spurr to ETOH) 3 hours
100% Spurr 6-8 hours

Polymerization:

Then Polymerize overnight (12 hour Max) at 70-80 Degrees C
*All infiltration Procedures shall be run on a Rotator.

For Biopsies from Muscle.Nerve/Skin Dehydration:

50%, 70%, 95% ETOH for 20-30 minutes each change
2 x 100% ETOH for 30 minutes

Infiltration* (Spurr/ETOH 100%)

1 part Spurr to 2 parts ETOH 24 hours (over weekend)
1 TO 1 24 hours (over weekend)
3 to 1 (Spurr to ETOH) 24 hours
100% Spurr 24 Hours

Polymerization:

Then Polymerize overnight (12 hour Max) at 70-80 Degrees C
*All infiltration Procedures shall be run on a Rotator.

M-Bond Kit, see Material Science section, page 374 >>>>

➤ **UltraBed Kit**

A Newly Introduced Low Viscosity Epoxy Embedding Kit

A Modification of the Dr. Spurr's Formula for Biological, Material, and Mineralogical Specimens

Versatile! Easy to use! Save Time and Money with this one-step-preparation low viscosity embedding kit.

The kit consists of two components, equal amount, very low viscosity, (~65cps), in convenient dispenser top bottles. To prepare the Embedding Resin, just mix equal amounts of the two components. The resin readily infiltrates into specimen and polymerizes to a clear, hard block overnight at 60°C

- **Convenient – by weight just disperse equal amount of the A and B that you need, and mix together**
- **Save time – Mixed resin can be used for both infiltration and embedding**
- **Less Hazardous – All components are shipped together as Non-Hazardous substances**

Kit comes with 100 ml each component A and component B



RT **14310** UltraBed Low Viscosity Kit 2x100ml

➤ **Methyl Methacrylate/Butyl Methacrylate**

The mixture of Butyl and Methyl Methacrylate offers many advantages over the standard GMA and HPMA embedding mediums:

- **It can be UV cured in the cold with the addition of benzoin methyl ether, or heat cured by the addition of benzoyl peroxide.**
- **The resin can be removed from the sections with a solvent (acetone) before staining.**

RT **14520** **Kit consists of:**
 225 ml Methyl Methacrylate kit
 225 ml Butyl Methacrylate
 15 g Benzoyl Peroxide Paste

➤ **Micro-Bed™ Resin**

Micro-Bed resin is a newly developed water-soluble resin which is a mixture of acrylate and polyester resins. It is a very universal embedding medium and may be used for either light or electron microscopy.

Due to its non-crosslinking characteristics, its hydrophilic nature, and roughness of its section surface, our Micro-Bed Resin is excellent in preserving tissue structure, offers good results in immunolabeling, and stands up well to conventional stains.

In light microscopy, tissues were stained with conventional histological stains (e.g., hematoxylin-eosin) and embedded in Micro-Bed: the results were comparable with those provided on paraffin embedded tissues. Further, polychrome silver-based and cytochemical stains (e.g., PAS) were also feasible. In transmission electron microscopy, images as good as those obtained with similar acrylic resins, (e.g., Lowicryl K4M), were obtained.

Micro-Bed is supplied as a single component-ready to use pre-mixed resin. Micro-Bed can be polymerized in either EMS embedding capsules or gelatin capsules by either heat (55-65°C) or UV (wavelength 365nm) light at low temperatures (-10 to 20°C) for 72 hours.

Scala C. et al. (1992). Development of a new acrylic resin ideally suited for light and electron microscopy. Electron Microscopy. Volume 3. EUREM 92, Granada, Spain. pg. 271



0-5°C **14210** Micro-Bed Embedding Resin 500ml

➤ **Polyester Wax**

See Histology section, page 493. >>>>

➤ **Quetol 651 - NSA**

A water miscible epoxy resin used for both light and electron microscopy. Its low viscosity permits easy infiltration and embedding, and yields light-colored blocks.

Kushida, H. et al., (1986) Pro. 11th Int. Cong. Electron Microsc., p. 2177. Kyoto

0-5°C **14640** **Kit consists of:**
 225ml Quetol 651
 450ml NMA
 450ml NSA
 *50ml DMP-30 Kit

ARTICLE OF INTEREST

The addition of 1% water to the epoxy resin Quetol increases the labeling intensity of the sample. The significant decrease of the curing temperature of the epoxy resin may assist in preservation of antigens. Water may also reduce the cross-linkage of the resin allowing more antigen to be available to the antibodies. The modified Quetol resin is an option for use in immunocytochemistry studies.

Refer to:

Andre R. Abad, (1992). Medium Temperature Epoxy Resin for Immunocytochemistry: Quetol 651 with Water. Microsc. Res. and Techn. 20:274-280.

➤ **Styrene Monomer, Polyester Resin**

Very low viscosity; monomeric styrene which penetrates rapidly into the tissues. It is soluble in ethanol and acetone. The infiltration and embedding can be done by styrene alone, and there is no need to dilute it with solvents. Polymerization can be done either by UV light (340-400nm) or heat (60°C) within 2-3 days without benzoyl peroxide added; 24 hours with 1% benzoyl peroxide added as a catalyst.

Delamater et al., (1971) Pro. 29th Ann. Meet. EMSA, p. 488. Claitor's Pub. Div., Baton Rouge, La.

Kushida, H. (1962b) J. Electron Microsc., 11:128

Kushida, H. (1961a) J. Electron Microsc., 10:16

RT **14650** **Kit consists of:**
 450ml Monomeric Styrene
 100ml Methyl Ethyl Ketone (UV activator)
 225ml Dibutyl Phthalate (plasticizer)
 225ml n-Butyl Methacrylate
 20g Benzoyl Peroxide (catalyst) Kit

► Technovit By Kulzer — The Resins and Accessories for all Methacrylate Embedding

Technovit® is one of the most sought after name in Methacrylate embedding medias in the world due to its diversity and availability of different kits and properties there is a media for each of your applications.

The systems developed by Heraeus Kulzer in collaboration with renowned scientists and institutes to embed tissue in plastic material for histological studies have proven themselves in practice for decades. They are successfully used for diagnostic and research purposes in medicine, veterinary medicine and botany. They are also successfully used in cutting technology for industrial applications and biomaterials.

The systems fulfill important requirements such as embedding at low temperatures, thin and semi-thin section techniques and optimal division and abrasion properties. The sections can be easily stretched, and under the light microscope the stained preparations show excellent morphology.

The scientific and economic conditions for histological studies of tissues are significantly improved with Heraeus Kulzer's histology technology.

- Simple, rational handling, as all components are compatible with one another.
- Due to the special material properties, the standard stain methods, enzyme chemistry and immunohistochemistry used in histological laboratories can be used, including in-situ hybridization.

Why plastic?

In contrast to all other embedding materials used in light microscopy in histological technology, uniform thin and semi-thin sections can be made after plastic has been embedded. In the process morphological details remain excellent. The mineralized and cellular structures can be better determined in undecalcified specimens embedded in plastic. The mineral matrix and the cartilaginous and ligament tissues are very well maintained.

The results of enzymatic immunohistochemical studies and in-situ hybridization show more sensitive and specific activity because all Technovit® plastics harden at low temperatures and below freezing temperatures due to the special composition of the polymerization systems.

► Technovit® 9100

Technovit® 9100 is an embedding medium system based on methyl methacrylate (MMA), which hardens at low temperature. It is designed for the embedding of mineralized tissues with extensive possibilities of staining for light microscopy.

Applications:

Hard-cutting technique for making thin layers

Examples: Iliac crest biopsies, smaller, spongy and compact bone tissue specimens.

Division thin section technique (division procedure in point contact technology)

Examples: Tooth/jaw areas with and without implants, non-cemented endoprostheses with shaft bones.

Combined division-thin section technique and hard-cutting technique (target preparation)

Examples: Boundary layer and environment assessment for metal implants and non-cemented endoprostheses.

Properties:

Technovit® 9100 Polymerization takes place under the exclusion of oxygen with the help of a peroxide/amine catalyst. Additional components such as PMMA-powder and a regulator allows for a controlled polymerization at temperatures between -8 and -20°C , which guarantees for the dispersion of the heat generated during polymerization. The polymerization time is between 18 and 24 hours using a volume between 3 and 15 ml in the above temperature range. All the routine techniques such as preparation tissues, staining, immuno- and enzyme-histochemistry, in-situ hybridization techniques can be performed.

Basic Solution — is composed of organic monomers, with at least one carbon-carbon double bond (C=C). The stabilizer added to this solution is for storage-stability. Hydrophilic properties are improved by the addition of a special hydrophilic generating agent.

PMMA-Powder — is an internal filler and it is made up of PMMA-micro pellets. It is used to:

- Reduce the polymerization shrinking effect.
- Reduce the heat generated during the polymerization process.
- Improve the quality of the polymerization block.

Hardener 1 — is one of the components of the polymerization initiation system. It is a derivative of dibenzoyl peroxide, which in combination with Hardener 2, makes the polymerization take place.

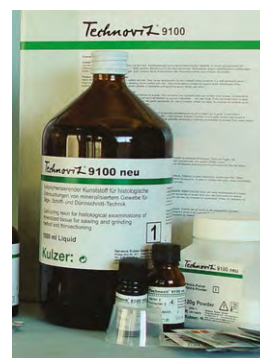
Hardener 2 — it works catalytically upon Hardener 1 to allows for a controlled polymerization, even at temperatures below 0°C .

Regulator — is composed of a reactive organic compound, which allows a controlled polymerization, even with large volumes of polymer, without increases in the temperature during the polymerization reaction.

PMMA-Granulate, EXART® — this granulate acts as an additional internal filler when larger amounts (500–1000ml) of polymer are to be used, for example, in the case of femur shaft with non-cemented endoprostheses. The amount of monomer (basic solution) is thereby reduced, at the same time making the polymerization easier to control.

Technovit® 9100 consists of:

- 1000ml Basic Solution (stabilized)
- 120g PMMA-Powder
- 8 Bags @ 1g Hardener 1
- 10ml Hardener 2
- 5ml Polymerization Regulator
- 500g PMMA-Granulate, EXART*



Section of stent.
Elastica Van Gieson

RT	14655	Technovit® 9100	kit
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*EXART – Trade mark of EXART-Apparatebau GmbH & Co. KG, D-22851 Norderstedt

➤ **Technovit® 7100 and 8100 Embedding Kits**

Technovit® Glycol Methacrylate embedding kits developed by Kulzer in Germany are the most convenient to use, and offers the best embedding results.



Features:

- **Technovit® GMA kits give better results offering improved morphology, and allows for 1 micron serial sectioning.**
- **Technovit® 7100 GMA is less sensitive to O₂ during polymerization so sealing of the molds is not necessary.**
- **The polymerization temperature never exceeds 40°C, which makes either kit a potential choice for enzyme histochemistry. Initiation chemistry of Technovit® 8100 GMA makes polymerization at 4°C possible for improved signal during immunohistochemistry.**
- **The initiator is prepackaged, eliminating messy handling of dry components, and by eliminating aromatic amines from the formation, the components are significantly less toxic.**
- **The consistent high quality of raw materials used to make the resin allows for a permanent clear colorless block and, most important, reproducible results.**

Technovit® H7100 –GAM kit consists of:

- 500ml Glycol Methacrylate monomer
- 5 x 0.6g packs Hardener I
- 40ml Hardener II

RT	14653	Technovit® H7100-GMA	kit
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Technovit® H8100 – GMA kit consists of:

- 500ml Glycol Methacrylate Monomer
- 5 x 0.6g packs Hardener I
- 30ml Hardener II

RT	14654	Technovit® H8100-GMA	kit
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Technovit Glycol Methacrylate 7100 Histo Techniques Set includes:

- Technovit Glycol Methacrylate Kit 7100 with 500 ml of GMA monomer, 5 x 1g packs of Hardener I, and 40 ml of Hardener II
- 100 pieces Histobloc
- 1 piece Histoform S or Q Embedding Mold
- 100 pieces Histoknife H
- 1 piece microtome knife holder, 17 or 22 cm
- Technovit 3040 Kit
- Technovit 3040, 100g powder and 80 ml liquid dosing devices

RT	14654-26	Technovit 7100 Histo Set	kit
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Technovit Glycol Methacrylate 8100 Histo Techniques Set includes :

- Technovit Glycol Methacrylate Kit 8100 with 500 ml of GMA monomer, 5 - 0.6 g packs of Hardener I, and 30 ml of Hardener II
- 500 cover foils
- 100 pieces Histobloc
- 1 piece Histoform S or Q Embedding Mold
- 100 piece Histoknife H
- 1 piece microtome knife holder, 17 or 22 cm
- Technovit 3040 Kit
- Technovit 3040, 100g powder and 80 ml liquid dosing devices

RT	14654-25	Technovit 8100 Histo Set	kit
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➤ **Technovit 4000**

The low shrinkage embedding medium

Technovit 4000 is a fast curing, cold polymerizing, three-component resin, which is based on a modified polyester, and it is available in the form of powder, syrup I, and syrup II. It is mixed at a ratio of 2:2:1 (powder:syrup I:syrup II). Syrup I and Syrup II are mixed together first and the powder is mixed in last. The color is white opaque.

Properties:

Technovit 4000 is distinguished by its low shrinkage when polymerizing and its perfect margin fit. Due to its excellent flow characteristics, Technovit 4000 guaranteed that geometrically demanding samples are optimally embedded. Its excellent adhesion properties with regard to metal are a guarantee of gapless embedding of all metal samples. These properties are of particular importance when working with samples that require good edge definitions.

- **Excellent margin fit**
- **Optimum grinding, polishing properties**

Application:

After mixing, Technovit 4000 can be used for casting for approximately 4 minutes and takes approximately 8 minutes to cure.

Technovit® 4000 Kit consists of:

- 750g Powder
- 500ml Liquid I
- 250ml Liquid II

RT	14656-02	Technovit 4000, Medium	kit
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➤ **Technovit® 3040 – Mounting Medium**

Technovit 3040 yellow is a fast curing methyl methacrylate-based resin, whose chemical composition warrants a firm, durable bond between Technovit and the specimen.

Technovit® 3040 consists of two components – powder and liquid – allowing simple mixing, easy adherence to the specimen, and fast curing. For fixing the mount, a high viscous consistency is required(i.e. a mixing ratio of approximately 2-3 parts per volume powder: 1 part per volume liquid) has proven to be the most advantageous.

Technovit® 3040 Kit consists of:

- 1 x 100g Technovit® 3040 powder
- 1 x 80ml Technovit® 3040 liquid

RT	14652	Technovit® 3040	kit
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➤ **Technovit HistoBloc**

Due to the special demand for the thinnest possible sections, polymerized Technovit® 7100 is most elastic and it is therefore recommended to fix the embedded specimen on a universal stable mount, to insure optimum clamping and cutting.

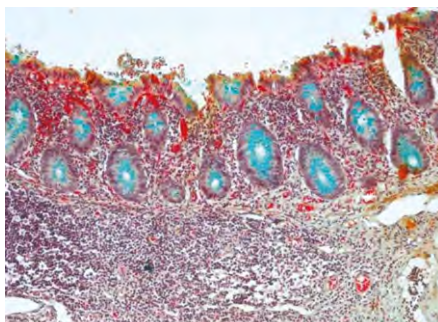
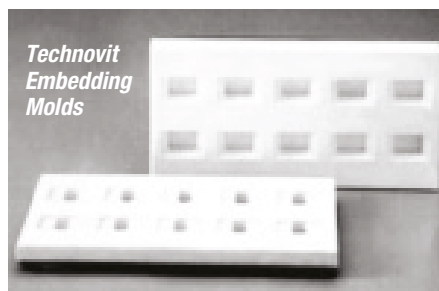
To avoid a subsequent complicated removal of the specimens from the mount, an inexpensive disposable version was developed.

Features:

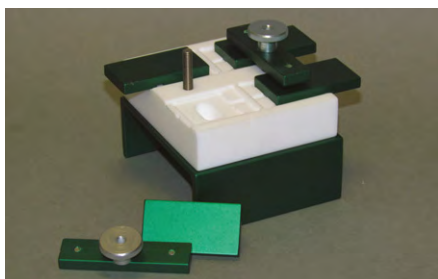
- **Fixed easily, securely and permanently**
- **Clamped into all rotary microtomes without adapter**
- **Embedded in the elastic Technovit in such a way that thinnest sections may be cut**
- **Optimally fixed using Technovit® 3040 at low cost (polymerisation in 5 to 10 minutes)**
- **Easy to write on**
- **Link together for storage**

Cat. #	Description	
14654-60	HistoBloc for "S" and "Q"	100/pk
14654-70	HistoBloc for "N"	50/pk

► Technovit By Kulzer – continued



Appendix for pentachrome staining in accordance with Movat



► Technovit Embedding Molds

An important prerequisite for easy-to-cut specimens is a mold with a special profile which will provide specimen blocks for easy application and simple cutting. This is achieved with Histoform S, an embedding mold composed of new material with a special shape.

All essential requirements such as:

- Material-saving volume
- Easy-to-cut shape
- Unlimited shelf life
- Easy removal of the embedded specimens because of the conical shape and the PTFE material
- Excellent temperature dissipation by way of refined steel bottom
- Accurate and easy fixing of the specimen blocks by special grooves were achieved with Histoform S, in cooperation with renowned users.

Curing temperature measurements have confirmed that at this volume the combination of PTFE and refined steel will result in a considerably lower polymerization temperature.

Three types are available: the Histoform Q and the Histoform S and the Histoform N. The Histoform Q was developed for the embedding of larger specimens; the characteristics are identical to Histoform S. These PTFE molds allow for easy removal of 10 plastic blocks when using the Histobloc system.

The mold cavities measure 10mm wide x 16mm high x 6.5mm deep in the "S" and 20mm wide x 16mm high x 10mm deep in the Q and in the "N" 9mm W x 18mm H x 5mm D.

Cat. #	Description	Qty.
14654-30	HistoForm Q	each
14654-35	HistoForm S	each
14654-40	HistoForm N	each

► Additional Technovit General Accessories and Supplies

Cat. #	Description	Qty	Cat. #	Description	Qty
14653-11	Microtome Knife Holder 17CM	each	14653-16	PE – Foils 75x25mm	each
14653-12	Microtome Knife Holder 22CM	each	14653-17	Insert For Specimen Holder M	each
14653-13	Histo Knife H	30/pack	14653-18	Specimen Holder H	each
14653-14	Histo Knife H	100/pack	14653-19	Embedding Mold 25mm	3/pk
14653-15	Mounting Press	each	14653-20	Insert for Embedding Form 25mm	3/pk

TECHNICAL TIP

Rapid Techniques for Specimen Preparation

Rapid methods which facilitate the completion of fixation through polymerization of resin blocks in a few hours.

Refer to:

- Hayat, M.A. and Giaquinta, R. (1970). Vapor fixation prior to fixation by immersion for electron microscopy. Proc. 7th Int. Cong. Electron Microsc., p.391. Grenoble, Soc. Francaise Microsc. Electronique, Paris.
- Johannessen, J.V. (1973). Rapid processing of kidney biopsies for electron microscopy. Kid. Intern., 3:46
- Rowden, G. and Lewis, M.G. (1974). Experience with a three-hour electron microscopy biopsy service. J. Clin. Pathol., 27:505
- Bain, J.M. and Gove, D.W. (1971). Rapid preparation of plant tissues for electron microscopy. J. Microsc., 93:159
- Takagi, I., Sato, T. and Yamada, K. (1979). A rapid method for embedding fractionated samples for electron microscopy. J. Electron Microsc., 28:316
- Altman, L.G., Schneider, B.G. and Papermaster, D.S. (1984). Rapid embedding of tissues in Lowicryl K4M for immunoelectron microscopy. J. Histochem. Cytochem., 32:1217

TECHNICAL TIP

Preparation Of Embedding Mixtures

It is essential to mix the components of viscous embedding medium (Araldite + Epon replacements) very thoroughly to obtain uniform polymerization. Inadequate mixing is one of the main causes of sectioning problems with epoxy resins. The simplest way to obtain good mixing is to warm the resin, the hardener, and the containers to be used for stirring at 60°C. A uniform mixture is obtained in a few minutes by this method and no special stirring apparatus is required. The warm components are easily poured from their containers for measurement. It is best to prepare the complete mixture just before use but if necessary it can be stored at 4°C in a bottle with a well fitting cap for several weeks, or for many months at -20°C. During infiltration of the specimens, the embedding mixture is kept at room temperature and warmed to 60°C.

CAUTION: WHEN WORKING WITH CHEMICALS IT IS WISE TO ALWAYS WEAR GLOVES AND WORK UNDER A FUME HOOD.

Glauert, A.M. Epoxy Resins: An update on Their Selection and Use. Microscopy and Analysis, September 1991, pp. 15-20.

► **Unicryl™**

A New Universal Resin for:

- Light Microscopy
- Electron Microscopy
- Immunolabeling
- In-Situ Hybridization
- Histochemistry

UNICRYL is a single component and easy to use resin which gives excellent structural preservation of tissues without chemically interacting or crosslinking with them. UNICRYL is largely hydrophilic, allowing good access to polar solutions and exhibiting low background staining or labeling from hydrophobic materials. It also minimizes the denaturation of proteins, allowing true antigenic properties to be maintained.

The excellent polymerization properties of UNICRYL are largely due to the fact that all of the components of the polymer have similar molecular weights, ensuring even penetration into the tissue.

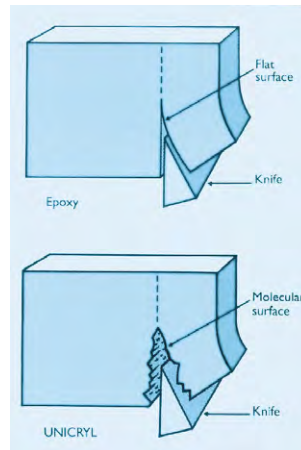
In addition, the enhanced labeling, staining and hybridizing qualities arise from the fact that sections are cleaved from the block face ahead of the knife edge, thus exposing more of the tissue components at the surface. UNICRYL is premixed and supplied as a single component. The resin has a long shelf life when stored in the cold. It is miscible with alcohol and has a low viscosity even down to -50°C. The resin can be polymerized by heat (50-60°C) or by UV irradiation at low temperatures (-10 to 20°C).

The polymerization of the resin is an exothermic reaction. Unicryl shrinks approximately 10% in volume during polymerization. Ethyl alcohol, acetone and many other solvents may be used as a dehydrating agent.

Complete instructions come with the kit.

Unicryl kit consists of:

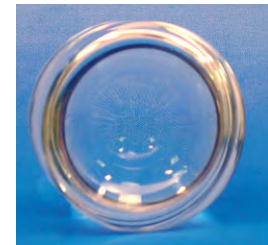
	250 ml Unicryl Resin	
0-5C 14660	Unicryl Embedding Kit	kit



► **Casting-Potting-Encapsulating Resins**

► **Crystal Clear™ – Water Liquid Plastics**

The Crystal Clear™ Series of polyurethane resins were designed for applications that require absolute clarity. These are low viscosity resins that cure at room temperature with negligible shrinkage to a hard plastic. Cured products are UV resistant and are not brittle.



Applications include potting, encapsulating, making prototype models, and lenses, object duplicating etc.

CAUTION: This product is NOT for home use, for research and industrial use only.

TECHNICAL OVERVIEW:

Pot Life	Full Cure	Casting Thickness
Crystal Clear 200 10 min.	16 hours	½" –3" (1.27–7.62cm)
Crystal Clear 204 120 min.	48 hours	3 – 6 (7.62–15.24cm)
Crystal Clear 206 180 min.	48 hours	> 6" (15.24cm)

Ordering: Each kit consists of 1 gallon resin A and adequate curing agent B

Cat. #	Description	Quantity
RT 24200	Crystal Clear™ 200	1 gal kit
RT 24204	Crystal Clear™ 204	1 gal kit
RT 24206	Crystal Clear™ 206	1 gal kit

► **Acrylic Plastic Casting**

Simply place your object in a mold, mix and pour Acrylic Plastic over it. In an hour it is hard and your object is firmly embedded in a clear, stable plastic. For high-gloss finish, it can be polished with a soft cloth. Mold making and casting can be done in two hours. Acrylic Plastic Casting is a thermosetting acrylic-polymer plastic with excellent clarity and stable characteristics.



The kit is available with 1 pint of resin and hardener, or 1 quart of resin and hardener.

Specific Gravity	1.17–1.20
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Cat. #	Description	Quantity
RT 24210-01	Acrylic Plastic Castin	1 pt Kit
RT 24210-02	Acrylic Plastic Casting	1 qt Kit
RT 24210-08	Acrylic Plastic Casting	1 gal Kit

TECHNICAL TIP

The Storing Of Embedding Resin Mixtures

Our experience over the years shows that the best way to store remaining embedding resin mixtures is in disposable plastic syringes.

PROCEDURE:

Take a fresh "all plastic" syringe (EMS Cat. #72520-72529- choose the appropriate size syringe depending on the volume mixture to be stored), remove the tip cover, slowly draw in the mixture. Remove any air space by holding the syringe with the tip in the upward position pulling the plunger slowly to clear the resin from the tip as well as letting the air move towards the tip; slowly push the plunger upward until the resin appears at the end of the tip; put on the tip cover. Wrap the syringe with aluminum foil, label it (name, mixture, and date) and store it in the refrigerator.

This method protects the mixture from contamination by condensation, and it is also more convenient for future use.

TECHNICAL TIP

Microwave Ovens and Embedding

Using a microwave oven of 400W, output rating at 2450 MHz, cumulative short exposures with seven 15s pulses and two 30s pulses, separated by 30s cooling intervals gives acceptable polymerization of embedding resins.

McLay, A.L.C., Anderson, J.D. and McMeekin W. (1987). Microwave polymerization of epoxy resin: rapid processing technique in ultrastructural pathology. J. Clin. Path., 40:350

► Casting-Potting-Encapsulating Resins (continued)



- Extremely high tear strength
- Excellent chemical resistance
- Long pot life
- Good dielectric properties
- Low shrinkage
- Excellent shelf aging
- Insensitive to inhibition
- Low viscosity
- Color coded catalyst
- Variable cure rate

Ordering: Blue Silicone Rubber comes as a kit consisting of 1 gal (9 lb) silicone base and 1 pt (1lb) blue catalyst.

Cat. #	Description	Qty
RT 24230-B	Blue Silicone Rubber Kit	1 gal



Curing: allow the mold to cure overnight (at least 16 hours) at room temperature (77°F/25°C) before de-molding. Do not cure rubber where temperature is less than 65°F/18°C. Post Curing the mold will aid in quickly attaining maximum physical and performance properties. After curing at room temperature, expose the rubber to 80°C for 2 hours and 100°C for 2 hours. Allow mold to cool to room temperature before using

NOTE: This clear silicone will cause rubber to yellow when applying post curing.

► Silicone – Room Temperature Cured

Per the requests of our customers we are introducing a series of room temperature cured silicones that are used in the labs.

1. Blue Silicone Rubber

Blue Silicone Rubber is extremely high tear, high tensile strength, two components, and tin catalyzed RTV silicone rubber. It is designed for casting polyurethane foam, polyester and epoxy parts. It is a superior product with the following advantages over the RTV silicones:

TYPICAL PROPERTIES

Un-catalyzed Compound	Base	Activator
Color	White	Blue
Viscosity (cps)	50,000–70,000	300–400
Specific Gravity	1.10	.99
Working time (hours)	1.5 to 2.5	
Cured Time (hours)	16 to 18	
Shelf Life (months)	6	

2. Clear Silicone Rubber

This silicone cures at room temperature with no shrinkage and offers a unique water clear see through rubber with excellent tear strength, chemical and heat resistance.

TYPICAL PROPERTIES

Hardness Shore A.....	40
Color	Translucent
Pot Life.....	60 min.
Demold Time.....	16 hours
Specific Volume	25.8
Specific Gravity	1.07
Mixed Viscosity.....	35,000cps
Die B Tear Strength.....	120 pli
Tensile Strength	800 psi
Shrinkage	Negligible
Mixing Ratio Wt. Or Vol.....	100:10 pbw

Cured Rubber (7 days @ 70°F & 50% R.H.)

Hardness, Shore A.....	32±4
Tensile Strength (psi).....	525 ± 25
Elongation (%).....	300 ± 25
Tear, Resistance (ppi).....	120 ± 10
Shrinkage (%)	0.1
Specific Gravity	1.09
Dielectric Strength (volts/mil)	500
Dielectric Constant @ 100Hz.....	3.3
Dissipation Factor @ 100Hz	0.019
Volume Resistivity (ohms/cm).....	1 x 10 ¹⁵

Ordering: Clear silicone comes as a kit of 1gallon (9 lb) silicone A and 1 pt (.9lb) curing agent B.

Cat. #	Description	Quantity
RT 24234-C	Clear Silicone Rubber Kit	1gal



► Kwik-Gard Sylgard™ 184

The Kwik-Gard™ is specially packaged Sylgard184 silicone that offers a quicker and easier way to apply the silicone, eliminating the messy procedure of preparing the mixture before application. Its special cartridge controls the precise mixing ratio to ensure proper curing. The disposable tip mixes resin and hardener as they are dispensed. Since no air is introduced during mixing, the resin does not need degassing for most applications. The mixed silicone is applied directly to the site, reducing preparation time and material waste. Each Kwik-Gard™ cartridge contains 37 mL of resin and hardener. The dispensing tip has a dead volume of 0.75 mL. Curing time for this silicone is 24hrs@25°C, 15 min.@150°C.

Cat. #	Description	Quantity
RT 24236-01	Kwik Gard™ Start Up kit (Dispenser, 1 Cartridge and 5 tips)	each
RT 24236-02	Kwik Gard™ Refill (2 cartridges and 10 dispensing tips)	each
RT 24236-03	Dispensing tips	10/pack
RT 24236-04	Kwik Gard™ Dispenser	each

► Sylgard™ 184

The same as the Kwik Gard™ But in its original container. A two-part silicone elastomer, ideal for potting and encapsulating applications.

Very low dielectric constant sealing compound used in patch clamping and many other lab applications. After cure, will withstand -55° to 200 °C. Curing time for this silicone 24hrs@25°C, and 15 min.@150°C.



Cat. #	Description	Quantity
RT 24236-10	Sylgard™ 184	1.1 lb

SECTION 4

Grids, Grid Storage Boxes, & Related Supplies

Gilder — a reliable support specimen grid source

EMS — Square Mesh and Oval Hole

Veco — the most rigid grids available

Maxtaform — smooth edges, firm support, and a large open area

Athene — exceptionally refined grid bars, and good handling characteristics

Index — Alpha Numeric and Asbestos Index Grids

Synaptek™ unflexible grids, made of beryllium-copper

Beryllium Grids for TEM

Embra and Molybdenum Grids

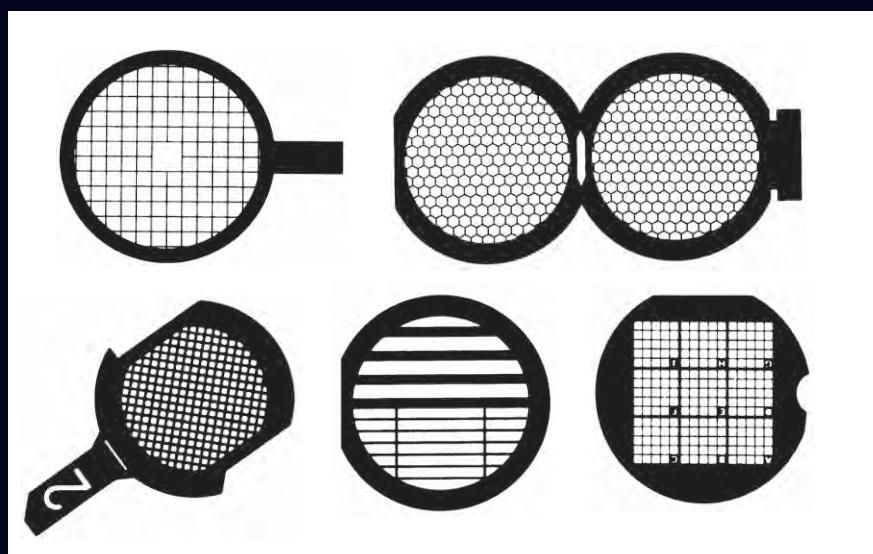
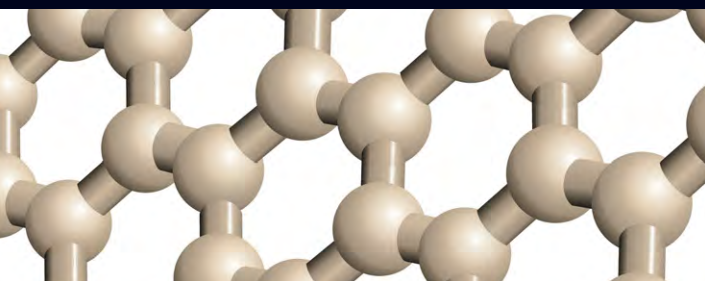
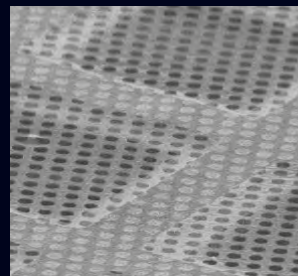
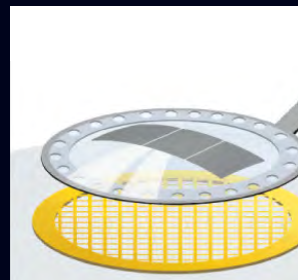
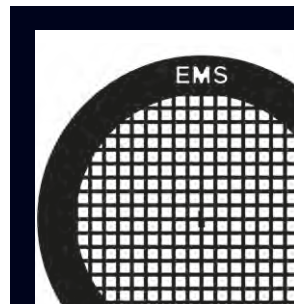
Support Film on Grids

C-flat™ Holey Carbon Grids for cryo-TEM

QUANTIFOIL Holey Carbon Films

Graphene Films for TEM

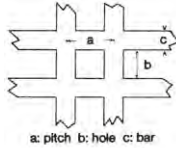
Grid Preparation Supplies



**Electron
Microscopy
Sciences**

► Gilder Grids

A reliable support specimen grid source. Features well-defined grid bars, maximum open area, and a matt/shiny side. Each grid is individually inspected. Newly introduced are copper grids with palladium plating. This plating offers better grid strength and avoids tarnishing.



Standard Square Mesh

Diameter: 3.05mm, **Thickness:** 0.7 mil (18µm)

Material: Copper (Cu), Nickel (Ni), Gold (Au), Copper/Palladium (Cu/Pd=CP), Molybdenum (Mo)



G100 - G400



G200TH



G200T



G200T

- [1] A thickened version of the standard, G200TH with an asymmetric center. A mark on the rim allows for precise orientation of the grids.
- [2] A combination of thin and thick bar grids, with a mark on the rim for orientation.
- [3] The handle is designed for ease of handling and is easily removed if necessary. To remove the handle, just bend it over on a 90-degree angle.

Gilder Finder Grids

Diameter: 3.05mm, **Thickness:** 0.7 mil (18µm)

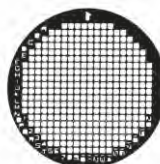
Material: Copper (Cu), Nickel (Ni), Gold (Au), Copper/Palladium (Cu/Pd=CP)



G200F1



G200F2



G200HF3

- [4] Thick bars dividing regions into 6 thin bar areas, which are identified by a numeric system.
- [5] Thick bars dividing regions into 9 thin bar areas, which are identified by alphabetical letters located in the center of the grid.
- [6] Each of the 322 grids squares, can be identified by reference to its unique combination of base 2 binary number and alphabet symbol (A-T). 0 is a short rounded solid pillar and 1 is a longer rounded solid pillar.

Standard Hexagonal Mesh

Diameter: 3.05mm, **Thickness:** 0.7 mil (18µm)

Material: Copper (Cu), Nickel (Ni), Gold (Au)



G100H & G200H



G150H; G300H & G400H

		TECHNICAL DATA			
Type	Cat#	Packed	Pitch (µm)	Hole (µm)	Bar (µm)
STANDARD SQUARE MESH					
50 mesh	G50-Cu	100/vial	500	420	80
	G50-Ni	100/vial	500	420	80
	G50-Au	50/vial	500	420	80
75 mesh	G75-Cu	100/vial	340	285	55
	G75-Ni	100/vial	340	285	55
	G75-Au	50/vial	340	280	60
100 mesh	G100-Cu	100/vial	250	205	45
	G100-Ni	100/vial	250	205	45
	G100-CP	100/vial	250	205	45
	G100-Au	50/vial	250	200	50
	G100-Mo	25/vial	250	205	45
150 mesh	G150-Cu	100/vial	165	125	40
	G150-Ni	100/vial	165	125	40
	G150-CP	100/vial	165	125	40
	G150-Au	50/vial	165	125	40
175 mesh	G175-Cu	100/vial	145	108	37
	G175-Ni	100/vial	145	108	37
	G175-Au	50/vial	145	108	37
200 mesh	G200-Cu	100/vial	125	90	35
	G200-Ni	100/vial	125	90	35
	G200-CP	100/vial	125	90	35
	G200-Au	50/vial	125	90	35
	G200-Mo	25/vial	125	90	35
250 mesh	G250-Cu	100/vial	100	70	30
	G250-Ni	100/vial	100	70	30
	G250-Au	50/vial	100	70	30
⁽¹⁾ 200 mesh <i>see description at left</i>	G200TH-Cu	100/vial	125	85	40
	G200TH-Ni	100/vial	125	85	40
⁽²⁾ 200 mesh <i>see description at left</i>	G200TT-Cu	100/vial	125	95	35-25
	G200TT-Ni	100/vial	125	95	35-25
⁽³⁾ 200 mesh <i>see description at left</i>	G200T-Cu	100/vial	125	85	40
	G200T-Ni	100/vial	125	85	40
300 mesh	G300-Cu	100/vial	83	58	25
	G300-Ni	100/vial	83	58	25
	G300-CP	100/vial	83	58	25
	G300-Au	50/vial	83	58	25
	G300-Mo	25/vial	83	58	25
400 mesh	G400-Cu	100/vial	62	37	25
	G400-Ni	100/vial	62	37	25
	G400-CP	100/vial	62	37	25
	G400-Au	50/vial	62	37	25
GILDER FINDER GRIDS					
⁽⁴⁾ 200 mesh <i>see description at left</i>	G200F1-Cu	100/vial	125	100	35-12
	G200F1-Ni	100/vial	125	100	35-12
	G200F1-CP	100/vial	125	100	35-12
	G200F1-Au	50/vial	125	100	35-12
⁽⁵⁾ 200 mesh <i>see description at left</i>	G200F2-Cu	100/vial	125	106	25-12
	G200F2-Ni	100/vial	125	106	25-12
	G200F2-CP	100/vial	125	106	25-12
	G200F2-Au	50/vial	125	106	25-12
⁽⁶⁾ 200 mesh <i>see description at left</i>	G200HF3-Cu	25/vial	125	-	-
	G200HF3-Ni	25/vial	125	-	-
STANDARD HEXAGONAL MESH					
50 mesh	G50H-Cu	100/vial	500	430	70
	G50H-Ni	100/vial	500	430	70
	G50H-Au	50/vial	500	430	70
75 mesh	G75H-Cu	100/vial	340	290	50
	G75H-Ni	100/vial	340	290	50
	G75H-Au	50/vial	340	290	50
100 mesh	G100H-Cu	100/vial	250	215	35
	G100H-Ni	100/vial	250	215	35
	G100H-Au	50/vial	250	205	45
200 mesh	G200H-Cu	100/vial	125	100	25
	G200H-Ni	100/vial	125	100	25
	G200H-Au	50/vial	125	100	25
300 mesh	G300H-Cu	100/vial	83	58	25
	G300H-Ni	100/vial	83	58	25
	G300H-Au	50/vial	83	58	25
400 mesh	G400H-Cu	100/vial	62	37	25
	G400H-Ni	100/vial	62	37	25
	G400H-Au	50/vial	62	37	25

► Gilder Grids (continued)

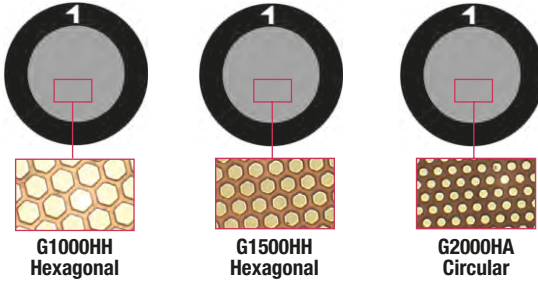
NEW High Mesh Values

There is increasing interest in the use of high mesh value TEM specimen support grids in life science, materials sciences, semiconductor and nanotechnology. We introduce three new products designed to improve support for thin specimens and membranes. These have a high hole/bar ratios giving good transmission values.

Diameter: 3.05mm, **Thickness:** 0.7 mil (18µm)

Mesh Diameter: 2mm

Material: Copper (Cu), Nickel (Ni), Gold (Au).



Parallel Bars

Diameter: 3.05mm, **Thickness:** 0.7 mil (18µm)

Material: Copper (Cu), Nickel (Ni), Gold (Au)

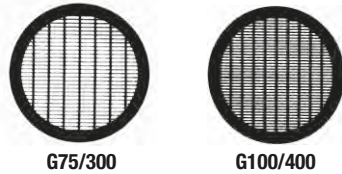


Rectangular

Diameter: 3.05mm,

Thickness: 0.7 mil (18µm)

Material: Copper (Cu), Nickel (Ni)



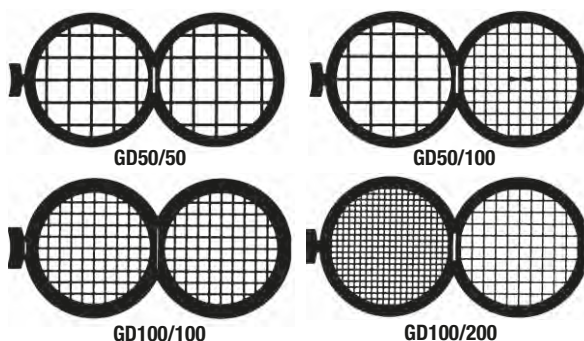
Double Grids (Oyster)

These are used mostly in metallurgical applications for supporting thin metal foils. These grids have a curved securing tab which folds to the curvature of the 'sandwiched' grid.

Diameter: 3.05mm, **Thickness:** 0.7 mil (18µm)

Material: Copper (Cu), Nickel (Ni), Gold (Au), Copper/Palladium (Cu/Pd=CP), Molybdenum (Mo)

Four configurations are available:



		TECHNICAL DATA			
Type	Cat#	Packed	Pitch (µm)	Hole (µm)	Bar (µm)
HIGH MESH VALUES					
G1000HH Hexagonal Mesh	G1000HH-Cu	25/vial	25	~19	~6
	G1000HH-Ni	25/vial	25	~19	~6
	G1000HH-Au	25/vial	25	~19	~6
G1500HH Hexagonal Mesh	G1500HH-Cu	15/vial	16.5	~10.5	~6
	G1500HH-Ni	15/vial	16.5	~10.5	~6
	G1500HH-Au	15/vial	16.5	~10.5	~6
G2000HA Circular Mesh	G2000HA-Cu	10/vial	12.5	~6.5	~6
	G2000HA-Ni	10/vial	12.5	~6.5	~6
	G2000HA-Au	10/vial	12.5	~6.5	~6
PARALLEL BARS					
G50P	G50P-Cu	100/vial	500	416	84
	G50P-Ni	100/vial	500	416	84
	G50P-Au	50/vial	500	416	84
G50PB	G50PB-Cu	100/vial	500	416	84
	G50PB-Ni	100/vial	500	416	84
	G50PB-Au	50/vial	500	416	84
G75P	G75P-Cu	100/vial	340	270	70
	G75P-Ni	100/vial	340	270	70
	G75P-Au	50/vial	340	270	70
G75PB	G75PB-Cu	100/vial	340	270	70
	G75PB-Ni	100/vial	340	270	70
	G75PB-Au	50/vial	340	270	70
G100P	G100P-Cu	100/vial	250	185	65
	G100P-Ni	100/vial	250	185	65
	G100P-Au	50/vial	250	185	65
G100PB	G100PB-Cu	100/vial	250	185	65
	G100PB-Ni	100/vial	250	185	65
	G100PB-Au	50/vial	250	185	65
G150P	G150P-Cu	100/vial	165	115	50
	G150P-Ni	100/vial	165	115	50
	G150P-Au	50/vial	165	115	50
G150PB	G150PB-Cu	100/vial	165	115	50
	G150PB-Ni	100/vial	165	115	50
	G150PB-Au	50/vial	165	115	50
G200P	G200P-Cu	100/vial	125	80	45
	G200P-Ni	100/vial	125	80	45
	G200P-Au	50/vial	125	80	45
G200PB	G200PB-Cu	100/vial	125	80	45
	G200PB-Ni	100/vial	125	80	45
	G200PB-Au	100/vial	125	80	45
G300P	G300P-Cu	100/vial	83	48	35
	G300P-Ni	100/vial	83	48	35
	G300P-Au	50/vial	83	48	35
G300PB	G300PB-Cu	100/vial	83	48	35
	G300PB-Ni	100/vial	83	48	35
	G300PB-Au	50/vial	83	48	35
G400P	G400P-Cu	100/vial	62	22	40
	G400P-Ni	100/vial	62	22	40
	G400P-Au	50/vial	62	22	40
G400PB	G400PB-Cu	100/vial	62	22	40
	G400PB-Ni	100/vial	62	22	40
	G400PB-Au	50/vial	62	22	40
RECTANGULAR					
G75/300	G7530-Cu	100/vial	340/83	290/58	50/25
	G7530-Ni	100/vial	340/83	290/58	50/25
G100/400	G1040-Cu	100/vial	250/62	205/37	45/25
	G1040-Ni	100/vial	250/62	205/37	45/25
DOUBLE-GRID (OYSTER)					
GD50/50	GD50-Cu	100/vial	500/500	430/430	70/70
	GD50-Ni	100/vial	500/500	430/430	70/70
GD50/100	GD5010-Cu	100/vial	500/250	430/195	70/55
	GD5010-Ni	100/vial	500/250	430/195	70/55
GD100/100	GD1010-Cu	100/vial	250/250	200/200	50/50
	GD1010-Ni	100/vial	250/250	200/200	50/50
GD100/200	GD1020-Cu	100/vial	250/125	200/85	50/40
	GD1020-Ni	100/vial	250/125	200/85	50/40

► Gilder Grids (continued)

Single Slot Grids (Oval Hole)

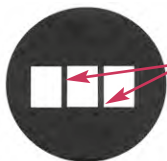
Diameter: 3.05mm, **Thickness:** 50µm

Material: Copper (Cu), Nickel (Ni), Gold (Au), Molybdenum (Mo)



GS2x0.5

GS2x1



GS2/3x1

The two central bars provide increased support enabling thinner films of the formvar/carbon type to be used.

Single Slot Grids (Aperture Grids)

Diameter: 3.05mm, **Thickness:** 50µm

Material: Copper (Cu), Nickel (Ni), Gold (Au)



GA75

GA100

GA150



GA200

GA300

GA400



GA500

GA600

GA800



GA1000

GA1500

GA2000

TECHNICAL DATA					
Type	Cat#	Packed	Pitch (µm)	Hole (µm)	Bar (µm)
SINGLE SLOT GRIDS (OVAL HOLE)					
GS2x0.5	G205-Cu	100/vial	—	2000x500	—
	G205-Ni	100/vial	—	2000x500	—
	G205-Au	50/vial	—	2000x500	—
GS2x1	G2010-Cu	100/vial	—	2000x1000	—
	G2010-Ni	100/vial	—	2000x1000	—
	G2010-Au	50/vial	—	2000x1000	—
	G2010-Mo	25/vial	—	2000x1000	—
GS2/3x1	G60610-Cu	100/vial	—	~606x1000	—
	G60610-Ni	100/vial	—	~606x1000	—
	G60610-Au	50/vial	—	~606x1000	—
	G60610-Mo	100/vial	—	~606x1000	—
GS1x0.2	G102-Cu	100/vial	—	1000x200	—
	G102-Ni	100/vial	—	1000x200	—
	G102-Au	50/vial	—	1000x200	—
GS1.5x0.3	G153-Cu	100/vial	—	1500x300	—
	G153-Ni	100/vial	—	1500x300	—
	G153-Au	50/vial	—	1500x300	—
GS2x0.75	G207-Cu	100/vial	—	2000x750	—
	G207-Ni	100/vial	—	2000x750	—
	G207-Au	50/vial	—	2000x750	—
GS2x1.5	G215-Cu	100/vial	—	2000x150	—
	G215-Ni	100/vial	—	2000x150	—
	G215-Au	50/vial	—	2000x150	—
SINGLE SLOT GRIDS (APERTURE GRIDS)					
GA50	GA50-Cu	100/vial	—	50	—
	GA50-Ni	100/vial	—	50	—
	GA50-Au	50/vial	—	50	—
GA75	GA75-Cu	100/vial	—	75	—
	GA75-Ni	100/vial	—	75	—
	GA75-Au	50/vial	—	75	—
GA100	GA100-Cu	100/vial	—	100	—
	GA100-Ni	100/vial	—	100	—
	GA100-Au	50/vial	—	100	—
GA150	GA150-Cu	100/vial	—	150	—
	GA150-Ni	100/vial	—	150	—
	GA150-Au	50/vial	—	150	—
GA200	GA200-Cu	100/vial	—	200	—
	GA200-Ni	100/vial	—	200	—
	GA200-Au	50/vial	—	200	—
GA300	GA300-Cu	100/vial	—	300	—
	GA300-Ni	100/vial	—	300	—
	GA300-Au	50/vial	—	300	—
GA400	GA400-Cu	100/vial	—	400	—
	GA400-Ni	100/vial	—	400	—
	GA400-Au	50/vial	—	400	—
GA500	GA500-Cu	100/vial	—	500	—
	GA500-Ni	100/vial	—	500	—
	GA500-Au	50/vial	—	500	—
GA600	GA600-Cu	100/vial	—	600	—
	GA600-Ni	100/vial	—	600	—
	GA600-Au	50/vial	—	600	—
GA800	GA800-Cu	100/vial	—	800	—
	GA800-Ni	100/vial	—	800	—
	GA800-Au	50/vial	—	800	—
GA1000	GA1000-Cu	100/vial	—	1000	—
	GA1000-Ni	100/vial	—	1000	—
	GA1000-Au	50/vial	—	1000	—
	GA1000-Mo	25/vial	—	1000	—
GA1500	GA1500-Cu	100/vial	—	1500	—
	GA1500-Ni	100/vial	—	1500	—
	GA1500-Au	50/vial	—	1500	—
GA2000	GA2000-Cu	100/vial	—	2000	—
	GA2000-Ni	100/vial	—	2000	—
	GA2000-Au	50/vial	—	2000	—

► Gilder Thin Bar Grids

Thin Bar Grids have been developed using a new technology to produce ultra-fine grids with thinner cross bars than regular grids. The result is equally firm specimen support but with 40% more open area for viewing maximum specimen surface area.

Square Mesh

Diameter: 3.05mm, **Thickness:** 0.8 mil

Material: Copper (Cu), Nickel (Ni), Gold (Au)



T200-T400

T1000

Variable Mesh

Hexagonal Mesh

Diameter: 3.05mm, **Thickness:** 0.8 mil

Material: Copper (Cu), Nickel (Ni)

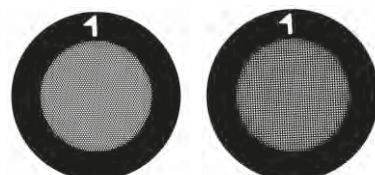


T200H-T600H

NEW Revolutionary Specimen Support Grids

Diameter: 3.05mm, **Thickness:** 0.8 mil

Material: Copper (Cu), Nickel (Ni)



T601

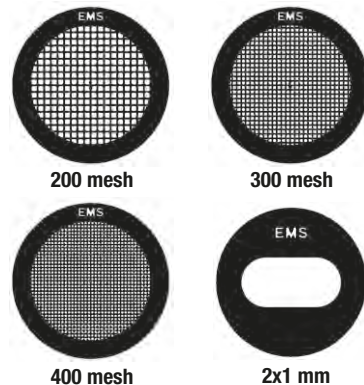
T601H

► NEW EMS Grids

Square Mesh and Oval Hole

Diameter: 3.05mm, **Thickness:** see chart

Material: Copper (Cu), Nickel (Ni), Gold (Au), Molybdenum (Mo)



200 mesh

300 mesh

400 mesh

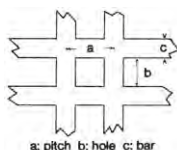
2x1 mm

TECHNICAL DATA					
Type	Cat#	Packed	Pitch (µm)	Hole (µm)	Bar (µm)
SQUARE MESH					
200 mesh	T200-Cu	100/vial	125	113	12
200 mesh	T200-Ni	100/vial	125	113	12
200 mesh	T200-Au	25/vial	125	113	12
300 mesh	T300-Cu	100/vial	83	73	10
300 mesh	T300-Ni	100/vial	83	73	10
300 mesh	T300-Au	25/vial	83	73	10
400 mesh	T400-Cu	100/vial	62	54	8
400 mesh	T400-Ni	100/vial	62	54	8
400 mesh	T400-Au	25/vial	62	54	8
1000 mesh	T1000-Cu	25/vial	25	19	6
1000 mesh	T1000-Ni	25/vial	25	19	6
Variable Mesh	TVM-Cu TVM-Ni	100/vial 100/vial	Combined: 150, 200, 300, 400 mesh Same as above		
HEXAGONAL MESH					
200 mesh	T200H-Cu	100/vial	125	113	12
200 mesh	T200H-Ni	100/vial	125	113	12
300 mesh	T300H-Cu	100/vial	83	73	10
300 mesh	T300H-Ni	100/vial	83	73	10
400 mesh	T400H-Cu	100/vial	62	54	8
400 mesh	T400H-Ni	100/vial	62	54	8
600 mesh	T600H-Cu	100/vial	37	29	8
600 mesh	T600H-Ni	100/vial	37	29	8
REVOLUTIONARY SPECIMEN SUPPORT GRIDS					
In addition to our square and hexagonal mesh Gilder Thin Bar Grids, we are now able to produce a very fine mesh that values up to 2,000 lines/inch. There is an increasing need in TEM for support thin films, routinely carbon, as thin as 1.5 - 2.0nm.					
The pitch (the distance from the center of one bar to the center of the next bar) dimension in all grids remains constant, which allows them to be used as a lower magnification calibration aid.					
Type T600HH (hexagonal) and T600HS (square) represent our efforts to reduce the grid bar width (only 5 microns) enabling more of the specimen to be viewed. All new types, apart from one side being shiny, the other matte, have a large asymmetrical mark in the rim which gives the identification of which side the specimen is on. Grids are 3.05mm overall diameter; 2.05mm mesh area diameter.					
600 mesh (square)	T601-Cu	100/vial	42	37	5
	T601-Ni	100/vial	42	37	5
600 mesh (hexagonal)	T601H-Cu	100/vial	42	37	5
	T601H-Ni	100/vial	42	37	5
1500 mesh (square)	T1500-Cu	15/vial	16.5	11.5	5
	T1500-Ni	15/vial	16.5	11.5	5
2000 mesh (square)	T2000-Cu	10/vial	12.5	7.5	5
	T2000-Ni	10/vial	12.5	7.5	5

TECHNICAL DATA						
Type	Cat#	Packed	Pitch (µm)	Hole (µm)	Bar (µm)	Thickness
SQUARE MESH						
200 mesh	EMS200-Cu	100/vial	125	95	35	Up to 27µm, +/-5µm
	EMS200-Ni	100/vial	125	95	35	Up to 27µm, +/-5µm
	EMS200-Au	50/vial	125	95	35	11µm, +/-2µm
	EMS200-Mo	25/vial	125	95	35	25µm, +/-4µm
300 mesh	EMS300-Cu	100/vial	83	58	25	Up to 19µm, +/-5µm
	EMS300-Ni	100/vial	83	58	25	Up to 19µm, +/-5µm
	EMS300-Au	50/vial	83	58	25	10µm, +/-2µm
	EMS300-Mo	25/vial	83	58	25	25µm, +/-4µm
400 mesh	EMS400-Cu	100/vial	62	37	25	Up to 19µm, +/-5µm
	EMS400-Ni	100/vial	62	37	25	Up to 19µm, +/-5µm
	EMS400-Au	50/vial	62	37	25	9µm, +/-2µm
	EMS400-Mo	25/vial	62	37	25	25µm, +/-4µm
OVAL HOLE						
2x1 mm	EMS2010-Cu	100/vial	—	2000x1000	—	27µm, +/-5µm
	EMS2010-Ni	100/vial	—	2000x1000	—	27µm, +/-5µm
	EMS2010-Au	50/vial	—	2000x1000	—	27 micron
	EMS2010-Mo	25/vial	—	2000x1000	—	25µm, +/-4µm

► Veco Grids

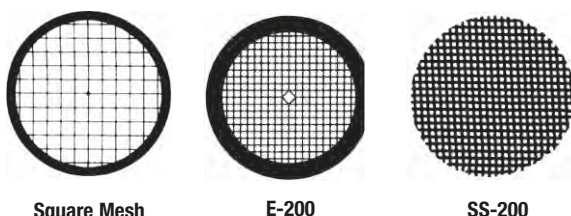
With a wide variety of styles available, Veco Grids offer superior handling characteristics. Plus, with a 0.8 mil thickness, Veco Grids are the most rigid grids available.



Square Mesh with Center Reference

Diameter: 3.05mm, **Thickness:** 0.8 mil

Material: Copper (Cu), Nickel (Ni), Gold (Au)



Square Mesh

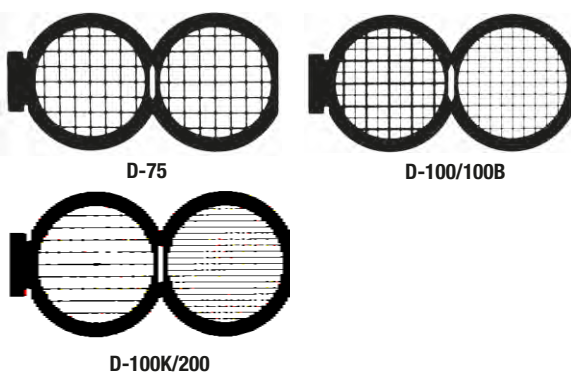
E-200

SS-200

Square Mesh Oyster Grids

Diameter: 3.05mm, **Thickness:** 0.8 mil

Material: Copper (Cu), Nickel (Ni)



D-75

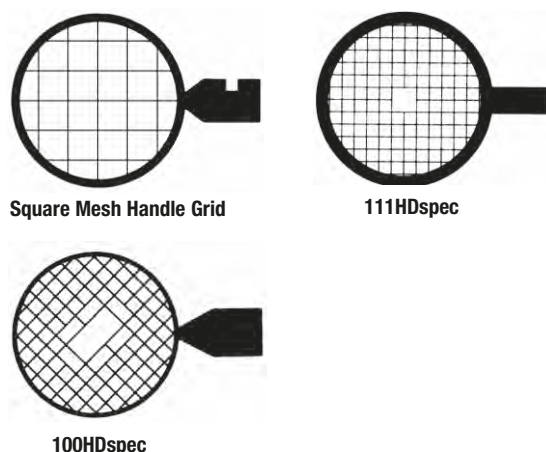
D-100/100B

D-100K/200

Square Mesh Handle Grids

Diameter: 3.05mm, **Thickness:** 0.8 mil

Material: Copper (Cu), Nickel (Ni)



Square Mesh Handle Grid

111HDspec

100HDspec

TECHNICAL DATA					
Type	Cat#	Packed	Pitch (µm)	Hole (µm)	Bar (µm)
SQUARE MESH WITH CENTER REFERENCE					
50 mesh	0050-Cu	100/vial	500	450	50
	0050-Ni	100/vial	500	450	50
	0050-Au	50/vial	500	450	50
75 mesh	0075-Cu	100/vial	333	283	50
	0075-Ni	100/vial	333	283	50
	0075-Au	50/vial	333	283	50
100 mesh	0100-Cu	100/vial	250	200	50
	0100-Ni	100/vial	250	200	50
	0100-Au	50/vial	250	200	50
150 mesh	0150-Cu	100/vial	167	117	50
	0150-Ni	100/vial	167	117	50
	0150-Au	50/vial	167	117	50
200 mesh	0200-Cu	100/vial	125	85	40
	0200-Ni	100/vial	125	85	40
	0200-Au	50/vial	125	85	40
250 mesh	0250-Cu	100/vial	100	60	40
	0250-Ni	100/vial	100	60	40
300 mesh	0300-Cu	100/vial	83	45	38
	0300-Ni	100/vial	83	45	38
	0300-Au	50/vial	83	45	38
400 mesh	0400-Cu	100/vial	63	30	33
	0400-Ni	100/vial	63	30	33
	0400-Au	50/vial	63	30	33
E200	0200-Cu	100/vial	125	85	40
E200	0200-Ni	100/vial	125	85	40
SS 200	0200-SS	100/vial	Punched from Stainless Steel Woven 200 mesh		
SQUARE MESH OYSTER GRIDS					
D75	D75-Cu	100/vial	333	283	50
	D75-Ni	100/vial	333	283	50
D100/100B	D100B-Cu	100/vial	250x 230/270	200 190	50x 40/80
	D100B-Ni	100/vial	250x 230/270	200 190	50x 40/80
D100K/200	D1002D-Cu	100/vial	250x 125	200/ 85	50x 40
	D1002D-Ni	100/vial	250x 125	200x 85	50x 40
SQUARE MESH HANDLE GRIDS					
100 mesh	HD100-Cu	100/vial	250	200	50
	HD100-Ni	100/vial	250	200	50
150 mesh	HD150-Cu	100/vial	167	117	50
	HD150-Ni	100/vial	167	117	50
200 mesh	HD200-Cu	100/vial	125	85	40
	HD200-Ni	100/vial	125	85	40
300 mesh	HD300-Cu	100/vial	83	45	38
	HD300-Ni	100/vial	83	45	38
400 mesh	HD400-Cu	100/vial	63	30	33
	HD400-Ni	100/vial	63	30	33
111HDspec	HD111S-Cu	100/vial	—	190	—
	HD111S-Ni	100/vial	—	190	—
100HDspec	HD100S-Cu	100/vial	—	200	—
	HD100S-Ni	100/vial	—	200	—

TECHNICAL TIP

Removing a Charge from the Surface of Grids

Sometimes when you are trying to pick up sections, they won't adhere to the grid surface. If you don't have time to glow discharge clean the grid surfaces, try this little trick. Dip the grids in distilled water for a moment and wick off the excess with filter paper. Let them dry while you are arranging your sections. Your sections should now adhere to the grid surface. Some labs soak the grids they will use for the day in distilled water until they are needed. If this procedure fails, reclean your grids with acetone or chloroform or glow discharge clean the grid surfaces. Jeanette Killius, NEUCOM, Rootstown, OH.

➤ Veco Grids (continued)

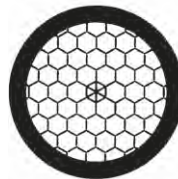
Hexagonal Mesh

Diameter: 3.05mm, **Thickness:** 0.8 mil

Material: Copper (Cu), Nickel (Ni), Gold (Au)



Hexagonal Mesh

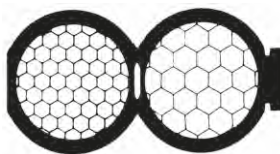


H111K Spec

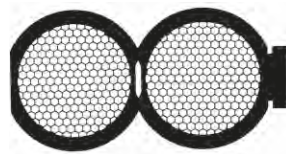
Oyster Type Hexagonal Mesh

Diameter: 3.05mm, **Thickness:** 0.8 mil

Material: Copper (Cu), Nickel (Ni), Gold (Au)



DH75/300

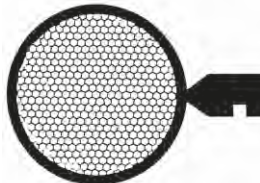


DH75-DH300

Handle Grids Hexagonal Mesh

Diameter: 3.05mm, **Thickness:** 0.8 mil

Material: Copper (Cu), Nickel (Ni), Gold (Au)



100-400 mesh

Parallel Bar (R)

Diameter: 3.05mm, **Thickness:** 0.8 mil

Material: Copper (Cu), Nickel (Ni)



R100-R300

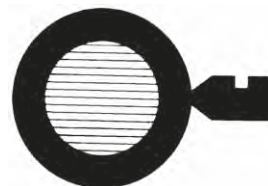


RB90

Parallel Bar Handle Grids

Diameter: 3.05mm, **Thickness:** 0.8 mil

Material: Copper (Cu), Nickel (Ni)



R100-R300

		TECHNICAL DATA			
Type	Cat#	Packed	Pitch (µm)	Hole (µm)	Bar (µm)
HEXAGONAL MESH					
H75 mesh	H075-Cu	100/vial	333	283	50
	H075-Ni	100/vial	333	283	50
H100 mesh	H100-Cu	100/vial	250	200	50
	H100-Ni	100/vial	250	200	50
H150 mesh	H150-Cu	100/vial	167	117	50
	H150-Ni	100/vial	167	117	50
H200 mesh	H200-Cu	100/vial	125	85	40
	H200-Ni	100/vial	125	85	40
	H200-Au	50/vial	125	85	40
H300 mesh	H300-Cu	100/vial	83	45	38
	H300-Ni	100/vial	83	45	38
	H300-Au	50/vial	83	45	38
H400 mesh	H400-Cu	100/vial	63	30	33
	H400-Ni	100/vial	63	30	33
H111KSpec	H111K-Cu	100/vial	-	185	-
	H111K-Ni	100/vial	-	185	-
OYSTER TYPE HEXAGONAL MESH					
DH75/300	D753H-Cu	100/vial	333/83	293/45	50/38
	D753H-Ni	100/vial	333/83	293/45	50/38
DH75 mesh	D75H-Cu	100/vial	333	283	50
	D75H-Ni	100/vial	333	283	50
DH100 mesh	D100H-Cu	100/vial	250	200	50
	D100H-Ni	100/vial	250	200	50
DH200 mesh	D200H-Cu	100/vial	125	85	40
	D200H-Ni	100/vial	125	85	40
DH300 mesh	D300H-Cu	100/vial	83	45	38
	D300H-Ni	100/vial	83	45	38
HANDLE GRIDS HEXAGONAL MESH					
100 mesh	HD100H-Cu	100/vial	250	200	50
	HD100H-Ni	100/vial	250	200	50
150 mesh	HD150H-Cu	100/vial	167	117	50
	HD150H-Ni	100/vial	167	117	50
200 mesh	HD200H-Cu	100/vial	125	85	40
	HD200H-Ni	100/vial	125	85	40
300 mesh	HD300H-Cu	100/vial	83	45	38
	HD300H-Ni	100/vial	83	45	38
400 mesh	HD400H-Cu	100/vial	63	30	33
	HD400H-Ni	100/vial	63	30	33
PARALLEL BAR (R)					
R100	R100-Cu	100/vial	250	200	50
	R100-Ni	100/vial	250	200	50
R150	R150-Cu	100/vial	167	117	50
	R150-Ni	100/vial	167	117	50
R200	R200-Cu	100/vial	125	85	40
	R200-Ni	100/vial	125	85	40
R300	R300-Cu	100/vial	85	45	38
	R300-Ni	100/vial	85	45	38
RB90	RB90-Cu	100/vial	276	92	184
	RB90-Ni	100/vial	276	92	184
PARALLEL BAR HANDLE GRIDS					
R100	HDR100-Cu	100/vial	250	200	50
	HDR100-Ni	100/vial	250	200	50
R200	HDR200-Cu	100/vial	125	85	40
	HDR200-Ni	100/vial	125	85	40
R300	HDR300-Cu	100/vial	85	45	38
	HDR300-Ni	100/vial	85	45	38

TECHNICAL TIP

On-Grid Enhancement

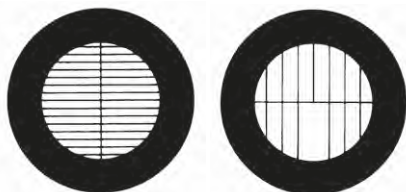
The use of nickel grids is recommended for on-grid enhancement, as nickel is relatively insensitive to silver enhancement. Gold or copper grids should not be used.

► Veco Grids (continued)

Parallel Bar with Divider

Diameter: 3.05mm, **Thickness:** 0.8 mil

Material: Copper (Cu), Nickel (Ni)



R100D-R300D

R100 Aspec

Sjostrand for Serial Sections

Diameter: 3.05mm, **Thickness:** 0.8 mil

Material: Copper (Cu), Nickel (Ni)

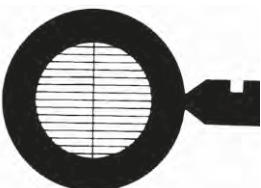


R100/200A

Parallel Bar with Divider Handle Grids

Diameter: 3.05mm, **Thickness:** 0.8 mil

Material: Copper (Cu), Nickel (Ni)

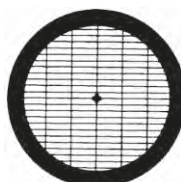


R100D-R300D

Slotted Patterns

Diameter: 3.05mm, **Thickness:** 0.8 mil

Material: Copper (Cu), Nickel (Ni)



50/75-100/400

Thin and Thick Bars

Diameter: 3.05mm, **Thickness:** 0.8 mil

Material: Copper (Cu), Nickel (Ni)



100µk

100+ym

GE 200

		TECHNICAL DATA			
Type	Cat#	Packed	Pitch (µm)	Hole (µm)	Bar (µm)
PARALLEL BAR WITH DIVIDER					
R100D	R100D-Cu	100/vial	250	200	50
	R100D-Ni	100/vial	250	200	50
R150D	R150D-Cu	100/vial	167	117	50
	R150D-Ni	100/vial	167	117	50
R200D	R200D-Cu	100/vial	125	85	40
	R200D-Ni	100/vial	125	85	40
R300D	R300D-Cu	100/vial	85	45	38
	R300D-Ni	100/vial	85	45	38
R100Aspec	R100As-Cu	100/vial	250	200	50
	R100As-Ni	100/vial	250	200	50
SJOSTRAND FOR SERIAL SECTIONS					
R100/200A	R12CA-Cu	100/vial	250/125	120/75	130/50
	R12CA-Ni	100/vial	250/125	120/75	130/50
PARALLEL BAR WITH DIVIDER HANDLE GRIDS					
R100D	HDR100D-Cu	100/vial	250	200	50
	HDR100D-Ni	100/vial	250	200	50
R200D	HDR200D-Cu	100/vial	125	85	40
	HDR200D-Ni	100/vial	125	85	40
R300D	HDR300D-Cu	100/vial	85	45	38
	HDR300D-Ni	100/vial	85	45	38
SLOTTED PATTERNS					
50/75	575-Cu	100/vial	500/333	450/283	50
	575-Ni	100/vial	500/333	450/283	50
75/300	753-Cu	100/vial	300/83	293/43	40
	753-Ni	100/vial	300/83	293/43	40
100/400	1040-Cu	100/vial	250/63	212/25	38
	1040-Ni	100/vial	250/63	212/25	38
THIN AND THICK BARS					
100µk	100S-Cu	100/vial	156/132	100	56/32
	100S-Ni	100/vial	156/132	100	56/32
100+ym	100YM-Cu	100/vial	—	100	—
	100YM-Ni	100/vial	—	100	—
GE200	GE200-Cu	100/vial	125/145	Slotted area 80 Single slot: 1000x500	45/65
	GE200-Ni	100/vial	125/145	Slotted area 80 Single slot: 1000x500	45/65

► For more Technical Tips on Grids, see pages 108, 109 ►►►

TECHNICAL TIP

Shiny Side Or Rough Side?

Retention of sections on grids during poststaining and immunocytochemical procedures frequently is of crucial importance in the electron microscopy laboratory. Opinions differ regarding the side of grids most suitable for permanent adhesion. The controversy is easily solved by examination of the surfaces involved. Grids are manufactured with a dull or rough side, and a shiny or smooth side. Epoxy sections exhibit a bumpy surface when viewed in the boat. Scanning electron microscopy images of epoxy sections without embedded material also reveal an uneven surface. Let us imagine a grid to be a single sided piece of sandpaper and the section to be a double sided piece of sandpaper. Sandpaper grips another piece of sandpaper much more readily than it does a smoothly polished metal surface. For the most secure adhesion of sections to grids **SECTIONS SHOULD BE PICKED UP ON THE ROUGH SIDE OF THE GRID.**

Hildegard H. Crowley, Dept. of Biological Sciences,
University of Denver, Denver, CO. 80208

► Veco Grids (continued)

Single Hole

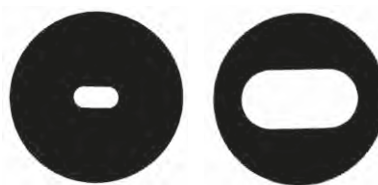
Diameter: 3.05mm, **Thickness:** 0.8 mil
Material: Copper (Cu), Nickel (Ni)



A600-A2000

Single Slot Oval

Diameter: 3.05mm, **Thickness:** 0.8 mil
Material: Copper (Cu), Nickel (Ni)



L0.2x1.5-L2x1.5

Special Shapes

Diameter: 3.05mm, **Thickness:** 0.8 mil, **Material:** Copper (Cu)



Z1600



EA1500



Z600

Oyster

Diameter: 3.05mm,
Thickness: 0.8 mil
Material: Copper (Cu),
Nickel (Ni)



DL2X1

Handle

Diameter: 3.05mm,
Thickness: 0.8 mil
Material: Copper (Cu),
Nickel (Ni)



HDL2X1

Rectangular

Diameter: 3.05mm,
Thickness: 0.8 mil
Material: Copper (Cu),
Nickel (Ni)



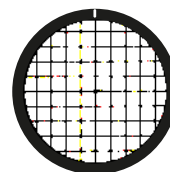
L2.X0.6-L0.2X0.5

Type	Cat#	Packed	Hole Dia. (µm)
SINGLE HOLE			
A600	0600-Cu	100/vial	600
	0600-Ni	100/vial	600
A800	0800-Cu	100/vial	800
	0800-Ni	100/vial	800
A1000	1000-Cu	100/vial	1000
	1000-Ni	100/vial	1000
A1500	1500-Cu	100/vial	1500
	1500-Ni	100/vial	1500
A2000	2000-Cu	100/vial	2000
	2000-Ni	100/vial	2000
SPECIAL SHAPES			
Z1600	Z1600-Cu	100/vial	inner:1600 outer:1900 width:150
EA1500	EA150-Cu	100/vial	1500
Z600	Z600-Cu	100/vial	inner:600 outer:900 width:150
SINGLE SLOT OVAL			
L0.2x1.5	0215-Cu	100/vial	200x1500
	0215-Ni	100/vial	200x1500
L2x1	2010-Cu	100/vial	2000x1000
	2010-Ni	100/vial	2000x1000
L2x1.5	2015-Cu	100/vial	2000x1500
	2015-Ni	100/vial	2000x1500
OYSTER			
DL 2x1	DL2010-Cu	25/vial	2000x1000
	DL2010-Ni	25/vial	2000x1000
HANDLE			
HDL2x1	HD2010-Cu	100/vial	2000x1000
	HD2010-Ni	100/vial	2000x1000
RECTANGULAR			
L2x0.6	0620-Cu	100/vial	2000x600
	0620-Ni	100/vial	2000x600
L0.2x1	1002-Cu	100/vial	200x1000
	1002-Ni	100/vial	200x1000
L0.2x0.5	0502-Cu	100/vial	200x500
	0502-Ni	100/vial	200x500

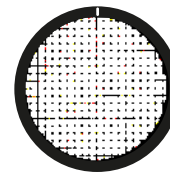
► TEM Specimen Supports in Molybdenum

We have extended our range of TEM grid materials to include four types, which are now available in Molybdenum. The new products are manufactured using a process known as chemical 'milling' (etching) instead of the more familiar technique of 'electroforming' (deposition) that is used in the manufacture of copper, nickel and gold products. Molybdenum is used principally in applications where it's high temperature, hardness, expansion of coefficient and corrosion resistance characteristics are considered important. The material which is used has a purity of 99.9%.

Symbol: Mo
Atomic number: 42
Melting point: 2617.0°C (2890.15°K, 4742.6°F)
Boiling point: 4612.0°C (4885.15°K, 8333.6°F) –
Density: 10.22 g/cm³



G200-Mo
200# Grid



G100-Mo
100# Grid



G2010-Mo
2x1 Grid

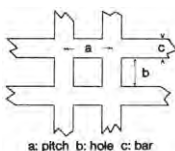


G1000-Mo
1000 Micron Grid

Cat. No.	Overall Diameter	Rim Width	Rim Mark	Center Mark	Lines/ inch	Pitch	Bar Width	Hole Width	Overall thickness	Packed
G200-Mo	3.05mm	0.225mm	Yes	Yes	200	125 µm	35 µm	90 µm	25 µm	25/vial
G100-Mo	3.05mm	0.225mm	Yes	Yes	100	250 µm	45 µm	205 µm	25 µm	25/vial
G2010-Mo	3.05mm	N/A	N/A	N/A	N/A	N/A	N/A	2 x 1mm	50 µm	25/vial
G1000-Mo	3.05mm	N/A	N/A	N/A	N/A	N/A	N/A	1000 µm	50 µm	25/vial

► Maxtaform Grids

High Grade Maxtaform Grids with clean and smooth edges, firm support, and a large open area. Our copper grids are available with one surface coated with inert Rhodium. This coating will eliminate tarnishing, give side identification, and reduce the bar thickness.



a: pitch b: hole c: bar

Square Mesh and Oval Hole

Diameter: 3.05mm, **Thickness:** 0.75 mil

Material: Copper/Rhodium (Cu/Rh = CR), Nickel (Ni), Gold (Au)



100-400 mesh



100-400 mesh



2x1 mm

TECHNICAL DATA					
Type	Cat#	Packed	Pitch (μm)	Hole (μm)	Bar (μm)
SQUARE MESH					
100 mesh	M100-CR	100/vial	254	213	41
	M100-Ni	100/vial	254	213	41
150 mesh	M150-CR	100/vial	165	131	34
	M150-Ni	100/vial	165	131	34
	M150-Au	100/vial	165	131	34
200 mesh	M200-CR	100/vial	127	103	24
	M200-Ni	100/vial	127	103	24
	M200-Au	100/vial	127	103	24
300 mesh	M300-CR	100/vial	84	61	23
	M300-Ni	100/vial	84	61	23
	M300-Au	100/vial	84	61	23
400 mesh	M400-CR	100/vial	63	43	20
	M400-Ni	100/vial	63	43	20
	M400-Au	100/vial	63	43	20
OVAL HOLE					
2x1 mm	M2010-CR	100/vial	—	2000x1000	—
	M2010-Ni	100/vial	—	2000x1000	—
	M2010-Au	25/vial	—	2000x1000	—

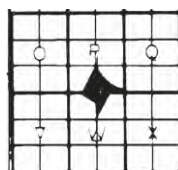
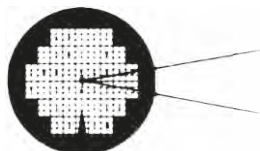
► Maxtaform Finder Grids

Maxtaform grids with reference patterns are of the highest consistent quality, with a wide choice to choose from to suit all your particular needs.

London Finder

H 2, Pitch 127μ, 200 mesh

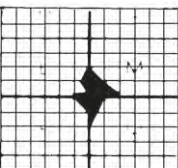
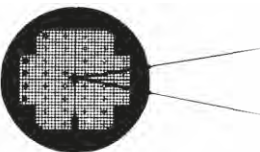
LF200-Cu	100/vial
LF200-Ni	100/vial
LF200-Au	100/vial



London Finder

H 7, Pitch 63μ, 400 mesh

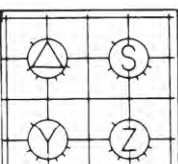
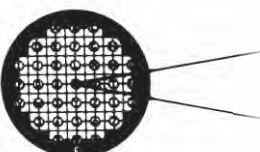
LF400-Cu	100/vial
LF400-Ni	100/vial
LF400-Au	100/vial



London Finder

H 15, Pitch 188μ, 135 mesh

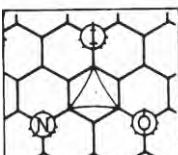
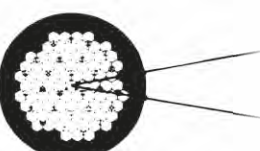
LF135-Cu	100/vial
LF135-Ni	100/vial



London Honeycomb

H 6, Pitch 235μ, Honeycomb

LH200-Cu	100/vial
LH200-Ni	100/vial



► Maxtaform Specialist Grids

3 mm diameter. These grids fill all your special needs.

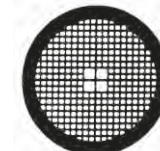
H 9, Pitch 508μ, 50 mesh

H9Spec-Cu	100/vial
H9Spec-Ni	100/vial



HF14, Pitch 127μ, 200 mesh

HF14Spec-Cu	100/vial
HF14Spec-Ni	100/vial



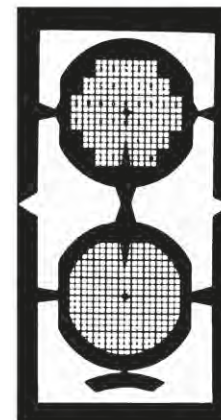
H 1, Pitch 127μ, 200 mesh

H1Spec-Cu	100/vial
H1Spec-Ni	100/vial



H 12 Folding,
Pitch 126μ, 200 mesh

H12Spec-Cu	25/vial
H12Spec-Ni	25/vial



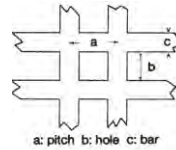
H 4, Pitch 63μ, 400 mesh

H4Spec-Cu	100/vial
H4Spec-Ni	100/vial



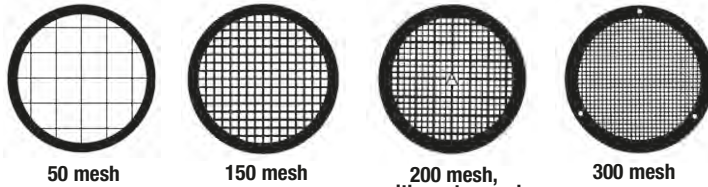
► Athene Grids

EMS is pleased to now offer the Athene range of grids, renowned for decades for the highest quality standards, exceptionally refined grid bars, and good handling characteristics.



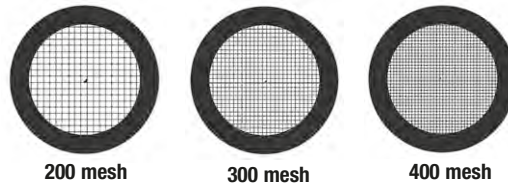
Square Mesh

Diameter: 3.05mm, **Material:** Copper (Cu), Nickel (Ni), Gold (Au)



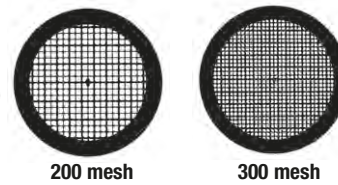
Thin Bar with Center Mark

Diameter: 3.05mm, **Material:** Copper (Cu), Nickel (Ni)



Thick and Thin Bar with Center Mark

Diameter: 3.05mm, **Material:** Copper (Cu)



Hexagonal Mesh

Diameter: 3.05mm, **Material:** Copper (Cu), Nickel (Ni)



Slotted

Diameter: 3.05mm, **Material:** Copper (Cu)



► Index Grids

► Alpha Numeric Index Grid

By employing a rectangular mesh the support value of the grid has been increased, offering a value intermediate between the most commonly used grid (200 Lines/" and (300 Lines/"). Each grid rectangle is asymmetrical having different outlines in all four corners. This allows for the orientation of the grid to be determined at microscopic levels. The index feature enables the position of each grid to be identified with reference to the letters A-O along the horizontal axis and the numbers 1-15 along the vertical axis. The logo in the rim allows for precise orientation and aids in the identification of each side. Grids are available in Copper, Copper/Palladium, Nickel, and Gold.



SPECIFICATIONS:

	Horizontal Axis:	Vertical Axis:
Mesh:	200 Lines/"	250 Lines/"
Pitch:	125 microns	105 microns
Bar Width:	20 microns	15 microns
Hole Width:	105 microns	90 microns
Overall Diameter:	3.05 mm	3.05 mm

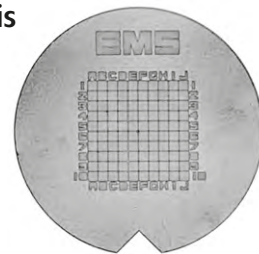
CORNER OUTLINE WITH REFERENCE TO LOGO IN THE RIM:

Top Right:	Right Angle
Top Left:	Inverted Quadrant
Bottom Right:	Diagonal Line
Bottom Left:	Quadrant

G200F4-Cu	Alpha/Numeric Index Grid, Copper	100/vial
G200F4-CP	Alpha/Numeric Index Grid, Copper/Palladium	100/vial
G200F4-Ni	Alpha/Numeric Index Grid, Nickel	100/vial
G200F4-Au	Alpha/Numeric Index Grid, Gold	50/vial

► Asbestos Analysis Index Grids

Our unique index grids for all of your microscopy work. These grids are manufactured in the strictest accordance to meet AHERA requirements.



SPECIFICATIONS:

Overall Diameter	3.05mm
Mesh	200 lines/"
Pitch	125 microns
Bar Width	10 microns +/- 2 microns
Hole Width	115 microns +/- 2 microns
Index Identification	Horizontal: A-J, Vertical: 1-10
EMS Logo in Rim	
Asymmetrical Cut Out In Rim	Allows for precise repeat location and aids in side differentiation

G200EMSIND-Cu	Asbestos Analysis Index Grids, Copper	100/vial
G200EMSIND-Ni	Asbestos Analysis Index Grids, Nickel	100/vial

TECHNICAL DATA					
Type	Cat#	Packed	Pitch (µm)	Hole (µm)	Bar (µm)
SQUARE MESH					
50 mesh	A50-Cu	100/vial	—	450	—
150 mesh	A150-Cu	100/vial	—	150	—
200 mesh	A200-Cu	100/vial	—	100	27
	A200-Ni	100/vial	—	100	27
300 mesh	A300-Cu	100/vial	—	70	—
	A300-Ni	100/vial	—	70	—
400 mesh	A400-Cu	100/vial	—	45	—
SQUARE MESH WITH CENTER MARK					
200 mesh	AC200-Cu	100/vial	—	100	27
	AC200-Au	100/vial	—	100	27
THIN BAR WITH CENTER MARK					
200 mesh	AT200-Cu	100/vial	—	—	10
	AT200-Ni	100/vial	—	—	10
300 mesh	AT300-Cu	100/vial	—	—	10
	AT300-Ni	100/vial	—	—	10
400 mesh	AT400-Cu	100/vial	—	—	10
THICK AND THIN BAR WITH CENTER MARK					
200 mesh	ATT200-Cu	100/vial	—	150	—
300 mesh	ATT200-Cu	100/vial	—	75	—
HEXAGONAL MESH					
100 mesh	AH100-Cu	100/vial	—	240	—
	AH100-Ni	100/vial	—	240	—
400 mesh	AH400-Cu	100/vial	—	240	—
SLOTTED					
Multiple Slots	AS-Cu	100/vial		350-700	

► SEM Finder Grids

These new SEM grids are designed to aid in the identification and localization of SEM specimens when placed on standard SEM stubs. The SEMF2 allows for easy characterization and analysis of particles and suspensions.

The SEMF3 uses an alpha-numeric index, allowing up to 25 predetermined specimens to be fixed and then located in a SEM.

Type SEMF1

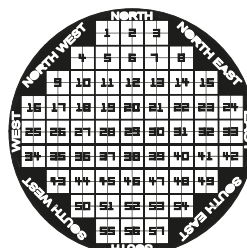
Referring to the annular rim identifies north, south, east and west. The four quadrant markers are tapered towards the centre. 100 Radial sectors are identified by reference to decimal numbers in the annular rim and alphabet letters in the four quadrants.



Overall Diameter: 10 mm
Overall Thickness: ~50 µm
Material: Copper, Nickel or Gold

Type SEMF2

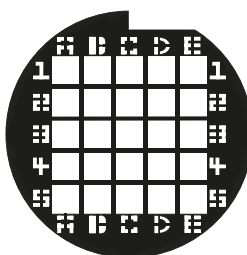
The larger cells are identified using numbers from 1 – 57. Each large cell is sub-divided into 4, making a total of 228 identifiable cells by reference to their number and geographical location.



Overall Diameter: 10 mm
Overall Thickness: ~50 µm
Material: Copper, Nickel or Gold

Type SEMF3

25 cells are identified by reference to their alpha-numeric position. The large asymmetric cut-out feature in the rim enables the right view to be easily obtained when placing on a SEM stub.



Overall Diameter: 10 mm
Overall Thickness: ~50 µm
Material: Copper, Nickel or Gold

80101-Cu	SEMF1, Copper	10/vial
80101-Ni	SEMF1, Nickel	10/vial
80101-Au	SEMF1, Gold	5/vial
80102-Cu	SEMF2, Copper	10/vial
80102-Ni	SEMF2, Nickel	10/vial
80102-Au	SEMF2, Gold	5/vial
80103-Cu	SEMF3, Copper	10/vial
80103-Ni	SEMF3, Nickel	10/vial
80103-Au	SEMF3, Gold	5/vial

► For Beryllium Planchets, see page 637

► Synaptek™ Grids

Very reliable under the electron beam- Synaptek® unflexible grids, made of a special alloy (Beryllium-Copper). Offers extreme stability for coating with support film. 4 mil thick (100µm), 3.05mm diameter, this standard 2x1mm oval slot grids are contamination free and reusable after cleaning. 0.5x2mm oval slots are also available.

NUM grids: Numbered grids are in random order. Numbers may be duplicated.

DOT grids: 2 dots are marked on one side of the grid for identification. Dots are visible to the naked eye.

NOTCH grids: A mark, stamped on one side of the grid to facilitate the handling of the grids. Notch is available with NUM or DOT grids.

GILDED grids: completely Gold-Plated grids, suitable for immunology research, autoradiography, as well as special needs.



DOT
2x1mm slot



NOTCH-DOT
2x1mm slot



DOT
2x0.5mm slot



NOTCH-NUM
2x1mm slot



NUM
2x1mm slot



GILDED NOTCH-NUM
2x1mm slot



NOTCH
2x1mm slot



NOTCH DOT
0.8x1.8mm slot



DOT
1.5mm hole

Cat. No.	Description	Pack
S2010-DOT	DOT, 2 x 1 mm slot	100/vial
S2010-NUM	NUM, 2 x 1 mm slot	100/vial
S2010-NOTCH	NOTCH, 2 x 1 mm slot	100/vial
S2010-ND	NOTCH-DOT, 2 x 1 mm slot	100/vial
S2010-NN	NOTCH-NUM, 2 x 1 mm slot	100/vial
SG2010-NN	GILDED NOTCH-NUM, 2 x 1 mm slot, Gold Plated	100/vial
S2005-DOT	DOT, 0.5 x 2mm slot	100/vial
S1808-ND	NOTCH-DOT, 0.8 x 1.8mm slot	100/vial
S1020-NI	Ni-NOTCH-DOT, 1 x 2mm slot, Nickel	100/vial
S1500-DOT	DOT, 1.5mm hole	100/vial
S1500NI-DOT	Ni-DOT, 1.5mm hole, Nickel	100/vial
S1500MO-DOT	Mo-DOT, 1.5mm hole, Molybdenum, Thickness of 75µm (3 mil)	25/vial

► Beryllium Grids for Transmission Electron Microscopy

Beryllium grids are superior to all other materials for in situ analysis in transmission electron microscopes because for practical purposes they give off no detectable background radiation which could interfere with the analysis. **Purity:** 99.97%, **Size:** 3.05mm

0200-Be Beryllium Grids 200 Mesh each

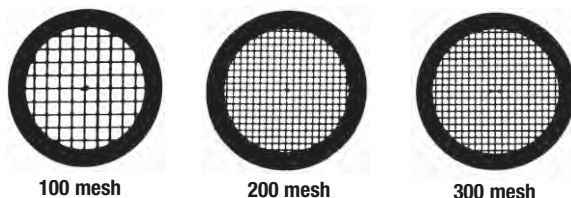
► EMBRA Grids

Diameter: 3.05mm, **Thickness:** 16µm for meshed and 5-20 µm for oval hole grids

Material: Copper (Cu), Nickel (Ni), Gold (Au), Stainless Steel (SS), Titanium (Ti), Molybdenum (Mo), Aluminum (Al)

EMBRA electroformed grids combine a high open area with a rigid construction which allows for relatively easy handling. We offer these grids in a series of hard to find materials, which are not available from other manufacturers. They are as follows: Stainless Steel (SS), Titanium (Ti), Molybdenum (Mo), and Aluminum (Al)

Square Mesh

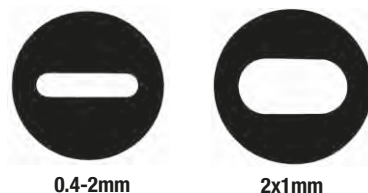


100 mesh

200 mesh

300 mesh

Oval Slot

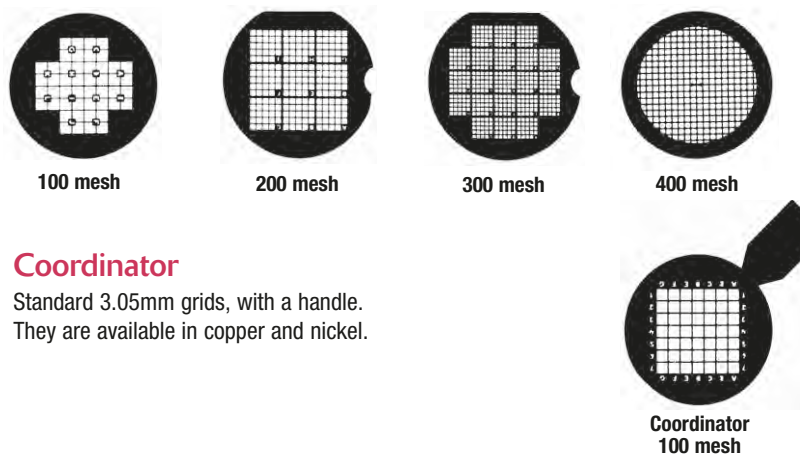


0.4-2mm

2x1mm

Finder

Standard 3.05mm diameter grids which have one straight and one round cut out from the rim which assists in the orientation of the grid. They are available in Copper, Nickel, and Gold Grids.



100 mesh

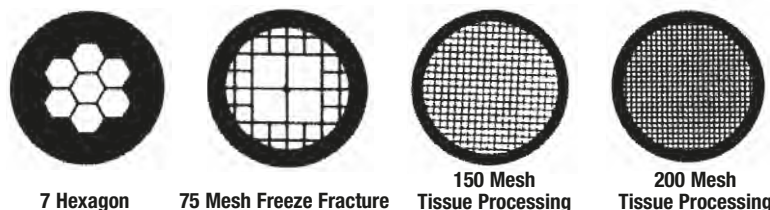
200 mesh

300 mesh

400 mesh

Coordinator
100 mesh

Selective Grids

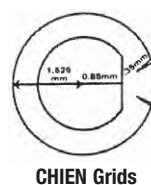


7 Hexagon

75 Mesh Freeze Fracture

150 Mesh
Tissue Processing200 Mesh
Tissue Processing

CHIEN Grids



CHIEN Grids

Type	Cat#	Pack	Open Area
SQUARE MESH			
100 mesh	E100-SS	25/vial	65%
	E100-Ti	25/vial	65%
	E100-Mo	25/vial	65%
	E100-Al	25/vial	65%
200 mesh	E200-SS	25/vial	50%
	E200-Ti	25/vial	50%
	E200-Mo	25/vial	50%
	E200-Al	25/vial	50%
300 mesh	E300-Ti	25/vial	40%
	E300-Mo	25/vial	40%
	E300-Al	25/vial	40%
OVAL SLOT			
0.4x2mm	E0420-SS	25/vial	—
	E0420-Ti	25/vial	—
	E0420-Mo	25/vial	—
	E0420-Al	25/vial	—
2x1mm	E2010-SS	25/vial	—
	E2010-Ti	25/vial	—
	E2010-Mo	25/vial	—
	E2010-Al	25/vial	—
FINDER			
100 mesh	EF100-Cu	100/vial	—
	EF100-Ni	100/vial	—
200 mesh	EF200-Cu	100/vial	—
	EF200-Ni	100/vial	—
	EF200-Au	25/vial	—
300 mesh	EF300-Cu	100/vial	—
	EF300-Ni	100/vial	—
	EF300-Au	25/vial	—
400 mesh	EF400-Cu	100/vial	—
	EF400-Ni	100/vial	—
	EF400-Au	25/vial	—
COORDINATOR			
100 mesh	EC100-Cu	100/vial	—
	EC100-Ni	100/vial	—
200 mesh	EC200-Cu	100/vial	—
	EC200-Ni	100/vial	—
300 mesh	EC300-Cu	100/vial	—
	EC300-Ni	100/vial	—
SELECTIVE GRIDS			
7 Hexagon			
7-Hex	E7HEX-Cu	100/vial	—
7-Hex	E7HEX-Ni	100/vial	—
Freeze Fracture			
75FF	E75FF-Cu	100/vial	—
75FF	E75FF-Ni	100/vial	—
Tissue Processing			
6G150	ETP150-Cu	100/vial	—
6G150	ETP150-Ni	100/vial	—
6G200	ETP200-Cu	100/vial	—
6G200	ETP200-Ni	100/vial	—
Chien Grids			
9G20H	EC20H-Cu	100/vial	—
9G20H	EC20H-Ni	100/vial	—

* Reference: Chien R, Van de Velde R, Heusser R: Simultaneous Ultramicrotomy of multiple areas and examination of ribbons on one new grid. Proc. 43rd Annual Meeting, Elec. Micro. Soc. Amer., G W Bailey, ed, San Francisco Press, 460 (1985). Galey FR, Nilson SEG: A new method for transferring sections from the liquid surface of the trough through staining solutions to the supporting film of a grid. J. Ultrastruct. Res., 14, (1966), 405-410.

SUPPORT FILM ON GRIDS

Support Film on grids has become a main product line for us since the demand for high quality coated grids has increased. To make your microscopy work easier and to save you a great deal of time we offer you a complete line. All of our coated grids are optically checked followed by batch testing in the EM. Packed in grid storage box.

All the grids below (except for the Beryllium Support Films) are available with the following options:

- Molybdenum grids in place of Au, Cu, or Ni
- As Silicon-free
- With ultra-thin thickness (thickness can be requested)
- Extra thick thickness

NOTE: All of our film is laid on the shiny side of the grid.

Support Film on Grids Application Guide

Which support film is best for your particular application? Are there any alternatives? What about Lacey Films?

Substrate Application	Formvar Only	Carbon Only	Formvar/Carbon	Formvar/SiO	Silicon SiO	Lacey Film
Diffraction Studies	—	BEST CHOICE	—	GOOD OPTION	GOOD OPTION	SUITABLE
EDS (Energy Dispersive Spectrometry)	—	GOOD OPTION	GOOD OPTION	—	—	SUITABLE
High Resolution Microscopy	—	BEST CHOICE	GOOD OPTION	GOOD OPTION	BEST CHOICE	SUITABLE
High Temp. Techniques/Heating Stage	—	BEST CHOICE	—	—	GOOD OPTION	SUITABLE
Low Magnification Microscopy	GOOD OPTION	GOOD OPTION	BEST CHOICE	BEST CHOICE	GOOD OPTION	—
Particulate Suspension, Biological	—	BEST CHOICE	GOOD OPTION	BEST CHOICE	BEST CHOICE	SUITABLE
Particulate Suspension, Non-Biological	—	BEST CHOICE	GOOD OPTION	BEST CHOICE	BEST CHOICE	SUITABLE
Powders, Dry	—	GOOD OPTION	GOOD OPTION	BEST CHOICE	GOOD OPTION	—
Replicas, Low Temp. Techniques	GOOD OPTION	GOOD OPTION	BEST CHOICE	—	—	SUITABLE
Suspensions, Bacterial	—	BEST CHOICE	GOOD OPTION	BEST CHOICE	BEST CHOICE	SUITABLE
Suspensions, Cell Fragment	—	BEST CHOICE	BEST CHOICE	BEST CHOICE	BEST CHOICE	SUITABLE
Suspensions, Viral	—	BEST CHOICE	GOOD OPTION	GOOD OPTION	BEST CHOICE	SUITABLE
Thin Sections	GOOD OPTION	GOOD OPTION	BEST CHOICE	GOOD OPTION	BEST CHOICE	SUITABLE

➤ 1. Formvar Film Only

A thin film of pure formvar resin. The thickness range is as follows:

Standard: Approx. 10nm, **Ultra-Thin (UL):** 5-6nm, **Thick (TH):** 15-20nm, **Extra Thick (ET):** 25-50nm

➤ Formvar Square Mesh

COPPER

NICKEL

GOLD

Standard Thickness

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FF100-Cu-25	100 MESH	standard	25/box	FF100-Ni-25	100 MESH	standard	25/box	FF100-Au-25	100 MESH	standard	25/box
FF100-Cu-50			50/box	FF100-Ni-50			50/box	FF100-Au-50			50/box
FF150-Cu-25	150 MESH	standard	25/box	FF150-Ni-25	150 MESH	standard	25/box	FF150-Au-25	150 MESH	standard	25/box
FF150-Cu-50			50/box	FF150-Ni-50			50/box	FF150-Au-50			50/box
FF200-Cu-25	200 MESH	standard	25/box	FF200-Ni-25	200 MESH	standard	25/box	FF200-Au-25	200 MESH	standard	25/box
FF200-Cu-50			50/box	FF200-Ni-50			50/box	FF200-Au-50			50/box
FF300-Cu-25	300 MESH	standard	25/box	FF300-Ni-25	300 MESH	standard	25/box	FF300-Au-25	300 MESH	standard	25/box
FF300-Cu-50			50/box	FF300-Ni-50			50/box	FF300-Au-50			50/box
FF400-Cu-25	400 MESH	standard	25/box	FF400-Ni-25	400 MESH	standard	25/box	FF400-Au-25	400 MESH	standard	25/box
FF400-Cu-50			50/box	FF400-Ni-50			50/box	FF400-Au-50			50/box

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FF100-Cu-UL	100 MESH	ultra-thin	50/box	FF100-Ni-UL	100 MESH	ultra-thin	50/box	FF100-Au-UL	100 MESH	ultra-thin	50/box
FF100-Cu-TH		thick	50/box	FF100-Ni-TH		thick	50/box	FF100-Au-TH		thick	50/box
FF100-Cu-ET		extra thick	50/box	FF100-Ni-ET		extra thick	50/box	FF100-Au-ET		extra thick	50/box
FF150-Cu-UL	150 MESH	ultra-thin	50/box	FF150-Ni-UL	150 MESH	ultra-thin	50/box	FF150-Au-UL	150 MESH	ultra-thin	50/box
FF150-Cu-TH		thick	50/box	FF150-Ni-TH		thick	50/box	FF150-Au-TH		thick	50/box
FF150-Cu-ET		extra thick	50/box	FF150-Ni-ET		extra thick	50/box	FF150-Au-ET		extra thick	50/box
FF200-Cu-UL	200 MESH	ultra-thin	50/box	FF200-Ni-UL	200 MESH	ultra-thin	50/box	FF200-Au-UL	200 MESH	ultra-thin	50/box
FF200-Cu-TH		thick	50/box	FF200-Ni-TH		thick	50/box	FF200-Au-TH		thick	50/box
FF200-Cu-ET		extra thick	50/box	FF200-Ni-ET		extra thick	50/box	FF200-Au-ET		extra thick	50/box
FF300-Cu-UL	300 MESH	ultra-thin	50/box	FF300-Ni-UL	300 MESH	ultra-thin	50/box	FF300-Au-UL	300 MESH	ultra-thin	50/box
FF300-Cu-TH		thick	50/box	FF300-Ni-TH		thick	50/box	FF300-Au-TH		thick	50/box
FF300-Cu-ET		extra thick	50/box	FF300-Ni-ET		extra thick	50/box	FF300-Au-ET		extra thick	50/box
FF400-Cu-UL	400 MESH	ultra-thin	50/box	FF400-Ni-UL	400 MESH	ultra-thin	50/box	FF400-Au-UL	400 MESH	ultra-thin	50/box
FF400-Cu-TH		thick	50/box	FF400-Ni-TH		thick	50/box	FF400-Au-TH		thick	50/box
FF400-Cu-ET		extra thick	50/box	FF400-Ni-ET		extra thick	50/box	FF400-Au-ET		extra thick	50/box

SUPPORT FILM ON GRIDS

► Formvar Gilder Finder Grids

Standard Thickness

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FF200F1-Cu-25	F1	standard	25/box	FF200F1-Ni-25	F1	standard	25/box	FF200F1-Au-25	F1	standard	25/box
FF200F1-Cu-50			50/box	FF200F1-Ni-50			50/box	FF200F1-Au-50			50/box
FF200F2-Cu-25	F2	standard	25/box	FF200F2-Ni-25	F2	standard	25/box	FF200F2-Au-25	F2	standard	25/box
FF200F2-Cu-50			50/box	FF200F2-Ni-50			50/box	FF200F2-Au-50			50/box

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FF200F1-Cu-UL	F1	ultra-thin	50/box	FF200F1-Ni-UL	F1	ultra-thin	50/box	FF200F1-Au-UL	F1	ultra-thin	50/box
FF200F1-Cu-TH		thick	50/box	FF200F1-Ni-TH		thick	50/box	FF200F1-Au-TH		thick	50/box
FF200F1-Cu-ET		extra thick	50/box	FF200F1-Ni-ET		extra thick	50/box	FF200F1-Au-ET		extra thick	50/box
FF200F2-Cu-UL	F2	ultra-thin	50/box	FF200F2-Ni-UL	F2	ultra-thin	50/box	FF200F2-Au-UL	F2	ultra-thin	50/box
FF200F2-Cu-TH		thick	50/box	FF200F2-Ni-TH		thick	50/box	FF200F2-Au-TH		thick	50/box
FF200F2-Cu-ET		extra thick	50/box	FF200F2-Ni-ET		extra thick	50/box	FF200F2-Au-ET		extra thick	50/box

► Formvar London Finder Grids

Standard Thickness

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FFLF135-Cu-25	LF135	standard	25/box	FFLF135-Ni-25	LF135	standard	25/box	FFLF135-Au-25	LF135	standard	25/box
FFLF135-Cu-50			50/box	FFLF135-Ni-50			50/box	FFLF135-Au-50			50/box
FFLF200-Cu-25	LF200	standard	25/box	FFLF200-Ni-25	LF200	standard	25/box	FFLF200-Au-25	LF200	standard	25/box
FFLF200-Cu-50			50/box	FFLF200-Ni-50			50/box	FFLF200-Au-50			50/box
FFLF400-Cu-25	LF400	standard	25/box	FFLF400-Ni-25	LF400	standard	25/box	FFLF400-Au-25	LF400	standard	25/box
FFLF400-Cu-50			50/box	FFLF400-Ni-50			50/box	FFLF400-Au-50			50/box

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FFLF135-Cu-UL	LF135	ultra-thin	50/box	FFLF135-Ni-UL	LF135	ultra-thin	50/box	FFLF135-Au-UL	LF135	ultra-thin	50/box
FFLF135-Cu-TH		thick	50/box	FFLF135-Ni-TH		thick	50/box	FFLF135-Au-TH		thick	50/box
FFLF135-Cu-ET		extra thick	50/box	FFLF135-Ni-ET		extra thick	50/box	FFLF135-Au-ET		extra thick	50/box
FFLF200-Cu-UL	LF200	ultra-thin	50/box	FFLF200-Ni-UL	LF200	ultra-thin	50/box	FFLF200-Au-UL	LF200	ultra-thin	50/box
FFLF200-Cu-TH		thick	50/box	FFLF200-Ni-TH		thick	50/box	FFLF200-Au-TH		thick	50/box
FFLF200-Cu-ET		extra thick	50/box	FFLF200-Ni-ET		extra thick	50/box	FFLF200-Au-ET		extra thick	50/box
FFLF400-Cu-UL	LF400	ultra-thin	50/box	FFLF400-Ni-UL	LF400	ultra-thin	50/box	FFLF400-Au-UL	LF400	ultra-thin	50/box
FFLF400-Cu-TH		thick	50/box	FFLF400-Ni-TH		thick	50/box	FFLF400-Au-TH		thick	50/box
FFLF400-Cu-ET		extra thick	50/box	FFLF400-Ni-ET		extra thick	50/box	FFLF400-Au-ET		extra thick	50/box

► Formvar Hexagonal Mesh

Standard Thickness

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FF100H-Cu-25	100 MESH	standard	25/box	FF100H-Ni-25	100 MESH	standard	25/box	FF100H-Au-25	100 MESH	standard	25/box
FF100H-Cu-50			50/box	FF100H-Ni-50			50/box	FF100H-Au-50			50/box
FF200H-Cu-25	200 MESH	standard	25/box	FF200H-Ni-25	200 MESH	standard	25/box	FF200H-Au-25	200 MESH	standard	25/box
FF200H-Cu-50			50/box	FF200H-Ni-50			50/box	FF200H-Au-50			50/box
FF300H-Cu-25	300 MESH	standard	25/box	FF300H-Ni-25	300 MESH	standard	25/box	FF300H-Au-25	300 MESH	standard	25/box
FF300H-Cu-50			50/box	FF300H-Ni-50			50/box	FF300H-Au-50			50/box
FF400H-Cu-25	400 MESH	standard	25/box	FF400H-Ni-25	400 MESH	standard	25/box	FF400H-Au-25	400 MESH	standard	25/box
FF400H-Cu-50			50/box	FF400H-Ni-50			50/box	FF400H-Au-50			50/box

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FF100H-Cu-UL	100 MESH	ultra-thin	50/box	FF100H-Ni-UL	100 MESH	ultra-thin	50/box	FF100H-Au-UL	100 MESH	ultra-thin	50/box
FF100H-Cu-TH		thick	50/box	FF100H-Ni-TH		thick	50/box	FF100H-Au-TH		thick	50/box
FF100H-Cu-ET		extra thick	50/box	FF100H-Ni-ET		extra thick	50/box	FF100H-Au-ET		extra thick	50/box
FF200H-Cu-UL	200 MESH	ultra-thin	50/box	FF200H-Ni-UL	200 MESH	ultra-thin	50/box	FF200H-Au-UL	200 MESH	ultra-thin	50/box
FF200H-Cu-TH		thick	50/box	FF200H-Ni-TH		thick	50/box	FF200H-Au-TH		thick	50/box
FF200H-Cu-ET		extra thick	50/box	FF200H-Ni-ET		extra thick	50/box	FF200H-Au-ET		extra thick	50/box
FF300H-Cu-UL	300 MESH	ultra-thin	50/box	FF300H-Ni-UL	300 MESH	ultra-thin	50/box	FF300H-Au-UL	300 MESH	ultra-thin	50/box
FF300H-Cu-TH		thick	50/box	FF300H-Ni-TH		thick	50/box	FF300H-Au-TH		thick	50/box
FF300H-Cu-ET		extra thick	50/box	FF300H-Ni-ET		extra thick	50/box	FF300H-Au-ET		extra thick	50/box
FF400H-Cu-UL	400 MESH	ultra-thin	50/box	FF400H-Ni-UL	400 MESH	ultra-thin	50/box	FF400H-Au-UL	400 MESH	ultra-thin	50/box
FF400H-Cu-TH		thick	50/box	FF400H-Ni-TH		thick	50/box	FF400H-Au-TH		thick	50/box
FF400H-Cu-ET		extra thick	50/box	FF400H-Ni-ET		extra thick	50/box	FF400H-Au-ET		extra thick	50/box

SUPPORT FILM ON GRIDS**▶ Formvar Thin Bar Square Mesh****Standard Thickness**

Cat. #	Type	Thickness	Qty
FFT200-Cu-25 FFT200-Cu-50	200 MESH	standard	25/box 50/box
FFT300-Cu-25 FFT300-Cu-50	300 MESH	standard	25/box 50/box
FFT400-Cu-25 FFT400-Cu-50	400 MESH	standard	25/box 50/box
FFT1000-Cu-25 FFT1000-Cu-50	1000 MESH	standard	25/box 50/box

Cat. #	Type	Thickness	Qty
FFT200-Ni-25 FFT200-Ni-50	200 MESH	standard	25/box 50/box
FFT300-Ni-25 FFT300-Ni-50	300 MESH	standard	25/box 50/box
FFT400-Ni-25 FFT400-Ni-50	400 MESH	standard	25/box 50/box
FFT1000-Ni-25 FFT1000-Ni-50	1000 MESH	standard	25/box 50/box

Cat. #	Type	Thickness	Qty
FFT200-Au-25 FFT200H-Au-50	200 MESH	standard	25/box 50/box
FFT300-Au-25 FFT300-Au-50	300 MESH	standard	25/box 50/box
FFT400-Au-25 FFT400-Au-50	400 MESH	standard	25/box 50/box
FFT1000-Au-25 FFT1000-Au-50	1000 MESH	standard	25/box 50/box

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty
FFT200-Cu-UL FFT200-Cu-TH FFT200-Cu-ET	200 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
FFT300-Cu-UL FFT300-Cu-TH FFT300-Cu-ET	300 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
FFT400-Cu-UL FFT400-Cu-TH FFT400-Cu-ET	400 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
FFT1000-Cu-UL FFT1000-Cu-TH FFT1000-Cu-ET	1000 MESH	ultra-thin thick extra thick	50/box 50/box 50/box

Cat. #	Type	Thickness	Qty
FFT200-Ni-UL FFT200-Ni-TH FFT200-Ni-ET	200 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
FFT300-Ni-UL FFT300-Ni-TH FFT300-Ni-ET	300 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
FFT400-Ni-UL FFT400-Ni-TH FFT400-Ni-ET	400 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
FFT1000-Ni-UL FFT1000-Ni-TH FFT1000-Ni-ET	1000 MESH	ultra-thin thick extra thick	50/box 50/box 50/box

Cat. #	Type	Thickness	Qty
FFT200-Au-UL FFT200-Au-TH FFT200-Au-ET	200 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
FFT300-Au-UL FFT300-Au-TH FFT300-Au-ET	300 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
FFT400-Au-UL FFT400-Au-TH FFT400-Au-ET	400 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
FFT1000-Au-UL FFT1000-Au-TH FFT1000-Au-ET	1000 MESH	ultra-thin thick extra thick	50/box 50/box 50/box

▶ Formvar Thin Bar Hexagonal Mesh**Standard Thickness**

Cat. #	Type	Thickness	Qty
FFTH200-Cu-25 FFTH200-Cu-50	200 MESH	standard	25/box 50/box
FFTH300-Cu-25 FFTH300-Cu-50	300 MESH	standard	25/box 50/box
FFTH400-Cu-25 FFTH400-Cu-50	400 MESH	standard	25/box 50/box
FFTH600-Cu-25 FFTH600-Cu-50	600 MESH	standard	25/box 50/box

Cat. #	Type	Thickness	Qty
FFTH200-Ni-25 FFTH200-Ni-50	200 MESH	standard	25/box 50/box
FFTH300-Ni-25 FFTH300-Ni-50	300 MESH	standard	25/box 50/box
FFTH400-Ni-25 FFTH400-Ni-50	400 MESH	standard	25/box 50/box
FFTH600-Ni-25 FFTH600-Ni-50	600 MESH	standard	25/box 50/box

Cat. #	Type	Thickness	Qty
FFTH200-Au-25 FFTH200-Au-50	200 MESH	standard	25/box 50/box
FFTH300-Au-25 FFTH300-Au-50	300 MESH	standard	25/box 50/box
FFTH400-Au-25 FFTH400-Au-50	400 MESH	standard	25/box 50/box
FFTH600-Au-25 FFTH600-Au-50	600 MESH	standard	25/box 50/box

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty
FFTH200-Cu-UL FFTH200-Cu-TH FFTH200-Cu-ET	200 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
FFTH300-Cu-UL FFTH300-Cu-TH FFTH300-Cu-ET	300 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
FFTH400-Cu-UL FFTH400-Cu-TH FFTH400-Cu-ET	400 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
FFTH600-Cu-UL FFTH600-Cu-TH FFTH600-Cu-ET	600 MESH	ultra-thin thick extra thick	50/box 50/box 50/box

Cat. #	Type	Thickness	Qty
FFTH200-Ni-UL FFTH200-Ni-TH FFTH200-Ni-ET	200 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
FFTH300-Ni-UL FFTH300-Ni-TH FFTH300-Ni-ET	300 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
FFTH400-Ni-UL FFTH400-Ni-TH FFTH400-Ni-ET	400 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
FFTH600-Ni-UL FFTH600-Ni-TH FFTH600-Ni-ET	600 MESH	ultra-thin thick extra thick	50/box 50/box 50/box

Cat. #	Type	Thickness	Qty
FFTH200-Au-UL FFTH200-Au-TH FFTH200-Au-ET	200 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
FFTH300-Au-UL FFTH300-Au-TH FFTH300-Au-ET	300 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
FFTH400-Au-UL FFTH400-Au-TH FFTH400-Au-ET	400 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
FFTH600-Au-UL FFTH600-Au-TH FFTH600-Au-ET	600 MESH	ultra-thin thick extra thick	50/box 50/box 50/box

▶ Formvar Slots**Standard Thickness**

Cat. #	Type	Thickness	Qty
FF205-Cu-25 FF205-Cu-50	2 x 0.5mm	standard	25/box 50/box
FF2010-Cu-25 FF2010-Cu-50	2 x 1mm	standard	25/box 50/box

Cat. #	Type	Thickness	Qty
FF205-Ni-25 FF205-Ni-50	2 x 0.5mm	standard	25/box 50/box
FF2010-Ni-25 FF2010-Ni-50	2 x 1mm	standard	25/box 50/box

Cat. #	Type	Thickness	Qty
FF205-Au-25 FF205-Au-50	2 x 0.5mm	standard	25/box 50/box
FF2010-Au-25 FF2010-Au-50	2 x 1mm	standard	25/box 50/box

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty
FF205-Cu-UL FF205-Cu-TH FF205-Cu-ET	2 x 0.5mm	ultra-thin thick extra thick	50/box 50/box 50/box
FF2010-Cu-UL FF2010-Cu-TH FF2010-Cu-ET	2 x 1mm	ultra-thin thick extra thick	50/box 50/box 50/box

Cat. #	Type	Thickness	Qty
FF205-Ni-UL FF205-Ni-TH FF205-Ni-ET	2 x 0.5mm	ultra-thin thick extra thick	50/box 50/box 50/box
FF2010-Ni-UL FF2010-Ni-TH FF2010-Ni-ET	2 x 1mm	ultra-thin thick extra thick	50/box 50/box 50/box

Cat. #	Type	Thickness	Qty
FF205-Au-UL FF205-Au-TH FF205-Au-ET	2 x 0.5mm	ultra-thin thick extra thick	50/box 50/box 50/box
FF2010-Au-UL FF2010-Au-TH FF2010-Au-ET	2 x 1mm	ultra-thin thick extra thick	50/box 50/box 50/box

SUPPORT FILM ON GRIDS

► Formvar Single Hole

Standard Thickness

COPPER

NICKEL

Cat. #	Type	Thickness	Qty
FFGA75-Cu-25	75 micron	standard	25/box
FFGA75-Cu-50		50/box	
FFGA100-Cu-25	100 micron	standard	25/box
FFGA100-Cu-50		50/box	
FFGA150-Cu-25	150 micron	standard	25/box
FFGA150-Cu-50		50/box	
FFGA200-Cu-25	200 micron	standard	25/box
FFGA200-Cu-50		50/box	
FFGA300-Cu-25	300 micron	standard	25/box
FFGA300-Cu-50		50/box	
FFGA400-Cu-25	400 micron	standard	25/box
FFGA400-Cu-50		50/box	
FFGA600-Cu-25	600 micron	standard	25/box
FFGA600-Cu-50		50/box	
FFGA800-Cu-25	800 micron	standard	25/box
FFGA800-Cu-50		50/box	
FFGA1000-Cu-25	1000 micron	standard	25/box
FFGA1000-Cu-50		50/box	
FFGA1500-Cu-25	1500 micron	standard	25/box
FFGA1500-Cu-50		50/box	

Cat. #	Type	Thickness	Qty
FFGA75-Ni-25	75 micron	standard	25/box
FFGA75-Ni-50		50/box	
FFGA100-Ni-25	100 micron	standard	25/box
FFGA100-Ni-50		50/box	
FFGA150-Ni-25	150 micron	standard	25/box
FFGA150-Ni-50		50/box	
FFGA200-Ni-25	200 micron	standard	25/box
FFGA200-Ni-50		50/box	
FFGA300-Ni-25	300 micron	standard	25/box
FFGA300-Ni-50		50/box	
FFGA400-Ni-25	400 micron	standard	25/box
FFGA400-Ni-50		50/box	
FFGA600-Ni-25	600 micron	standard	25/box
FFGA600-Ni-50		50/box	
FFGA800-Ni-25	800 micron	standard	25/box
FFGA800-Ni-50		50/box	
FFGA1000-Ni-25	1000 micron	standard	25/box
FFGA1000-Ni-50		50/box	
FFGA1500-Ni-25	1500 micron	standard	25/box
FFGA1500-Ni-50		50/box	

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty
FFGA75-Cu-UL	75 micron	ultra-thin	50/box
FFGA75-Cu-TH		thick	50/box
FFGA75-Cu-ET		extra thick	50/box
FFGA100-Cu-UL	100 micron	ultra-thin	50/box
FFGA100-Cu-TH		thick	50/box
FFGA100-Cu-ET		extra thick	50/box
FFGA150-Cu-UL	150 micron	ultra-thin	50/box
FFGA150-Cu-TH		thick	50/box
FFGA150-Cu-ET		extra thick	50/box
FFGA200-Cu-UL	200 micron	ultra-thin	50/box
FFGA200-Cu-TH		thick	50/box
FFGA200-Cu-ET		extra thick	50/box
FFGA300-Cu-UL	300 micron	ultra-thin	50/box
FFGA300-Cu-TH		thick	50/box
FFGA300-Cu-ET		extra thick	50/box
FFGA400-Cu-UL	400 micron	ultra-thin	50/box
FFGA400-Cu-TH		thick	50/box
FFGA400-Cu-ET		extra thick	50/box
FFGA600-Cu-UL	600 micron	ultra-thin	50/box
FFGA600-Cu-TH		thick	50/box
FFGA600-Cu-ET		extra thick	50/box
FFGA800-Cu-UL	800 micron	ultra-thin	50/box
FFGA800-Cu-TH		thick	50/box
FFGA800-Cu-ET		extra thick	50/box
FFGA1000-Cu-UL	1000 micron	ultra-thin	50/box
FFGA1000-Cu-TH		thick	50/box
FFGA1000-Cu-ET		extra thick	50/box
FFGA1500-Cu-UL	1500 micron	ultra-thin	50/box
FFGA1500-Cu-TH		thick	50/box
FFGA1500-Cu-ET		extra thick	50/box

Cat. #	Type	Thickness	Qty
FFGA75-Ni-UL	75 micron	ultra-thin	50/box
FFGA75-Ni-TH		thick	50/box
FFGA75-Ni-ET		extra thick	50/box
FFGA100-Ni-UL	100 micron	ultra-thin	50/box
FFGA100-Ni-TH		thick	50/box
FFGA100-Ni-ET		extra thick	50/box
FFGA150-Ni-UL	150 micron	ultra-thin	50/box
FFGA150-Ni-TH		thick	50/box
FFGA150-Ni-ET		extra thick	50/box
FFGA200-Ni-UL	200 micron	ultra-thin	50/box
FFGA200-Ni-TH		thick	50/box
FFGA200-Ni-ET		extra thick	50/box
FFGA300-Ni-UL	300 micron	ultra-thin	50/box
FFGA300-Ni-TH		thick	50/box
FFGA300-Ni-ET		extra thick	50/box
FFGA400-Ni-UL	400 micron	ultra-thin	50/box
FFGA400-Ni-TH		thick	50/box
FFGA400-Ni-ET		extra thick	50/box
FFGA600-Ni-UL	600 micron	ultra-thin	50/box
FFGA600-Ni-TH		thick	50/box
FFGA600-Ni-ET		extra thick	50/box
FFGA800-Ni-UL	800 micron	ultra-thin	50/box
FFGA800-Ni-TH		thick	50/box
FFGA800-Ni-ET		extra thick	50/box
FFGA1000-Ni-UL	1000 micron	ultra-thin	50/box
FFGA1000-Ni-TH		thick	50/box
FFGA1000-Ni-ET		extra thick	50/box
FFGA1500-Ni-UL	1500 micron	ultra-thin	50/box
FFGA1500-Ni-TH		thick	50/box
FFGA1500-Ni-ET		extra thick	50/box

ARTICLE OF INTEREST

A simplified method for handling EM grids is described. This new method not only offers safety and identification of your samples but offers you improved handling, temporary storage, and identification of grids bearing ultrathin sections as well as a novel method for preparing bulk samples.

Refer to: Gorycki, M.(1992). A Simple Method for Handling Grids. Biotechnic & Histochemistry 67/5, 313-314.

TECHNICAL TIP

How do Nickel and Copper grids react with Periodic Acid?

Periodic Acid + Ni... Ni-Periodate + H₂
 Periodic Acid + Cu... Cu-Periodate + H₂
 In this case you should use Gold Grids.

SUPPORT FILM ON GRIDS

➤ 2. Carbon Film Only

A thin film of pure carbon deposited on one side of the grid. The thickness range is as follows:

Standard: Approx. 5-6nm, **Ultra-Thin (UL):** 3-4nm, **Thick (TH):** 10nm, **Extra Thick (ET):** 20-30nm

➤ Carbon Square Mesh

Standard Thickness

Cat. #	Type	Thickness	Qty
CF150-Cu-25	150 MESH	standard	25/box
CF150-Cu-50		50/box	
CF200-Cu-25	200 MESH	standard	25/box
CF200-Cu-50		50/box	
CF300-Cu-25	300 MESH	standard	25/box
CF300-Cu-50		50/box	
CF400-Cu-25	400 MESH	standard	25/box
CF400-Cu-50		50/box	

Cat. #	Type	Thickness	Qty
CF150-Ni-25	150 MESH	standard	25/box
CF150-Ni-50		50/box	
CF200-Ni-25	200 MESH	standard	25/box
CF200-Ni-50		50/box	
CF300-Ni-25	300 MESH	standard	25/box
CF300-Ni-50		50/box	
CF400-Ni-25	400 MESH	standard	25/box
CF400-Ni-50		50/box	

COPPER		NICKEL		GOLD			
Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
CF150-Au-25	150 MESH	standard	25/box	CF150-Au-25	150 MESH	standard	25/box
CF150-Au-50		50/box	CF150-Au-50	50/box			
CF200-Au-25	200 MESH	standard	25/box	CF200-Au-25	200 MESH	standard	25/box
CF200-Au-50		50/box	CF200-Au-50	50/box			
CF300-Au-25	300 MESH	standard	25/box	CF300-Au-25	300 MESH	standard	25/box
CF300-Au-50		50/box	CF300-Au-50	50/box			
CF400-Au-25	400 MESH	standard	25/box	CF400-Au-25	400 MESH	standard	25/box
CF400-Au-50		50/box	CF400-Au-50	50/box			

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty
CF150-Cu-UL	150 MESH	ultra-thin	50/box
CF150-Cu-TH		thick	50/box
CF150-Cu-ET		extra thick	50/box
CF200-Cu-UL	200 MESH	ultra-thin	50/box
CF200-Cu-TH		thick	50/box
CF200-Cu-ET		extra thick	50/box
CF300-Cu-UL	300 MESH	ultra-thin	50/box
CF300-Cu-TH		thick	50/box
CF300-Cu-ET		extra thick	50/box
CF400-Cu-UL	400 MESH	ultra-thin	50/box
CF400-Cu-TH		thick	50/box
CF400-Cu-ET		extra thick	50/box

Cat. #	Type	Thickness	Qty
CF150-Ni-UL	150 MESH	ultra-thin	50/box
CF150-Ni-TH		thick	50/box
CF150-Ni-ET		extra thick	50/box
CF200-Ni-UL	200 MESH	ultra-thin	50/box
CF200-Ni-TH		thick	50/box
CF200-Ni-ET		extra thick	50/box
CF300-Ni-UL	300 MESH	ultra-thin	50/box
CF300-Ni-TH		thick	50/box
CF300-Ni-ET		extra thick	50/box
CF400-Ni-UL	400 MESH	ultra-thin	50/box
CF400-Ni-TH		thick	50/box
CF400-Ni-ET		extra thick	50/box

Cat. #	Type	Thickness	Qty
CF150-Au-UL	150 MESH	ultra-thin	50/box
CF150-Au-TH		thick	50/box
CF150-Au-ET		extra thick	50/box
CF200-Au-UL	200 MESH	ultra-thin	50/box
CF200-Au-TH		thick	50/box
CF200-Au-ET		extra thick	50/box
CF300-Au-UL	300 MESH	ultra-thin	50/box
CF300-Au-TH		thick	50/box
CF300-Au-ET		extra thick	50/box
CF400-Au-UL	400 MESH	ultra-thin	50/box
CF400-Au-TH		thick	50/box
CF400-Au-ET		extra thick	50/box

➤ Carbon Gilder Finder Grids

Standard Thickness

Cat. #	Type	Thickness	Qty
CF200F1-Cu-25	F1	standard	25/box
CF200F1-Cu-50		50/box	
CF200F2-Cu-25	F2	standard	25/box
CF200F2-Cu-50		50/box	

Cat. #	Type	Thickness	Qty
CF200F1-Ni-25	F1	standard	25/box
CF200F1-Ni-50		50/box	
CF200F2-Ni-25	F2	standard	25/box
CF200F2-Ni-50		50/box	

COPPER		NICKEL		GOLD			
Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
CF200F1-Au-25	F1	standard	25/box	CF200F1-Au-25	F1	standard	25/box
CF200F1-Au-50		50/box	CF200F1-Au-50	50/box			
CF200F2-Au-25	F2	standard	25/box	CF200F2-Au-25	F2	standard	25/box
CF200F2-Au-50		50/box	CF200F2-Au-50	50/box			

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty
CF200F1-Cu-UL	F1	ultra-thin	50/box
CF200F1-Cu-TH		thick	50/box
CF200F1-Cu-ET		extra thick	50/box
CF200F2-Cu-UL	F2	ultra-thin	50/box
CF200F2-Cu-TH		thick	50/box
CF200F2-Cu-ET		extra thick	50/box

Cat. #	Type	Thickness	Qty
CF200F1-Ni-UL	F1	ultra-thin	50/box
CF200F1-Ni-TH		thick	50/box
CF200F1-Ni-ET		extra thick	50/box
CF200F2-Ni-UL	F2	ultra-thin	50/box
CF200F2-Ni-TH		thick	50/box
CF200F2-Ni-ET		extra thick	50/box

Cat. #	Type	Thickness	Qty
CF200F1-Au-UL	F1	ultra-thin	50/box
CF200F1-Au-TH		thick	50/box
CF200F1-Au-ET		extra thick	50/box
CF200F2-Au-UL	F2	ultra-thin	50/box
CF200F2-Au-TH		thick	50/box
CF200F2-Au-ET		extra thick	50/box

TECHNICAL TIP

The Preparation of Adhesive Coated Grids for Picking Up Carbon Film to Make Carbon Coated Grids

The following steps should be followed in the preparation of adhesive coated grids:

1. Submerge about 2" of Scotch clear tape (3M) into 10ml of Dichloroethane (Ethylene Dichloride); shake and discard the tape.
2. The solution now becomes "grid-glue"
3. Place the grids (dull side up) on a piece of filter paper (dust-free room).
4. Take a pipette and place a drop of "grid-glue" on top of each grid.
5. Let the grids dry.
6. The grids are now ready to pick up the carbon foil and make the carbon coated grids.

➤ For more Technical Tips on Grids, see pages 108, 109 >>>>

SUPPORT FILM ON GRIDS

► Carbon London Finder Grids

Standard Thickness

Cat. #	Type	Thickness	Qty
CFLF135-Cu-25	LF135	standard	25/box
CFLF135-Cu-50			50/box
CFLF200-Cu-25	LF200	standard	25/box
CFLF200-Cu-50			50/box
CFLF400-Cu-25	LF400	standard	25/box
CFLF400-Cu-50			50/box

Cat. #	Type	Thickness	Qty
CFLF135-Ni-25	LF135	standard	25/box
CFLF135-Ni-50			50/box
CFLF200-Ni-25	LF200	standard	25/box
CFLF200-Ni-50			50/box
CFLF400-Ni-25	LF400	standard	25/box
CFLF400-Ni-50			50/box

Cat. #	Type	Thickness	Qty
CFLF135-Au-25	LF135	standard	25/box
CFLF135-Au-50			50/box
CFLF200-Au-25	LF200	standard	25/box
CFLF200-Au-50			50/box
CFLF400-Au-25	LF400	standard	25/box
CFLF400-Au-50			50/box

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty
CFLF135-Cu-UL	LF135	ultra-thin	50/box
CFLF135-Cu-TH		thick	50/box
CFLF135-Cu-ET		extra thick	50/box
CFLF200-Cu-UL	LF200	ultra-thin	50/box
CFLF200-Cu-TH		thick	50/box
CFLF200-Cu-ET		extra thick	50/box
CFLF400-Cu-UL	LF400	ultra-thin	50/box
CFLF400-Cu-TH		thick	50/box
CFLF400-Cu-ET		extra thick	50/box

Cat. #	Type	Thickness	Qty
CFLF135-Ni-UL	LF135	ultra-thin	50/box
CFLF135-Ni-TH		thick	50/box
CFLF135-Ni-ET		extra thick	50/box
CFLF200-Ni-UL	LF200	ultra-thin	50/box
CFLF200-Ni-TH		thick	50/box
CFLF200-Ni-ET		extra thick	50/box
CFLF400-Ni-UL	LF400	ultra-thin	50/box
CFLF400-Ni-TH		thick	50/box
CFLF400-Ni-ET		extra thick	50/box

Cat. #	Type	Thickness	Qty
CFLF135-Au-UL	LF135	ultra-thin	50/box
CFLF135-Au-TH		thick	50/box
CFLF135-Au-ET		extra thick	50/box

► Carbon Hexagonal Mesh

Standard Thickness

Cat. #	Type	Thickness	Qty
CF100H-Cu-25	100 MESH	standard	25/box
CF100H-Cu-50			50/box
CF200H-Cu-25	200 MESH	standard	25/box
CF200H-Cu-50			50/box
CF300H-Cu-25	300 MESH	standard	25/box
CF300H-Cu-50			50/box
CF400H-Cu-25	400 MESH	standard	25/box
CF400H-Cu-50			50/box

Cat. #	Type	Thickness	Qty
CF100H-Ni-25	100 MESH	standard	25/box
CF100H-Ni-50			50/box
CF200H-Ni-25	200 MESH	standard	25/box
CF200H-Ni-50			50/box
CF300H-Ni-25	300 MESH	standard	25/box
CF300H-Ni-50			50/box
CF400H-Ni-25	400 MESH	standard	25/box
CF400H-Ni-50			50/box

Cat. #	Type	Thickness	Qty
CF100H-Au-25	100 MESH	standard	25/box
CF100H-Au-50			50/box
CF200H-Au-25	200 MESH	standard	25/box
CF200H-Au-50			50/box
CF300H-Au-25	300 MESH	standard	25/box
CF300H-Au-50			50/box
CF400H-Au-25	400 MESH	standard	25/box
CF400H-Au-50			50/box

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty
CF100H-Cu-UL	100 MESH	ultra-thin	50/box
CF100H-Cu-TH		thick	50/box
CF100H-Cu-ET		extra thick	50/box
CF200H-Cu-UL	200 MESH	ultra-thin	50/box
CF200H-Cu-TH		thick	50/box
CF200H-Cu-ET		extra thick	50/box
CF300H-Cu-UL	300 MESH	ultra-thin	50/box
CF300H-Cu-TH		thick	50/box
CF300H-Cu-ET		extra thick	50/box
CF400H-Cu-UL	400 MESH	ultra-thin	50/box
CF400H-Cu-TH		thick	50/box
CF400H-Cu-ET		extra thick	50/box

Cat. #	Type	Thickness	Qty
CF100H-Ni-UL	100 MESH	ultra-thin	50/box
CF100H-Ni-TH		thick	50/box
CF100H-Ni-ET		extra thick	50/box
CF200H-Ni-UL	200 MESH	ultra-thin	50/box
CF200H-Ni-TH		thick	50/box
CF200H-Ni-ET		extra thick	50/box
CF300H-Ni-UL	300 MESH	ultra-thin	50/box
CF300H-Ni-TH		thick	50/box
CF300H-Ni-ET		extra thick	50/box
CF400H-Ni-UL	400 MESH	ultra-thin	50/box
CF400H-Ni-TH		thick	50/box
CF400H-Ni-ET		extra thick	50/box

Cat. #	Type	Thickness	Qty
CF100H-Au-UL	100 MESH	ultra-thin	50/box
CF100H-Au-TH		thick	50/box
CF100H-Au-ET		extra thick	50/box
CF200H-Au-UL	200 MESH	ultra-thin	50/box
CF200H-Au-TH		thick	50/box
CF200H-Au-ET		extra thick	50/box
CF300H-Au-UL	300 MESH	ultra-thin	50/box
CF300H-Au-TH		thick	50/box
CF300H-Au-ET		extra thick	50/box
CF400H-Au-UL	400 MESH	ultra-thin	50/box
CF400H-Au-TH		thick	50/box
CF400H-Au-ET		extra thick	50/box

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Introducing DuraSiN™, revolutionizing the way samples are prepared and analyzed in the transmission electron microscope.

DuraSiN™ Film and Mesh products are affordably-priced, durable, nonorganic, low scatter support grids for quantitative TEM and X-ray analysis. Unlike other support films and grids, DuraSiN™ Film and Mesh products can withstand harsh chemical and temperature environments.

For more information, see page 152-157. >>>>



SEM image of a DuraSiN™ Film (taken from the back side)



SEM image of a DuraSiN™ Mesh (taken from the back side)

SUPPORT FILM ON GRIDS

► Carbon Thin Bar Square Mesh

Standard Thickness

Cat. #	Type	Thickness	Qty
CFT200-Cu-25 CFT200-Cu-50	200 MESH	standard	25/box 50/box
CFT300-Cu-25 CFT300-Cu-50	300 MESH	standard	25/box 50/box
CFT400-Cu-25 CFT400-Cu-50	400 MESH	standard	25/box 50/box
CFT1000-Cu-25 CFT1000-Cu-50	1000 MESH	standard	25/box 50/box

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty
CFT200-Cu-UL CFT200-Cu-TH CFT200-Cu-ET	200 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
CFT300-Cu-UL CFT300-Cu-TH CFT300-Cu-ET	300 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
CFT400-Cu-UL CFT400-Cu-TH CFT400-Cu-ET	400 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
CFT1000-Cu-UL CFT1000-Cu-TH CFT1000-Cu-ET	1000 MESH	ultra-thin thick extra thick	50/box 50/box 50/box

► Carbon Thin Bar Hexagonal Mesh

Standard Thickness

Cat. #	Type	Thickness	Qty
CFTH200-Cu-25 CFTH200-Cu-50	200 MESH	standard	25/box 50/box
CFTH300-Cu-25 CFTH300-Cu-50	300 MESH	standard	25/box 50/box
CFTH400-Cu-25 CFTH400-Cu-50	400 MESH	standard	25/box 50/box
CFTH600-Cu-25 CFTH600-Cu-50	600 MESH	standard	25/box 50/box

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty
CFTH200-Cu-UL CFTH200-Cu-TH CFTH200-Cu-ET	200 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
CFTH300-Cu-UL CFTH300-Cu-TH CFTH300-Cu-ET	300 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
CFTH400-Cu-UL CFTH400-Cu-TH CFTH400-Cu-ET	400 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
CFTH600-Cu-UL CFTH600-Cu-TH CFTH600-Cu-ET	600 MESH	ultra-thin thick extra thick	50/box 50/box 50/box

► Carbon Slots

Standard Thickness

Cat. #	Type	Thickness	Qty
CF205-Cu-25 CF205-Cu-50	2 x 0.5mm	standard	25/box 50/box
CF2010-Cu-25 CF2010-Cu-50	2 x 1mm	standard	25/box 50/box

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty
CFT205-Cu-UL CFT205-Cu-TH CFT205-Cu-ET	2 x 0.5mm	ultra-thin thick extra thick	50/box 50/box 50/box
CFT2010-Cu-UL CFT2010-Cu-TH CFT2010-Cu-ET	2 x 1mm	ultra-thin thick extra thick	50/box 50/box 50/box

Cat. #	Type	Thickness	Qty
CFT200-Ni-25 CFT200-Ni-50	200 MESH	standard	25/box 50/box
CFT300-Ni-25 CFT300-Ni-50	300 MESH	standard	25/box 50/box
CFT400-Ni-25 CFT400-Ni-50	400 MESH	standard	25/box 50/box
CFT1000-Ni-25 CFT1000-Ni-50	1000 MESH	standard	25/box 50/box

Cat. #	Type	Thickness	Qty
CFT200-Ni-UL CFT200-Ni-TH CFT200-Ni-ET	200 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
CFT300-Ni-UL CFT300-Ni-TH CFT300-Ni-ET	300 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
CFT400-Ni-UL CFT400-Ni-TH CFT400-Ni-ET	400 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
CFT1000-Ni-UL CFT1000-Ni-TH CFT1000-Ni-ET	1000 MESH	ultra-thin thick extra thick	50/box 50/box 50/box

Cat. #	Type	Thickness	Qty
CFTH200-Ni-25 CFTH200-Ni-50	200 MESH	standard	25/box 50/box
CFTH300-Ni-25 CFTH300-Ni-50	300 MESH	standard	25/box 50/box
CFTH400-Ni-25 CFTH400-Ni-50	400 MESH	standard	25/box 50/box
CFTH600-Ni-25 CFTH600-Ni-50	600 MESH	standard	25/box 50/box

Cat. #	Type	Thickness	Qty
CFTH200-Ni-UL CFTH200-Ni-TH CFTH200-Ni-ET	200 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
CFTH300-Ni-UL CFTH300-Ni-TH CFTH300-Ni-ET	300 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
CFTH400-Ni-UL CFTH400-Ni-TH CFTH400-Ni-ET	400 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
CFTH600-Ni-UL CFTH600-Ni-TH CFTH600-Ni-ET	600 MESH	ultra-thin thick extra thick	50/box 50/box 50/box

Cat. #	Type	Thickness	Qty
CF205-Ni-25 CF205-Ni-50	2 x 0.5mm	standard	25/box 50/box
CF2010-Ni-25 CF2010-Ni-50	2 x 1mm	standard	25/box 50/box

Cat. #	Type	Thickness	Qty
CFT205-Ni-UL CFT205-Ni-TH CFT205-Ni-ET	2 x 0.5mm	ultra-thin thick extra thick	50/box 50/box 50/box
CFT2010-Ni-UL CFT2010-Ni-TH CFT2010-Ni-ET	2 x 1mm	ultra-thin thick extra thick	50/box 50/box 50/box

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NICKEL

GOLD

Cat. #	Type	Thickness	Qty
CFT200-Au-25 CFT200-Au-50	200 MESH	standard	25/box 50/box
CFT300-Au-25 CFT300-Au-50	300 MESH	standard	25/box 50/box
CFT400-Au-25 CFT400-Au-50	400 MESH	standard	25/box 50/box
CFT1000-Au-25 CFT1000-Au-50	1000 MESH	standard	25/box 50/box

Cat. #	Type	Thickness	Qty
CFT200-Au-UL CFT200-Au-TH CFT200-Au-ET	200 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
CFT300-Au-UL CFT300-Au-TH CFT300-Au-ET	300 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
CFT400-Au-UL CFT400-Au-TH CFT400-Au-ET	400 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
CFT1000-Au-UL CFT1000-Au-TH CFT1000-Au-ET	1000 MESH	ultra-thin thick extra thick	50/box 50/box 50/box

COPPER

NICKEL

GOLD

Cat. #	Type	Thickness	Qty
CFTH200-Au-25 CFTH200-Au-50	200 MESH	standard	25/box 50/box
CFTH300-Au-25 CFTH300-Au-50	300 MESH	standard	25/box 50/box
CFTH400-Au-25 CFTH400-Au-50	400 MESH	standard	25/box 50/box
CFTH600-Au-25 CFTH600-Au-50	600 MESH	standard	25/box 50/box

Cat. #	Type	Thickness	Qty
CFTH200-Au-UL CFTH200-Au-TH CFTH200-Au-ET	200 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
CFTH300-Au-UL CFTH300-Au-TH CFTH300-Au-ET	300 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
CFTH400-Au-UL CFTH400-Au-TH CFTH400-Au-ET	400 MESH	ultra-thin thick extra thick	50/box 50/box 50/box
CFTH600-Au-UL CFTH600-Au-TH CFTH600-Au-ET	600 MESH	ultra-thin thick extra thick	50/box 50/box 50/box

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NICKEL

GOLD

Cat. #	Type	Thickness	Qty
CF205-Au-25 CF205-Au-50	2 x 0.5mm	standard	25/box 50/box
CF2010-Au-25 CF2010-Au-50	2 x 1mm	standard	25/box 50/box

Cat. #	Type	Thickness	Qty
CFT205-Au-UL CFT205-Au-TH CFT205-Au-ET	2 x 0.5mm	ultra-thin thick extra thick	50/box 50/box 50/box
CFT2010-Au-UL CFT2010-Au-TH CFT2010-Au-ET	2 x 1mm	ultra-thin thick extra thick	50/box 50/box 50/box

SUPPORT FILM ON GRIDS

► Carbon Single Hole

Standard Thickness

COPPER

NICKEL

Cat. #	Type	Thickness	Qty
CFGA75-Cu-25	75 micron	standard	25/box
CFGA75-Cu-50		50/box	
CFGA100-Cu-25	100 micron	standard	25/box
CFGA100-Cu-50		50/box	
CFGA150-Cu-25	150 micron	standard	25/box
CFGA150-Cu-50		50/box	
CFGA200-Cu-25	200 micron	standard	25/box
CFGA200-Cu-50		50/box	
CFGA300-Cu-25	300 micron	standard	25/box
CFGA300-Cu-50		50/box	
CFGA400-Cu-25	400 micron	standard	25/box
CFGA400-Cu-50		50/box	
CFGA600-Cu-25	600 micron	standard	25/box
CFGA600-Cu-50		50/box	
CFGA800-Cu-25	800 micron	standard	25/box
CFGA800-Cu-50		50/box	
CFGA1000-Cu-25	1000 micron	standard	25/box
CFGA1000-Cu-50		50/box	
CFGA1500-Cu-25	1500 micron	standard	25/box
CFGA1500-Cu-50		50/box	

Cat. #	Type	Thickness	Qty
CFGA75-Ni-25	75 micron	standard	25/box
CFGA75-Ni-50		50/box	
CFGA100-Ni-25	100 micron	standard	25/box
CFGA100-Ni-50		50/box	
CFGA150-Ni-25	150 micron	standard	25/box
CFGA150-Ni-50		50/box	
CFGA200-Ni-25	200 micron	standard	25/box
CFGA200-Ni-50		50/box	
CFGA300-Ni-25	300 micron	standard	25/box
CFGA300-Ni-50		50/box	
CFGA400-Ni-25	400 micron	standard	25/box
CFGA400-Ni-50		50/box	
CFGA600-Ni-25	600 micron	standard	25/box
CFGA600-Ni-50		50/box	
CFGA800-Ni-25	800 micron	standard	25/box
CFGA800-Ni-50		50/box	
CFGA1000-Ni-25	1000 micron	standard	25/box
CFGA1000-Ni-50		50/box	
CFGA1500-Ni-25	1500 micron	standard	25/box
CFGA1500-Ni-50		50/box	

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty
CFGA75-Cu-UL	75 micron	ultra-thin	50/box
CFGA75-Cu-TH		thick	50/box
CFGA75-Cu-ET		extra thick	50/box
CFGA100-Cu-UL	100 micron	ultra-thin	50/box
CFGA100-Cu-TH		thick	50/box
CFGA100-Cu-ET		extra thick	50/box
CFGA150-Cu-UL	150 micron	ultra-thin	50/box
CFGA150-Cu-TH		thick	50/box
CFGA150-Cu-ET		extra thick	50/box
CFGA200-Cu-UL	200 micron	ultra-thin	50/box
CFGA200-Cu-TH		thick	50/box
CFGA200-Cu-ET		extra thick	50/box
CFGA300-Cu-UL	300 micron	ultra-thin	50/box
CFGA300-Cu-TH		thick	50/box
CFGA300-Cu-ET		extra thick	50/box
CFGA400-Cu-UL	400 micron	ultra-thin	50/box
CFGA400-Cu-TH		thick	50/box
CFGA400-Cu-ET		extra thick	50/box
CFGA600-Cu-UL	600 micron	ultra-thin	50/box
CFGA600-Cu-TH		thick	50/box
CFGA600-Cu-ET		extra thick	50/box
CFGA800-Cu-UL	800 micron	ultra-thin	50/box
CFGA800-Cu-TH		thick	50/box
CFGA800-Cu-ET		extra thick	50/box
CFGA1000-Cu-UL	1000 micron	ultra-thin	50/box
CFGA1000-Cu-TH		thick	50/box
CFGA1000-Cu-ET		extra thick	50/box
CFGA1500-Cu-UL	1500 micron	ultra-thin	50/box
CFGA1500-Cu-TH		thick	50/box
CFGA1500-Cu-ET		extra thick	50/box

Cat. #	Type	Thickness	Qty
CFGA75-Ni-UL	75 micron	ultra-thin	50/box
CFGA75-Ni-TH		thick	50/box
CFGA75-Ni-ET		extra thick	50/box
CFGA100-Ni-UL	100 micron	ultra-thin	50/box
CFGA100-Ni-TH		thick	50/box
CFGA100-Ni-ET		extra thick	50/box
CFGA150-Ni-UL	150 micron	ultra-thin	50/box
CFGA150-Ni-TH		thick	50/box
CFGA150-Ni-ET		extra thick	50/box
CFGA200-Ni-UL	200 micron	ultra-thin	50/box
CFGA200-Ni-TH		thick	50/box
CFGA200-Ni-ET		extra thick	50/box
CFGA300-Ni-UL	300 micron	ultra-thin	50/box
CFGA300-Ni-TH		thick	50/box
CFGA300-Ni-ET		extra thick	50/box
CFGA400-Ni-UL	400 micron	ultra-thin	50/box
CFGA400-Ni-TH		thick	50/box
CFGA400-Ni-ET		extra thick	50/box
CFGA600-Ni-UL	600 micron	ultra-thin	50/box
CFGA600-Ni-TH		thick	50/box
CFGA600-Ni-ET		extra thick	50/box
CFGA800-Ni-UL	800 micron	ultra-thin	50/box
CFGA800-Ni-TH		thick	50/box
CFGA800-Ni-ET		extra thick	50/box
CFGA1000-Ni-UL	1000 micron	ultra-thin	50/box
CFGA1000-Ni-TH		thick	50/box
CFGA1000-Ni-ET		extra thick	50/box
CFGA1500-Ni-UL	1500 micron	ultra-thin	50/box
CFGA1500-Ni-TH		thick	50/box
CFGA1500-Ni-ET		extra thick	50/box

ARTICLE OF INTEREST

A simplified method for handling EM grids is described. This new method not only offers safety and identification of your samples but offers you improved handling, temporary storage, and identification of grids bearing ultrathin sections as well as a novel method for preparing bulk samples.

Refer to: Gorycki, M.(1992). A Simple Method for Handling Grids. Biotechnic & Histochemistry 67/5, 313-314.

TECHNICAL TIP

How do Nickel and Copper grids react with Periodic Acid?

Periodic Acid + Ni... Ni-Periodate + H₂
 Periodic Acid + Cu... Cu-Periodate + H₂
 In this case you should use Gold Grids.

SUPPORT FILM ON GRIDS

► 3. Formvar/Carbon Film

A formvar coated grid, stabilized with evaporated carbon film. This type of coating is excellent for specimen support, especially for ultra thin sections. The thickness range is as follows:

Standard Option A: 10nm Formvar and 1nm Carbon

Standard Option B (SB): 10nm Formvar and 3-4nm Carbon

Standard Option C (SC): 10nm Formvar and 20-30nm Carbon

Ultra-Thin Option A (UA): 5-6nm Formvar and 1nm Carbon

Ultra-Thin Option B (UB): 5-6nm Formvar and 3-4nm Carbon

Ultra-Thin Option C (UC): 5-6nm Formvar and 20-30nm Carbon

Thick Option A (TA): 15-20nm Formvar and 1nm Carbon

Thick Option B (TB): 15-20nm Formvar and 3-4nm Carbon

Thick Option C (TC): 15-20nm Formvar and 20-30nm Carbon

Extra Thick Option A (EA): 25-50nm Formvar and 1nm Carbon

Extra Thick Option B (EB): 25-50nm Formvar and 3-4nm Carbon

Extra Thick Option C (EC): 25-50nm Formvar and 20-30nm Carbon

► Formvar/Carbon Square Mesh

COPPER

NICKEL

GOLD

Standard Thickness

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FCF100-Cu-25	100 MESH	standard 'A'	25/box	FCF100-Ni-25	100 MESH	standard 'A'	25/box	FCF100-Au-25	100 MESH	standard 'A'	25/box
FCF100-Cu-50			50/box	FCF100-Ni-50			50/box	FCF100-Au-50			50/box
FCF150-Cu-25	150 MESH	standard 'A'	25/box	FCF150-Ni-25	150 MESH	standard 'A'	25/box	FCF150-Au-25	150 MESH	standard 'A'	25/box
FCF150-Cu-50			50/box	FCF150-Ni-50			50/box	FCF150-Au-50			50/box
FCF200-Cu-25	200 MESH	standard 'A'	25/box	FCF200-Ni-25	200 MESH	standard 'A'	25/box	FCF200-Au-25	200 MESH	standard 'A'	25/box
FCF200-Cu-50			50/box	FCF200-Ni-50			50/box	FCF200-Au-50			50/box
FCF300-Cu-25	300 MESH	standard 'A'	25/box	FCF300-Ni-25	300 MESH	standard 'A'	25/box	FCF300-Au-25	300 MESH	standard 'A'	25/box
FCF300-Cu-50			50/box	FCF300-Ni-50			50/box	FCF300-Au-50			50/box
FCF400-Cu-25	400 MESH	standard 'A'	25/box	FCF400-Ni-25	400 MESH	standard 'A'	25/box	FCF400-Au-25	400 MESH	standard 'A'	25/box
FCF400-Cu-50			50/box	FCF400-Ni-50			50/box	FCF400-Au-50			50/box

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty			
FCF100-Cu-SB	100 MESH	standard 'B'	50/box	FCF100-Ni-SB	100 MESH	standard 'B'	50/box	FCF100-Au-SB	100 MESH	standard 'B'	50/box			
FCF100-Cu-SC			standard 'C'	50/box			FCF100-Ni-SC	standard 'C'			50/box	FCF100-Au-SC	standard 'C'	50/box
FCF100-Cu-UA		ultra-thin 'A'	50/box	FCF100-Ni-UA		ultra-thin 'A'	50/box	FCF100-Au-UA		ultra-thin 'A'	50/box			
FCF100-Cu-UB		ultra-thin 'B'	50/box	FCF100-Ni-UB		ultra-thin 'B'	50/box	FCF100-Au-UB		ultra-thin 'B'	50/box			
FCF100-Cu-UC		ultra-thin 'C'	50/box	FCF100-Ni-UC		ultra-thin 'C'	50/box	FCF100-Au-UC		ultra-thin 'C'	50/box			
FCF100-Cu-TA		thick 'A'	50/box	FCF100-Ni-TA		thick 'A'	50/box	FCF100-Au-TA		thick 'A'	50/box			
FCF100-Cu-TB		thick 'B'	50/box	FCF100-Ni-TB		thick 'B'	50/box	FCF100-Au-TB		thick 'B'	50/box			
FCF100-Cu-TC		thick 'C'	50/box	FCF100-Ni-TC		thick 'C'	50/box	FCF100-Au-TC		thick 'C'	50/box			
FCF100-Cu-EA		extra thick 'A'	50/box	FCF100-Ni-EA		extra thick 'A'	50/box	FCF100-Au-EA		extra thick 'A'	50/box			
FCF100-Cu-EB		extra thick 'B'	50/box	FCF100-Ni-EB		extra thick 'B'	50/box	FCF100-Au-EB		extra thick 'B'	50/box			
FCF100-Cu-EC		extra thick 'C'	50/box	FCF100-Ni-EC		extra thick 'C'	50/box	FCF100-Au-EC		extra thick 'C'	50/box			
FCF150-Cu-SB		150 MESH	standard 'B'	50/box		FCF150-Ni-SB	150 MESH	standard 'B'		50/box	FCF150-Au-SB	150 MESH	standard 'B'	50/box
FCF150-Cu-SC				standard 'C'		50/box				FCF150-Ni-SC	standard 'C'			50/box
FCF150-Cu-UA	ultra-thin 'A'		50/box	FCF150-Ni-UA	ultra-thin 'A'	50/box		FCF150-Au-UA	ultra-thin 'A'	50/box				
FCF150-Cu-UB	ultra-thin 'B'		50/box	FCF150-Ni-UB	ultra-thin 'B'	50/box		FCF150-Au-UB	ultra-thin 'B'	50/box				
FCF150-Cu-UC	ultra-thin 'C'		50/box	FCF150-Ni-UC	ultra-thin 'C'	50/box		FCF150-Au-UC	ultra-thin 'C'	50/box				
FCF150-Cu-TA	thick 'A'		50/box	FCF150-Ni-TA	thick 'A'	50/box		FCF150-Au-TA	thick 'A'	50/box				
FCF150-Cu-TB	thick 'B'		50/box	FCF150-Ni-TB	thick 'B'	50/box		FCF150-Au-TB	thick 'B'	50/box				
FCF150-Cu-TC	thick 'C'		50/box	FCF150-Ni-TC	thick 'C'	50/box		FCF150-Au-TC	thick 'C'	50/box				
FCF150-Cu-EA	extra thick 'A'		50/box	FCF150-Ni-EA	extra thick 'A'	50/box		FCF150-Au-EA	extra thick 'A'	50/box				
FCF150-Cu-EB	extra thick 'B'		50/box	FCF150-Ni-EB	extra thick 'B'	50/box		FCF150-Au-EB	extra thick 'B'	50/box				
FCF150-Cu-EC	extra thick 'C'		50/box	FCF150-Ni-EC	extra thick 'C'	50/box		FCF150-Au-EC	extra thick 'C'	50/box				
FCF200-Cu-SB	200 MESH		standard 'B'	50/box	FCF200-Ni-SB	200 MESH		standard 'B'	50/box	FCF200-Au-SB	200 MESH		standard 'B'	50/box
FCF200-Cu-SC				standard 'C'	50/box				FCF200-Ni-SC	standard 'C'				50/box
FCF200-Cu-UA		ultra-thin 'A'	50/box	FCF200-Ni-UA	ultra-thin 'A'		50/box	FCF200-Au-UA	ultra-thin 'A'	50/box				
FCF200-Cu-UB		ultra-thin 'B'	50/box	FCF200-Ni-UB	ultra-thin 'B'		50/box	FCF200-Au-UB	ultra-thin 'B'	50/box				
FCF200-Cu-UC		ultra-thin 'C'	50/box	FCF200-Ni-UC	ultra-thin 'C'		50/box	FCF200-Au-UC	ultra-thin 'C'	50/box				
FCF200-Cu-TA		thick 'A'	50/box	FCF200-Ni-TA	thick 'A'		50/box	FCF200-Au-TA	thick 'A'	50/box				
FCF200-Cu-TB		thick 'B'	50/box	FCF200-Ni-TB	thick 'B'		50/box	FCF200-Au-TB	thick 'B'	50/box				
FCF200-Cu-TC		thick 'C'	50/box	FCF200-Ni-TC	thick 'C'		50/box	FCF200-Au-TC	thick 'C'	50/box				
FCF200-Cu-EA		extra thick 'A'	50/box	FCF200-Ni-EA	extra thick 'A'		50/box	FCF200-Au-EA	extra thick 'A'	50/box				
FCF200-Cu-EB		extra thick 'B'	50/box	FCF200-Ni-EB	extra thick 'B'		50/box	FCF200-Au-EB	extra thick 'B'	50/box				
FCF200-Cu-EC		extra thick 'C'	50/box	FCF200-Ni-EC	extra thick 'C'		50/box	FCF200-Au-EC	extra thick 'C'	50/box				

continues >>>>

SUPPORT FILM ON GRIDS

➤ Formvar/Carbon Square Mesh (continued)

COPPER NICKEL GOLD

NEW Thickness Ranges (continued)

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FCF300-Cu-SB	300 MESH	standard 'B'	50/box	FCF300-Ni-SB	300 MESH	standard 'B'	50/box	FCF300-Au-SB	300 MESH	standard 'B'	50/box
FCF300-Cu-SC		standard 'C'	50/box	FCF300-Ni-SC		standard 'C'	50/box	FCF300-Au-SC		standard 'C'	50/box
FCF300-Cu-UA		ultra-thin 'A'	50/box	FCF300-Ni-UA		ultra-thin 'A'	50/box	FCF300-Au-UA		ultra-thin 'A'	50/box
FCF300-Cu-UB		ultra-thin 'B'	50/box	FCF300-Ni-UB		ultra-thin 'B'	50/box	FCF300-Au-UB		ultra-thin 'B'	50/box
FCF300-Cu-UC		ultra-thin 'C'	50/box	FCF300-Ni-UC		ultra-thin 'C'	50/box	FCF300-Au-UC		ultra-thin 'C'	50/box
FCF300-Cu-TA		thick 'A'	50/box	FCF300-Ni-TA		thick 'A'	50/box	FCF300-Au-TA		thick 'A'	50/box
FCF300-Cu-TB		thick 'B'	50/box	FCF300-Ni-TB		thick 'B'	50/box	FCF300-Au-TB		thick 'B'	50/box
FCF300-Cu-TC		thick 'C'	50/box	FCF300-Ni-TC		thick 'C'	50/box	FCF300-Au-TC		thick 'C'	50/box
FCF300-Cu-EA		extra thick 'A'	50/box	FCF300-Ni-EA		extra thick 'A'	50/box	FCF300-Au-EA		extra thick 'A'	50/box
FCF300-Cu-EB		extra thick 'B'	50/box	FCF300-Ni-EB		extra thick 'B'	50/box	FCF300-Au-EB		extra thick 'B'	50/box
FCF300-Cu-EC		extra thick 'C'	50/box	FCF300-Ni-EC		extra thick 'C'	50/box	FCF300-Au-EC		extra thick 'C'	50/box
FCF400-Cu-SB	400 MESH	standard 'B'	50/box	FCF400-Ni-SB	400 MESH	standard 'B'	50/box	FCF400-Au-SB	400 MESH	standard 'B'	50/box
FCF400-Cu-SC		standard 'C'	50/box	FCF400-Ni-SC		standard 'C'	50/box	FCF400-Au-SC		standard 'C'	50/box
FCF400-Cu-UA		ultra-thin 'A'	50/box	FCF400-Ni-UA		ultra-thin 'A'	50/box	FCF400-Au-UA		ultra-thin 'A'	50/box
FCF400-Cu-UB		ultra-thin 'B'	50/box	FCF400-Ni-UB		ultra-thin 'B'	50/box	FCF400-Au-UB		ultra-thin 'B'	50/box
FCF400-Cu-UC		ultra-thin 'C'	50/box	FCF400-Ni-UC		ultra-thin 'C'	50/box	FCF400-Au-UC		ultra-thin 'C'	50/box
FCF400-Cu-TA		thick 'A'	50/box	FCF400-Ni-TA		thick 'A'	50/box	FCF400-Au-TA		thick 'A'	50/box
FCF400-Cu-TB		thick 'B'	50/box	FCF400-Ni-TB		thick 'B'	50/box	FCF400-Au-TB		thick 'B'	50/box
FCF400-Cu-TC		thick 'C'	50/box	FCF400-Ni-TC		thick 'C'	50/box	FCF400-Au-TC		thick 'C'	50/box
FCF400-Cu-EA		extra thick 'A'	50/box	FCF400-Ni-EA		extra thick 'A'	50/box	FCF400-Au-EA		extra thick 'A'	50/box
FCF400-Cu-EB		extra thick 'B'	50/box	FCF400-Ni-EB		extra thick 'B'	50/box	FCF400-Au-EB		extra thick 'B'	50/box
FCF400-Cu-EC		extra thick 'C'	50/box	FCF400-Ni-EC		extra thick 'C'	50/box	FCF400-Au-EC		extra thick 'C'	50/box

➤ Formvar/Carbon Grider Finder Grids

COPPER NICKEL GOLD

Standard Thickness

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FCF200F1-Cu-25	F1	standard 'A'	25/box	FCF200F1-Ni-25	F1	standard 'A'	25/box	FCF200F1-Au-25	F1	standard 'A'	25/box
FCF200F1-Cu-50		standard 'A'	50/box	FCF200F1-Ni-50		standard 'A'	50/box	FCF200F1-Au-50		standard 'A'	50/box
FCF200F2-Cu-25	F2	standard 'A'	25/box	FCF200F2-Ni-25	F2	standard 'A'	25/box	FCF200F2-Au-25	F2	standard 'A'	25/box
FCF200F2-Cu-50		standard 'A'	50/box	FCF200F2-Ni-50		standard 'A'	50/box	FCF200F2-Au-50		standard 'A'	50/box

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FCF200F1-Cu-SB	F1	standard 'B'	50/box	FCF200F1-Ni-SB	F1	standard 'B'	50/box	FCF200F1-Au-SB	F1	standard 'B'	50/box
FCF200F1-Cu-SC		standard 'C'	50/box	FCF200F1-Ni-SC		standard 'C'	50/box	FCF200F1-Au-SC		standard 'C'	50/box
FCF200F1-Cu-UA		ultra-thin 'A'	50/box	FCF200F1-Ni-UA		ultra-thin 'A'	50/box	FCF200F1-Au-UA		ultra-thin 'A'	50/box
FCF200F1-Cu-UB		ultra-thin 'B'	50/box	FCF200F1-Ni-UB		ultra-thin 'B'	50/box	FCF200F1-Au-UB		ultra-thin 'B'	50/box
FCF200F1-Cu-UC		ultra-thin 'C'	50/box	FCF200F1-Ni-UC		ultra-thin 'C'	50/box	FCF200F1-Au-UC		ultra-thin 'C'	50/box
FCF200F1-Cu-TA		thick 'A'	50/box	FCF200F1-Ni-TA		thick 'A'	50/box	FCF200F1-Au-TA		thick 'A'	50/box
FCF200F1-Cu-TB		thick 'B'	50/box	FCF200F1-Ni-TB		thick 'B'	50/box	FCF200F1-Au-TB		thick 'B'	50/box
FCF200F1-Cu-TC		thick 'C'	50/box	FCF200F1-Ni-TC		thick 'C'	50/box	FCF200F1-Au-TC		thick 'C'	50/box
FCF200F1-Cu-EA		extra thick 'A'	50/box	FCF200F1-Ni-EA		extra thick 'A'	50/box	FCF200F1-Au-EA		extra thick 'A'	50/box
FCF200F1-Cu-EB		extra thick 'B'	50/box	FCF200F1-Ni-EB		extra thick 'B'	50/box	FCF200F1-Au-EB		extra thick 'B'	50/box
FCF200F1-Cu-EC		extra thick 'C'	50/box	FCF200F1-Ni-EC		extra thick 'C'	50/box	FCF200F1-Au-EC		extra thick 'C'	50/box
FCF200F2-Cu-SB	F2	standard 'B'	50/box	FCF200F2-Ni-SB	F2	standard 'B'	50/box	FCF200F2-Au-SB	F2	standard 'B'	50/box
FCF200F2-Cu-SC		standard 'C'	50/box	FCF200F2-Ni-SC		standard 'C'	50/box	FCF200F2-Au-SC		standard 'C'	50/box
FCF200F2-Cu-UA		ultra-thin 'A'	50/box	FCF200F2-Ni-UA		ultra-thin 'A'	50/box	FCF200F2-Au-UA		ultra-thin 'A'	50/box
FCF200F2-Cu-UB		ultra-thin 'B'	50/box	FCF200F2-Ni-UB		ultra-thin 'B'	50/box	FCF200F2-Au-UB		ultra-thin 'B'	50/box
FCF200F2-Cu-UC		ultra-thin 'C'	50/box	FCF200F2-Ni-UC		ultra-thin 'C'	50/box	FCF200F2-Au-UC		ultra-thin 'C'	50/box
FCF200F2-Cu-TA		thick 'A'	50/box	FCF200F2-Ni-TA		thick 'A'	50/box	FCF200F2-Au-TA		thick 'A'	50/box
FCF200F2-Cu-TB		thick 'B'	50/box	FCF200F2-Ni-TB		thick 'B'	50/box	FCF200F2-Au-TB		thick 'B'	50/box
FCF200F2-Cu-TC		thick 'C'	50/box	FCF200F2-Ni-TC		thick 'C'	50/box	FCF200F2-Au-TC		thick 'C'	50/box
FCF200F2-Cu-EA		extra thick 'A'	50/box	FCF200F2-Ni-EA		extra thick 'A'	50/box	FCF200F2-Au-EA		extra thick 'A'	50/box
FCF200F2-Cu-EB		extra thick 'B'	50/box	FCF200F2-Ni-EB		extra thick 'B'	50/box	FCF200F2-Au-EB		extra thick 'B'	50/box
FCF200F2-Cu-EC		extra thick 'C'	50/box	FCF200F2-Ni-EC		extra thick 'C'	50/box	FCF200F2-Au-EC		extra thick 'C'	50/box

SUPPORT FILM ON GRIDS

Guide to Thickness Ranges

Standard Option A: 10nm Formvar and 1nm Carbon

Standard Option B (SB): 10nm Formvar and 3-4nm Carbon

Standard Option C (SC): 10nm Formvar and 20-30nm Carbon

Ultra-Thin Option A (UA): 5-6nm Formvar and 1nm Carbon

Ultra-Thin Option B (UB): 5-6nm Formvar and 3-4nm Carbon

Ultra-Thin Option C (UC): 5-6nm Formvar and 20-30nm Carbon

Thick Option A (TA): 15-20nm Formvar and 1nm Carbon

Thick Option B (TB): 15-20nm Formvar and 3-4nm Carbon

Thick Option C (TC): 15-20nm Formvar and 20-30nm Carbon

Extra Thick Option A (EA): 25-50nm Formvar and 1nm Carbon

Extra Thick Option B (EB): 25-50nm Formvar and 3-4nm Carbon

Extra Thick Option C (EC): 25-50nm Formvar and 20-30nm Carbon

► Formvar/Carbon London Finder Grids

Standard Thickness

Cat. #	Type	Thickness	Qty
FCFLF135-Cu-25	LF135	standard 'A'	25/box
FCFLF135-Cu-50		50/box	
FCFLF200-Cu-25	LF200	standard 'A'	25/box
FCFLF200-Cu-50		50/box	
FCFLF400-Cu-25	LF400	standard 'A'	25/box
FCFLF400-Cu-50		50/box	

Cat. #	Type	Thickness	Qty
FCFLF135-Ni-25	LF135	standard 'A'	25/box
FCFLF135-Ni-50		50/box	
FCFLF200-Ni-25	LF200	standard 'A'	25/box
FCFLF200-Ni-50		50/box	
FCFLF400-Ni-25	LF400	standard 'A'	25/box
FCFLF400-Ni-50		50/box	

Cat. #	Type	Thickness	Qty
FCFLF135-Au-25	LF135	standard 'A'	25/box
FCFLF135-Au-50		50/box	
FCFLF200-Au-25	LF200	standard 'A'	25/box
FCFLF200-Au-50		50/box	
FCFLF400-Au-25	LF400	standard 'A'	25/box
FCFLF400-Au-50		50/box	

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty
FCFLF135-Cu-SB	LF135	standard 'B'	50/box
FCFLF135-Cu-SC		standard 'C'	50/box
FCFLF135-Cu-UA		ultra-thin 'A'	50/box
FCFLF135-Cu-UB		ultra-thin 'B'	50/box
FCFLF135-Cu-UC		ultra-thin 'C'	50/box
FCFLF135-Cu-TA		thick 'A'	50/box
FCFLF135-Cu-TB		thick 'B'	50/box
FCFLF135-Cu-TC		thick 'C'	50/box
FCFLF135-Cu-EA		extra thick 'A'	50/box
FCFLF135-Cu-EB		extra thick 'B'	50/box
FCFLF135-Cu-EC		extra thick 'C'	50/box

Cat. #	Type	Thickness	Qty
FCFLF135-Ni-SB	LF135	standard 'B'	50/box
FCFLF135-Ni-SC		standard 'C'	50/box
FCFLF135-Ni-UA		ultra-thin 'A'	50/box
FCFLF135-Ni-UB		ultra-thin 'B'	50/box
FCFLF135-Ni-UC		ultra-thin 'C'	50/box
FCFLF135-Ni-TA		thick 'A'	50/box
FCFLF135-Ni-TB		thick 'B'	50/box
FCFLF135-Ni-TC		thick 'C'	50/box
FCFLF135-Ni-EA		extra thick 'A'	50/box
FCFLF135-Ni-EB		extra thick 'B'	50/box
FCFLF135-Ni-EC		extra thick 'C'	50/box

Cat. #	Type	Thickness	Qty
FCFLF135-Au-SB	LF135	standard 'B'	50/box
FCFLF135-Au-SC		standard 'C'	50/box
FCFLF135-Au-UA		ultra-thin 'A'	50/box
FCFLF135-Au-UB		ultra-thin 'B'	50/box
FCFLF135-Au-UC		ultra-thin 'C'	50/box
FCFLF135-Au-TA		thick 'A'	50/box
FCFLF135-Au-TB		thick 'B'	50/box
FCFLF135-Au-TC		thick 'C'	50/box
FCFLF135-Au-EA		extra thick 'A'	50/box
FCFLF135-Au-EB		extra thick 'B'	50/box
FCFLF135-Au-EC		extra thick 'C'	50/box

Cat. #	Type	Thickness	Qty
FCFLF200-Cu-SB	LF200	standard 'B'	50/box
FCFLF200-Cu-SC		standard 'C'	50/box
FCFLF200-Cu-UA		ultra-thin 'A'	50/box
FCFLF200-Cu-UB		ultra-thin 'B'	50/box
FCFLF200-Cu-UC		ultra-thin 'C'	50/box
FCFLF200-Cu-TA		thick 'A'	50/box
FCFLF200-Cu-TB		thick 'B'	50/box
FCFLF200-Cu-TC		thick 'C'	50/box
FCFLF200-Cu-EA		extra thick 'A'	50/box
FCFLF200-Cu-EB		extra thick 'B'	50/box
FCFLF200-Cu-EC		extra thick 'C'	50/box

Cat. #	Type	Thickness	Qty
FCFLF200-Ni-SB	LF200	standard 'B'	50/box
FCFLF200-Ni-SC		standard 'C'	50/box
FCFLF200-Ni-UA		ultra-thin 'A'	50/box
FCFLF200-Ni-UB		ultra-thin 'B'	50/box
FCFLF200-Ni-UC		ultra-thin 'C'	50/box
FCFLF200-Ni-TA		thick 'A'	50/box
FCFLF200-Ni-TB		thick 'B'	50/box
FCFLF200-Ni-TC		thick 'C'	50/box
FCFLF200-Ni-EA		extra thick 'A'	50/box
FCFLF200-Ni-EB		extra thick 'B'	50/box
FCFLF200-Ni-EC		extra thick 'C'	50/box

Cat. #	Type	Thickness	Qty
FCFLF400-Cu-SB	LF400	standard 'B'	50/box
FCFLF400-Cu-SC		standard 'C'	50/box
FCFLF400-Cu-UA		ultra-thin 'A'	50/box
FCFLF400-Cu-UB		ultra-thin 'B'	50/box
FCFLF400-Cu-UC		ultra-thin 'C'	50/box
FCFLF400-Cu-TA		thick 'A'	50/box
FCFLF400-Cu-TB		thick 'B'	50/box
FCFLF400-Cu-TC		thick 'C'	50/box
FCFLF400-Cu-EA		extra thick 'A'	50/box
FCFLF400-Cu-EB		extra thick 'B'	50/box
FCFLF400-Cu-EC		extra thick 'C'	50/box

Cat. #	Type	Thickness	Qty
FCFLF400-Ni-SB	LF400	standard 'B'	50/box
FCFLF400-Ni-SC		standard 'C'	50/box
FCFLF400-Ni-UA		ultra-thin 'A'	50/box
FCFLF400-Ni-UB		ultra-thin 'B'	50/box
FCFLF400-Ni-UC		ultra-thin 'C'	50/box
FCFLF400-Ni-TA		thick 'A'	50/box
FCFLF400-Ni-TB		thick 'B'	50/box
FCFLF400-Ni-TC		thick 'C'	50/box
FCFLF400-Ni-EA		extra thick 'A'	50/box
FCFLF400-Ni-EB		extra thick 'B'	50/box
FCFLF400-Ni-EC		extra thick 'C'	50/box

COPPER

NICKEL

GOLD

SUPPORT FILM ON GRIDS

➤ Formvar/Carbon Hexagonal Mesh

COPPER

NICKEL

GOLD

Standard Thickness

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FCF100H-Cu-25	100 MESH	standard 'A'	25/box	FCF100H-Ni-25	100 MESH	standard 'A'	25/box	FCF100H-Au-25	100 MESH	standard 'A'	25/box
FCF100H-Cu-50			50/box	FCF100H-Ni-50			50/box	FCF100H-Au-50			50/box
FCF200H-Cu-25	200 MESH	standard 'A'	25/box	FCF200H-Ni-25	200 MESH	standard 'A'	25/box	FCF200H-Au-25	200 MESH	standard 'A'	25/box
FCF200H-Cu-50			50/box	FCF200H-Ni-50			50/box	FCF200H-Au-50			50/box
FCF300H-Cu-25	300 MESH	standard 'A'	25/box	FCF300H-Ni-25	300 MESH	standard 'A'	25/box	FCF300H-Au-25	300 MESH	standard 'A'	25/box
FCF300H-Cu-50			50/box	FCF300H-Ni-50			50/box	FCF300H-Au-50			50/box
FCF400H-Cu-25	400 MESH	standard 'A'	25/box	FCF400H-Ni-25	400 MESH	standard 'A'	25/box	FCF400H-Au-25	400 MESH	standard 'A'	25/box
FCF400H-Cu-50			50/box	FCF400H-Ni-50			50/box	FCF400H-Au-50			50/box

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FCF100H-Cu-SB	100 MESH	standard 'B'	50/box	FCF100H-Ni-SB	100 MESH	standard 'B'	50/box	FCF100H-Au-SB	100 MESH	standard 'B'	50/box
FCF100H-Cu-SC			standard 'C'	50/box			FCF100H-Ni-SC	standard 'C'			50/box
FCF100H-Cu-UA		ultra-thin 'A'	50/box	FCF100H-Ni-UA		ultra-thin 'A'	50/box	FCF100H-Au-UA		ultra-thin 'A'	50/box
FCF100H-Cu-UB		ultra-thin 'B'	50/box	FCF100H-Ni-UB		ultra-thin 'B'	50/box	FCF100H-Au-UB		ultra-thin 'B'	50/box
FCF100H-Cu-UC		ultra-thin 'C'	50/box	FCF100H-Ni-UC		ultra-thin 'C'	50/box	FCF100H-Au-UC		ultra-thin 'C'	50/box
FCF100H-Cu-TA		thick 'A'	50/box	FCF100H-Ni-TA		thick 'A'	50/box	FCF100H-Au-TA		thick 'A'	50/box
FCF100H-Cu-TB		thick 'B'	50/box	FCF100H-Ni-TB		thick 'B'	50/box	FCF100H-Au-TB		thick 'B'	50/box
FCF100H-Cu-TC		thick 'C'	50/box	FCF100H-Ni-TC		thick 'C'	50/box	FCF100H-Au-TC		thick 'C'	50/box
FCF100H-Cu-EA		extra thick 'A'	50/box	FCF100H-Ni-EA		extra thick 'A'	50/box	FCF100H-Au-EA		extra thick 'A'	50/box
FCF100H-Cu-EB		extra thick 'B'	50/box	FCF100H-Ni-EB		extra thick 'B'	50/box	FCF100H-Au-EB		extra thick 'B'	50/box
FCF100H-Cu-EC	extra thick 'C'	50/box	FCF100H-Ni-EC	extra thick 'C'	50/box	FCF100H-Au-EC	extra thick 'C'	50/box			
FCF200H-Cu-SB	200 MESH	standard 'B'	50/box	FCF200H-Ni-SB	200 MESH	standard 'B'	50/box	FCF200H-Au-SB	200 MESH	standard 'B'	50/box
FCF200H-Cu-SC			standard 'C'	50/box			FCF200H-Ni-SC	standard 'C'			50/box
FCF200H-Cu-UA		ultra-thin 'A'	50/box	FCF200H-Ni-UA		ultra-thin 'A'	50/box	FCF200H-Au-UA		ultra-thin 'A'	50/box
FCF200H-Cu-UB		ultra-thin 'B'	50/box	FCF200H-Ni-UB		ultra-thin 'B'	50/box	FCF200H-Au-UB		ultra-thin 'B'	50/box
FCF200H-Cu-UC		ultra-thin 'C'	50/box	FCF200H-Ni-UC		ultra-thin 'C'	50/box	FCF200H-Au-UC		ultra-thin 'C'	50/box
FCF200H-Cu-TA		thick 'A'	50/box	FCF200H-Ni-TA		thick 'A'	50/box	FCF200H-Au-TA		thick 'A'	50/box
FCF200H-Cu-TB		thick 'B'	50/box	FCF200H-Ni-TB		thick 'B'	50/box	FCF200H-Au-TB		thick 'B'	50/box
FCF200H-Cu-TC		thick 'C'	50/box	FCF200H-Ni-TC		thick 'C'	50/box	FCF200H-Au-TC		thick 'C'	50/box
FCF200H-Cu-EA		extra thick 'A'	50/box	FCF200H-Ni-EA		extra thick 'A'	50/box	FCF200H-Au-EA		extra thick 'A'	50/box
FCF200H-Cu-EB		extra thick 'B'	50/box	FCF200H-Ni-EB		extra thick 'B'	50/box	FCF200H-Au-EB		extra thick 'B'	50/box
FCF200H-Cu-EC	extra thick 'C'	50/box	FCF200H-Ni-EC	extra thick 'C'	50/box	FCF200H-Au-EC	extra thick 'C'	50/box			
FCF300H-Cu-SB	300 MESH	standard 'B'	50/box	FCF300H-Ni-SB	300 MESH	standard 'B'	50/box	FCF300H-Au-SB	300 MESH	standard 'B'	50/box
FCF300H-Cu-SC			standard 'C'	50/box			FCF300H-Ni-SC	standard 'C'			50/box
FCF300H-Cu-UA		ultra-thin 'A'	50/box	FCF300H-Ni-UA		ultra-thin 'A'	50/box	FCF300H-Au-UA		ultra-thin 'A'	50/box
FCF300H-Cu-UB		ultra-thin 'B'	50/box	FCF300H-Ni-UB		ultra-thin 'B'	50/box	FCF300H-Au-UB		ultra-thin 'B'	50/box
FCF300H-Cu-UC		ultra-thin 'C'	50/box	FCF300H-Ni-UC		ultra-thin 'C'	50/box	FCF300H-Au-UC		ultra-thin 'C'	50/box
FCF300H-Cu-TA		thick 'A'	50/box	FCF300H-Ni-TA		thick 'A'	50/box	FCF300H-Au-TA		thick 'A'	50/box
FCF300H-Cu-TB		thick 'B'	50/box	FCF300H-Ni-TB		thick 'B'	50/box	FCF300H-Au-TB		thick 'B'	50/box
FCF300H-Cu-TC		thick 'C'	50/box	FCF300H-Ni-TC		thick 'C'	50/box	FCF300H-Au-TC		thick 'C'	50/box
FCF300H-Cu-EA		extra thick 'A'	50/box	FCF300H-Ni-EA		extra thick 'A'	50/box	FCF300H-Au-EA		extra thick 'A'	50/box
FCF300H-Cu-EB		extra thick 'B'	50/box	FCF300H-Ni-EB		extra thick 'B'	50/box	FCF300H-Au-EB		extra thick 'B'	50/box
FCF300H-Cu-EC	extra thick 'C'	50/box	FCF300H-Ni-EC	extra thick 'C'	50/box	FCF300H-Au-EC	extra thick 'C'	50/box			
FCF400H-Cu-SB	400 MESH	standard 'B'	50/box	FCF400H-Ni-SB	400 MESH	standard 'B'	50/box	FCF400H-Au-SB	400 MESH	standard 'B'	50/box
FCF400H-Cu-SC			standard 'C'	50/box			FCF400H-Ni-SC	standard 'C'			50/box
FCF400H-Cu-UA		ultra-thin 'A'	50/box	FCF400H-Ni-UA		ultra-thin 'A'	50/box	FCF400H-Au-UA		ultra-thin 'A'	50/box
FCF400H-Cu-UB		ultra-thin 'B'	50/box	FCF400H-Ni-UB		ultra-thin 'B'	50/box	FCF400H-Au-UB		ultra-thin 'B'	50/box
FCF400H-Cu-UC		ultra-thin 'C'	50/box	FCF400H-Ni-UC		ultra-thin 'C'	50/box	FCF400H-Au-UC		ultra-thin 'C'	50/box
FCF400H-Cu-TA		thick 'A'	50/box	FCF400H-Ni-TA		thick 'A'	50/box	FCF400H-Au-TA		thick 'A'	50/box
FCF400H-Cu-TB		thick 'B'	50/box	FCF400H-Ni-TB		thick 'B'	50/box	FCF400H-Au-TB		thick 'B'	50/box
FCF400H-Cu-TC		thick 'C'	50/box	FCF400H-Ni-TC		thick 'C'	50/box	FCF400H-Au-TC		thick 'C'	50/box
FCF400H-Cu-EA		extra thick 'A'	50/box	FCF400H-Ni-EA		extra thick 'A'	50/box	FCF400H-Au-EA		extra thick 'A'	50/box
FCF400H-Cu-EB		extra thick 'B'	50/box	FCF400H-Ni-EB		extra thick 'B'	50/box	FCF400H-Au-EB		extra thick 'B'	50/box
FCF400H-Cu-EC	extra thick 'C'	50/box	FCF400H-Ni-EC	extra thick 'C'	50/box	FCF400H-Au-EC	extra thick 'C'	50/box			

SUPPORT FILM ON GRIDS

► Formvar/Carbon Thin Bar Square Mesh

COPPER

NICKEL

GOLD

Standard Thickness

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FCFT200-Cu-25	200 MESH	standard 'A'	25/box	FCFT200-Ni-25	200 MESH	standard 'A'	25/box	FCFT200-Au-25	200 MESH	standard 'A'	25/box
FCFT200-Cu-50		standard 'C'	50/box	FCFT200-Ni-50		standard 'C'	50/box	FCFT200-Au-50		standard 'C'	50/box
FCFT300-Cu-25	300 MESH	standard 'A'	25/box	FCFT300-Ni-25	300 MESH	standard 'A'	25/box	FCFT300-Au-25	300 MESH	standard 'A'	25/box
FCFT300-Cu-50		standard 'C'	50/box	FCFT300-Ni-50		standard 'C'	50/box	FCFT300-Au-50		standard 'C'	50/box
FCFT400-Cu-25	400 MESH	standard 'A'	25/box	FCFT400-Ni-25	400 MESH	standard 'A'	25/box	FCFT400-Au-25	400 MESH	standard 'A'	25/box
FCFT400-Cu-50		standard 'C'	50/box	FCFT400-Ni-50		standard 'C'	50/box	FCFT400-Au-50		standard 'C'	50/box
FCFT1000-Cu-25	1000 MESH	standard 'A'	25/box	FCFT1000-Ni-25	1000 MESH	standard 'A'	25/box	FCFT1000-Au-25	1000 MESH	standard 'A'	25/box
FCFT1000-Cu-50		standard 'C'	50/box	FCFT1000-Ni-50		standard 'C'	50/box	FCFT1000-Au-50		standard 'C'	50/box

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FCFT200-Cu-SB	200 MESH	standard 'B'	50/box	FCFT200-Ni-SB	200 MESH	standard 'B'	50/box	FCFT200-Au-SB	200 MESH	standard 'B'	50/box
FCFT200-Cu-SC		standard 'C'	50/box	FCFT200-Ni-SC		standard 'C'	50/box	FCFT200-Au-SC		standard 'C'	50/box
FCFT200-Cu-UA		ultra-thin 'A'	50/box	FCFT200-Ni-UA		ultra-thin 'A'	50/box	FCFT200-Au-UA		ultra-thin 'A'	50/box
FCFT200-Cu-UB		ultra-thin 'B'	50/box	FCFT200-Ni-UB		ultra-thin 'B'	50/box	FCFT200-Au-UB		ultra-thin 'B'	50/box
FCFT200-Cu-UC		ultra-thin 'C'	50/box	FCFT200-Ni-UC		ultra-thin 'C'	50/box	FCFT200-Au-UC		ultra-thin 'C'	50/box
FCFT200-Cu-TA		thick 'A'	50/box	FCFT200-Ni-TA		thick 'A'	50/box	FCFT200-Au-TA		thick 'A'	50/box
FCFT200-Cu-TB		thick 'B'	50/box	FCFT200-Ni-TB		thick 'B'	50/box	FCFT200-Au-TB		thick 'B'	50/box
FCFT200-Cu-TC		thick 'C'	50/box	FCFT200-Ni-TC		thick 'C'	50/box	FCFT200-Au-TC		thick 'C'	50/box
FCFT200-Cu-EA		extra thick 'A'	50/box	FCFT200-Ni-EA		extra thick 'A'	50/box	FCFT200-Au-EA		extra thick 'A'	50/box
FCFT200-Cu-EB		extra thick 'B'	50/box	FCFT200-Ni-EB		extra thick 'B'	50/box	FCFT200-Au-EB		extra thick 'B'	50/box
FCFT200-Cu-EC	extra thick 'C'	50/box	FCFT200-Ni-EC	extra thick 'C'	50/box	FCFT200-Au-EC	extra thick 'C'	50/box			
FCFT300-Cu-SB	300 MESH	standard 'B'	50/box	FCFT300-Ni-SB	300 MESH	standard 'B'	50/box	FCFT300-Au-SB	300 MESH	standard 'B'	50/box
FCFT300-Cu-SC		standard 'C'	50/box	FCFT300-Ni-SC		standard 'C'	50/box	FCFT300-Au-SC		standard 'C'	50/box
FCFT300-Cu-UA		ultra-thin 'A'	50/box	FCFT300-Ni-UA		ultra-thin 'A'	50/box	FCFT300-Au-UA		ultra-thin 'A'	50/box
FCFT300-Cu-UB		ultra-thin 'B'	50/box	FCFT300-Ni-UB		ultra-thin 'B'	50/box	FCFT300-Au-UB		ultra-thin 'B'	50/box
FCFT300-Cu-UC		ultra-thin 'C'	50/box	FCFT300-Ni-UC		ultra-thin 'C'	50/box	FCFT300-Au-UC		ultra-thin 'C'	50/box
FCFT300-Cu-TA		thick 'A'	50/box	FCFT300-Ni-TA		thick 'A'	50/box	FCFT300-Au-TA		thick 'A'	50/box
FCFT300-Cu-TB		thick 'B'	50/box	FCFT300-Ni-TB		thick 'B'	50/box	FCFT300-Au-TB		thick 'B'	50/box
FCFT300-Cu-TC		thick 'C'	50/box	FCFT300-Ni-TC		thick 'C'	50/box	FCFT300-Au-TC		thick 'C'	50/box
FCFT300-Cu-EA		extra thick 'A'	50/box	FCFT300-Ni-EA		extra thick 'A'	50/box	FCFT300-Au-EA		extra thick 'A'	50/box
FCFT300-Cu-EB		extra thick 'B'	50/box	FCFT300-Ni-EB		extra thick 'B'	50/box	FCFT300-Au-EB		extra thick 'B'	50/box
FCFT300-Cu-EC	extra thick 'C'	50/box	FCFT300-Ni-EC	extra thick 'C'	50/box	FCFT300-Au-EC	extra thick 'C'	50/box			
FCFT400-Cu-SB	400 MESH	standard 'B'	50/box	FCFT400-Ni-SB	400 MESH	standard 'B'	50/box	FCFT400-Au-SB	400 MESH	standard 'B'	50/box
FCFT400-Cu-SC		standard 'C'	50/box	FCFT400-Ni-SC		standard 'C'	50/box	FCFT400-Au-SC		standard 'C'	50/box
FCFT400-Cu-UA		ultra-thin 'A'	50/box	FCFT400-Ni-UA		ultra-thin 'A'	50/box	FCFT400-Au-UA		ultra-thin 'A'	50/box
FCFT400-Cu-UB		ultra-thin 'B'	50/box	FCFT400-Ni-UB		ultra-thin 'B'	50/box	FCFT400-Au-UB		ultra-thin 'B'	50/box
FCFT400-Cu-UC		ultra-thin 'C'	50/box	FCFT400-Ni-UC		ultra-thin 'C'	50/box	FCFT400-Au-UC		ultra-thin 'C'	50/box
FCFT400-Cu-TA		thick 'A'	50/box	FCFT400-Ni-TA		thick 'A'	50/box	FCFT400-Au-TA		thick 'A'	50/box
FCFT400-Cu-TB		thick 'B'	50/box	FCFT400-Ni-TB		thick 'B'	50/box	FCFT400-Au-TB		thick 'B'	50/box
FCFT400-Cu-TC		thick 'C'	50/box	FCFT400-Ni-TC		thick 'C'	50/box	FCFT400-Au-TC		thick 'C'	50/box
FCFT400-Cu-EA		extra thick 'A'	50/box	FCFT400-Ni-EA		extra thick 'A'	50/box	FCFT400-Au-EA		extra thick 'A'	50/box
FCFT400-Cu-EB		extra thick 'B'	50/box	FCFT400-Ni-EB		extra thick 'B'	50/box	FCFT400-Au-EB		extra thick 'B'	50/box
FCFT400-Cu-EC	extra thick 'C'	50/box	FCFT400-Ni-EC	extra thick 'C'	50/box	FCFT400-Au-EC	extra thick 'C'	50/box			
FCFT1000-Cu-SB	1000 MESH	standard 'B'	50/box	FCFT1000-Ni-SB	1000 MESH	standard 'B'	50/box	FCFT1000-Au-SB	1000 MESH	standard 'B'	50/box
FCFT1000-Cu-SC		standard 'C'	50/box	FCFT1000-Ni-SC		standard 'C'	50/box	FCFT1000-Au-SC		standard 'C'	50/box
FCFT1000-Cu-UA		ultra-thin 'A'	50/box	FCFT1000-Ni-UA		ultra-thin 'A'	50/box	FCFT1000-Au-UA		ultra-thin 'A'	50/box
FCFT1000-Cu-UB		ultra-thin 'B'	50/box	FCFT1000-Ni-UB		ultra-thin 'B'	50/box	FCFT1000-Au-UB		ultra-thin 'B'	50/box
FCFT1000-Cu-UC		ultra-thin 'C'	50/box	FCFT1000-Ni-UC		ultra-thin 'C'	50/box	FCFT1000-Au-UC		ultra-thin 'C'	50/box
FCFT1000-Cu-TA		thick 'A'	50/box	FCFT1000-Ni-TA		thick 'A'	50/box	FCFT1000-Au-TA		thick 'A'	50/box
FCFT1000-Cu-TB		thick 'B'	50/box	FCFT1000-Ni-TB		thick 'B'	50/box	FCFT1000-Au-TB		thick 'B'	50/box
FCFT1000-Cu-TC		thick 'C'	50/box	FCFT1000-Ni-TC		thick 'C'	50/box	FCFT1000-Au-TC		thick 'C'	50/box
FCFT1000-Cu-EA		extra thick 'A'	50/box	FCFT1000-Ni-EA		extra thick 'A'	50/box	FCFT1000-Au-EA		extra thick 'A'	50/box
FCFT1000-Cu-EB		extra thick 'B'	50/box	FCFT1000-Ni-EB		extra thick 'B'	50/box	FCFT1000-Au-EB		extra thick 'B'	50/box
FCFT1000-Cu-EC	extra thick 'C'	50/box	FCFT1000-Ni-EC	extra thick 'C'	50/box	FCFT1000-Au-EC	extra thick 'C'	50/box			

SUPPORT FILM ON GRIDS

► Formvar/Carbon Thin Bar Hexagonal Mesh

COPPER

NICKEL

GOLD

Standard Thickness

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FCFTH200-Cu-25	200 MESH	standard 'A'	25/box	FCFTH200-Ni-25	200 MESH	standard 'A'	25/box	FCFTH200-Au-25	200 MESH	standard 'A'	25/box
FCFTH200-Cu-50			50/box	FCFTH200-Ni-50			50/box	FCFTH200-Au-50			50/box
FCFTH300-Cu-25	300 MESH	standard 'A'	25/box	FCFTH300-Ni-25	300 MESH	standard 'A'	25/box	FCFTH300-Au-25	300 MESH	standard 'A'	25/box
FCFTH300-Cu-50			50/box	FCFTH300-Ni-50			50/box	FCFTH300-Au-50			50/box
FCFTH400-Cu-25	400 MESH	standard 'A'	25/box	FCFTH400-Ni-25	400 MESH	standard 'A'	25/box	FCFTH400-Au-25	400 MESH	standard 'A'	25/box
FCFTH400-Cu-50			50/box	FCFTH400-Ni-50			50/box	FCFTH400-Au-50			50/box
FCFTH600-Cu-25	600 MESH	standard 'A'	25/box	FCFTH600-Ni-25	600 MESH	standard 'A'	25/box	FCFTH600-Au-25	600 MESH	standard 'A'	25/box
FCFTH600-Cu-50			50/box	FCFTH600-Ni-50			50/box	FCFTH600-Au-50			50/box

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty			
FCFTH200-Cu-SB	200 MESH	standard 'B'	50/box	FCFTH200-Ni-SB	200 MESH	standard 'B'	50/box	FCFTH200-Au-SB	200 MESH	standard 'B'	50/box			
FCFTH200-Cu-SC		standard 'C'	50/box	FCFTH200-Ni-SC		standard 'C'	50/box	FCFTH200-Au-SC		standard 'C'	50/box			
FCFTH200-Cu-UA		ultra-thin 'A'	50/box	FCFTH200-Ni-UA		ultra-thin 'A'	50/box	FCFTH200-Au-UA		ultra-thin 'A'	50/box			
FCFTH200-Cu-UB		ultra-thin 'B'	50/box	FCFTH200-Ni-UB		ultra-thin 'B'	50/box	FCFTH200-Au-UB		ultra-thin 'B'	50/box			
FCFTH200-Cu-UC		ultra-thin 'C'	50/box	FCFTH200-Ni-UC		ultra-thin 'C'	50/box	FCFTH200-Au-UC		ultra-thin 'C'	50/box			
FCFTH200-Cu-TA		thick 'A'	50/box	FCFTH200-Ni-TA		thick 'A'	50/box	FCFTH200-Au-TA		thick 'A'	50/box			
FCFTH200-Cu-TB		thick 'B'	50/box	FCFTH200-Ni-TB		thick 'B'	50/box	FCFTH200-Au-TB		thick 'B'	50/box			
FCFTH200-Cu-TC		thick 'C'	50/box	FCFTH200-Ni-TC		thick 'C'	50/box	FCFTH200-Au-TC		thick 'C'	50/box			
FCFTH200-Cu-EA		extra thick 'A'	50/box	FCFTH200-Ni-EA		extra thick 'A'	50/box	FCFTH200-Au-EA		extra thick 'A'	50/box			
FCFTH200-Cu-EB		extra thick 'B'	50/box	FCFTH200-Ni-EB		extra thick 'B'	50/box	FCFTH200-Au-EB		extra thick 'B'	50/box			
FCFTH200-Cu-EC		extra thick 'C'	50/box	FCFTH200-Ni-EC		extra thick 'C'	50/box	FCFTH200-Au-EC		extra thick 'C'	50/box			
FCFTH300-Cu-SB		300 MESH	standard 'B'	50/box		FCFTH300-Ni-SB	300 MESH	standard 'B'		50/box	FCFTH300-Au-SB	300 MESH	standard 'B'	50/box
FCFTH300-Cu-SC			standard 'C'	50/box		FCFTH300-Ni-SC		standard 'C'		50/box	FCFTH300-Au-SC		standard 'C'	50/box
FCFTH300-Cu-UA	ultra-thin 'A'		50/box	FCFTH300-Ni-UA	ultra-thin 'A'	50/box		FCFTH300-Au-UA	ultra-thin 'A'	50/box				
FCFTH300-Cu-UB	ultra-thin 'B'		50/box	FCFTH300-Ni-UB	ultra-thin 'B'	50/box		FCFTH300-Au-UB	ultra-thin 'B'	50/box				
FCFTH300-Cu-UC	ultra-thin 'C'		50/box	FCFTH300-Ni-UC	ultra-thin 'C'	50/box		FCFTH300-Au-UC	ultra-thin 'C'	50/box				
FCFTH300-Cu-TA	thick 'A'		50/box	FCFTH300-Ni-TA	thick 'A'	50/box		FCFTH300-Au-TA	thick 'A'	50/box				
FCFTH300-Cu-TB	thick 'B'		50/box	FCFTH300-Ni-TB	thick 'B'	50/box		FCFTH300-Au-TB	thick 'B'	50/box				
FCFTH300-Cu-TC	thick 'C'		50/box	FCFTH300-Ni-TC	thick 'C'	50/box		FCFTH300-Au-TC	thick 'C'	50/box				
FCFTH300-Cu-EA	extra thick 'A'		50/box	FCFTH300-Ni-EA	extra thick 'A'	50/box		FCFTH300-Au-EA	extra thick 'A'	50/box				
FCFTH300-Cu-EB	extra thick 'B'		50/box	FCFTH300-Ni-EB	extra thick 'B'	50/box		FCFTH300-Au-EB	extra thick 'B'	50/box				
FCFTH300-Cu-EC	extra thick 'C'		50/box	FCFTH300-Ni-EC	extra thick 'C'	50/box		FCFTH300-Au-EC	extra thick 'C'	50/box				
FCFTH400-Cu-SB	400 MESH		standard 'B'	50/box	FCFTH400-Ni-SB	400 MESH		standard 'B'	50/box	FCFTH400-Au-SB	400 MESH		standard 'B'	50/box
FCFTH400-Cu-SC			standard 'C'	50/box	FCFTH400-Ni-SC			standard 'C'	50/box	FCFTH400-Au-SC			standard 'C'	50/box
FCFTH400-Cu-UA		ultra-thin 'A'	50/box	FCFTH400-Ni-UA	ultra-thin 'A'		50/box	FCFTH400-Au-UA	ultra-thin 'A'	50/box				
FCFTH400-Cu-UB		ultra-thin 'B'	50/box	FCFTH400-Ni-UB	ultra-thin 'B'		50/box	FCFTH400-Au-UB	ultra-thin 'B'	50/box				
FCFTH400-Cu-UC		ultra-thin 'C'	50/box	FCFTH400-Ni-UC	ultra-thin 'C'		50/box	FCFTH400-Au-UC	ultra-thin 'C'	50/box				
FCFTH400-Cu-TA		thick 'A'	50/box	FCFTH400-Ni-TA	thick 'A'		50/box	FCFTH400-Au-TA	thick 'A'	50/box				
FCFTH400-Cu-TB		thick 'B'	50/box	FCFTH400-Ni-TB	thick 'B'		50/box	FCFTH400-Au-TB	thick 'B'	50/box				
FCFTH400-Cu-TC		thick 'C'	50/box	FCFTH400-Ni-TC	thick 'C'		50/box	FCFTH400-Au-TC	thick 'C'	50/box				
FCFTH400-Cu-EA		extra thick 'A'	50/box	FCFTH400-Ni-EA	extra thick 'A'		50/box	FCFTH400-Au-EA	extra thick 'A'	50/box				
FCFTH400-Cu-EB		extra thick 'B'	50/box	FCFTH400-Ni-EB	extra thick 'B'		50/box	FCFTH400-Au-EB	extra thick 'B'	50/box				
FCFTH400-Cu-EC		extra thick 'C'	50/box	FCFTH400-Ni-EC	extra thick 'C'		50/box	FCFTH400-Au-EC	extra thick 'C'	50/box				
FCFTH600-Cu-SB		600 MESH	standard 'B'	50/box	FCFTH600-Ni-SB		600 MESH	standard 'B'	50/box	FCFTH600-Au-SB		600 MESH	standard 'B'	50/box
FCFTH600-Cu-SC			standard 'C'	50/box	FCFTH600-Ni-SC			standard 'C'	50/box	FCFTH600-Au-SC			standard 'C'	50/box
FCFTH600-Cu-UA	ultra-thin 'A'		50/box	FCFTH600-Ni-UA	ultra-thin 'A'	50/box		FCFTH600-Au-UA	ultra-thin 'A'	50/box				
FCFTH600-Cu-UB	ultra-thin 'B'		50/box	FCFTH600-Ni-UB	ultra-thin 'B'	50/box		FCFTH600-Au-UB	ultra-thin 'B'	50/box				
FCFTH600-Cu-UC	ultra-thin 'C'		50/box	FCFTH600-Ni-UC	ultra-thin 'C'	50/box		FCFTH600-Au-UC	ultra-thin 'C'	50/box				
FCFTH600-Cu-TA	thick 'A'		50/box	FCFTH600-Ni-TA	thick 'A'	50/box		FCFTH600-Au-TA	thick 'A'	50/box				
FCFTH600-Cu-TB	thick 'B'		50/box	FCFTH600-Ni-TB	thick 'B'	50/box		FCFTH600-Au-TB	thick 'B'	50/box				
FCFTH600-Cu-TC	thick 'C'		50/box	FCFTH600-Ni-TC	thick 'C'	50/box		FCFTH600-Au-TC	thick 'C'	50/box				
FCFTH600-Cu-EA	extra thick 'A'		50/box	FCFTH600-Ni-EA	extra thick 'A'	50/box		FCFTH600-Au-EA	extra thick 'A'	50/box				
FCFTH600-Cu-EB	extra thick 'B'		50/box	FCFTH600-Ni-EB	extra thick 'B'	50/box		FCFTH600-Au-EB	extra thick 'B'	50/box				
FCFTH600-Cu-EC	extra thick 'C'		50/box	FCFTH600-Ni-EC	extra thick 'C'	50/box		FCFTH600-Au-EC	extra thick 'C'	50/box				

SUPPORT FILM ON GRIDS

► Formvar/Carbon Slots

Standard Thickness

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FCF205-Cu-25	2 x 0.5mm	standard 'A'	25/box	FCF205-Ni-25	2 x 0.5mm	standard 'A'	25/box	FCF205-Au-25	2 x 0.5mm	standard 'A'	25/box
FCF205-Cu-50			50/box	FCF205-Ni-50			50/box	FCF205-Au-50			50/box
FCF2010-Cu-25	2 x 1mm	standard 'A'	25/box	FCF2010-Ni-25	2 x 1mm	standard 'A'	25/box	FCF2010-Au-25	2 x 1mm	standard 'A'	25/box
FCF2010-Cu-50			50/box	FCF2010-Ni-50			50/box	FCF2010-Au-50			50/box

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FCF205-Cu-SB	2 x 0.5mm	standard 'B'	50/box	FCF205-Ni-SB	2 x 0.5mm	standard 'B'	50/box	FCF205-Au-SB	2 x 0.5mm	standard 'B'	50/box
FCF205-Cu-SC		standard 'C'	50/box	FCF205-Ni-SC		standard 'C'	50/box	FCF205-Au-SC		standard 'C'	50/box
FCF205-Cu-UA		ultra-thin 'A'	50/box	FCF205-Ni-UA		ultra-thin 'A'	50/box	FCF205-Au-UA		ultra-thin 'A'	50/box
FCF205-Cu-UB		ultra-thin 'B'	50/box	FCF205-Ni-UB		ultra-thin 'B'	50/box	FCF205-Au-UB		ultra-thin 'B'	50/box
FCF205-Cu-UC		ultra-thin 'C'	50/box	FCF205-Ni-UC		ultra-thin 'C'	50/box	FCF205-Au-UC		ultra-thin 'C'	50/box
FCF205-Cu-TA		thick 'A'	50/box	FCF205-Ni-TA		thick 'A'	50/box	FCF205-Au-TA		thick 'A'	50/box
FCF205-Cu-TB		thick 'B'	50/box	FCF205-Ni-TB		thick 'B'	50/box	FCF205-Au-TB		thick 'B'	50/box
FCF205-Cu-TC		thick 'C'	50/box	FCF205-Ni-TC		thick 'C'	50/box	FCF205-Au-TC		thick 'C'	50/box
FCF205-Cu-EA		extra thick 'A'	50/box	FCF205-Ni-EA		extra thick 'A'	50/box	FCF205-Au-EA		extra thick 'A'	50/box
FCF205-Cu-EB	extra thick 'B'	50/box	FCF205-Ni-EB	extra thick 'B'	50/box	FCF205-Au-EB	extra thick 'B'	50/box			
FCF205-Cu-EC	extra thick 'C'	50/box	FCF205-Ni-EC	extra thick 'C'	50/box	FCF205-Au-EC	extra thick 'C'	50/box			
FCF2010-Cu-SB	2 x 1mm	standard 'B'	50/box	FCF2010-Ni-SB	2 x 1mm	standard 'B'	50/box	FCF2010-Au-SB	2 x 1mm	standard 'B'	50/box
FCF2010-Cu-SC		standard 'C'	50/box	FCF2010-Ni-SC		standard 'C'	50/box	FCF2010-Au-SC		standard 'C'	50/box
FCF2010-Cu-UA		ultra-thin 'A'	50/box	FCF2010-Ni-UA		ultra-thin 'A'	50/box	FCF2010-Au-UA		ultra-thin 'A'	50/box
FCF2010-Cu-UB		ultra-thin 'B'	50/box	FCF2010-Ni-UB		ultra-thin 'B'	50/box	FCF2010-Au-UB		ultra-thin 'B'	50/box
FCF2010-Cu-UC		ultra-thin 'C'	50/box	FCF2010-Ni-UC		ultra-thin 'C'	50/box	FCF2010-Au-UC		ultra-thin 'C'	50/box
FCF2010-Cu-TA		thick 'A'	50/box	FCF2010-Ni-TA		thick 'A'	50/box	FCF2010-Au-TA		thick 'A'	50/box
FCF2010-Cu-TB		thick 'B'	50/box	FCF2010-Ni-TB		thick 'B'	50/box	FCF2010-Au-TB		thick 'B'	50/box
FCF2010-Cu-TC		thick 'C'	50/box	FCF2010-Ni-TC		thick 'C'	50/box	FCF2010-Au-TC		thick 'C'	50/box
FCF2010-Cu-EA		extra thick 'A'	50/box	FCF2010-Ni-EA		extra thick 'A'	50/box	FCF2010-Au-EA		extra thick 'A'	50/box
FCF2010-Cu-EB	extra thick 'B'	50/box	FCF2010-Ni-EB	extra thick 'B'	50/box	FCF2010-Au-EB	extra thick 'B'	50/box			
FCF2010-Cu-EC	extra thick 'C'	50/box	FCF2010-Ni-EC	extra thick 'C'	50/box	FCF2010-Au-EC	extra thick 'C'	50/box			

► Formvar/Carbon Single Hole

Standard Thickness

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FCFGA75-Cu-25	75 micron	standard 'A'	25/box	FCFGA75-Ni-25	75 micron	standard 'A'	25/box
FCFGA75-Cu-50		50/box	FCFGA75-Ni-50	50/box			
FCFGA100-Cu-25	100 micron	standard 'A'	25/box	FCFGA100-Ni-25	100 micron	standard 'A'	25/box
FCFGA100-Cu-50		50/box	FCFGA100-Ni-50	50/box			
FCFGA150-Cu-25	150 micron	standard 'A'	25/box	FCFGA150-Ni-25	150 micron	standard 'A'	25/box
FCFGA150-Cu-50		50/box	FCFGA150-Ni-50	50/box			
FCFGA200-Cu-25	200 micron	standard 'A'	25/box	FCFGA200-Ni-25	200 micron	standard 'A'	25/box
FCFGA200-Cu-50		50/box	FCFGA200-Ni-50	50/box			
FCFGA300-Cu-25	300 micron	standard 'A'	25/box	FCFGA300-Ni-25	300 micron	standard 'A'	25/box
FCFGA300-Cu-50		50/box	FCFGA300-Ni-50	50/box			
FCFGA400-Cu-25	400 micron	standard 'A'	25/box	FCFGA400-Ni-25	400 micron	standard 'A'	25/box
FCFGA400-Cu-50		50/box	FCFGA400-Ni-50	50/box			
FCFGA600-Cu-25	600 micron	standard 'A'	25/box	FCFGA600-Ni-25	600 micron	standard 'A'	25/box
FCFGA600-Cu-50		50/box	FCFGA600-Ni-50	50/box			
FCFGA800-Cu-25	800 micron	standard 'A'	25/box	FCFGA800-Ni-25	800 micron	standard 'A'	25/box
FCFGA800-Cu-50		50/box	FCFGA800-Ni-50	50/box			
FCFGA1000-Cu-25	1000 micron	standard 'A'	25/box	FCFGA1000-Ni-25	1000 micron	standard 'A'	25/box
FCFGA1000-Cu-50		50/box	FCFGA1000-Ni-50	50/box			
FCFGA1500-Cu-25	1500 micron	standard 'A'	25/box	FCFGA1500-Ni-25	1500 micron	standard 'A'	25/box
FCFGA1500-Cu-50		50/box	FCFGA1500-Ni-50	50/box			

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FCFGA75-Cu-SB	75 micron	standard 'B'	50/box	FCFGA75-Ni-SB	75 micron	standard 'B'	50/box
FCFGA75-Cu-SC		standard 'C'	50/box	FCFGA75-Ni-SC		standard 'C'	50/box
FCFGA75-Cu-UA		ultra-thin 'A'	50/box	FCFGA75-Ni-UA		ultra-thin 'A'	50/box
FCFGA75-Cu-UB		ultra-thin 'B'	50/box	FCFGA75-Ni-UB		ultra-thin 'B'	50/box
FCFGA75-Cu-UC		ultra-thin 'C'	50/box	FCFGA75-Ni-UC		ultra-thin 'C'	50/box
FCFGA75-Cu-TA		thick 'A'	50/box	FCFGA75-Ni-TA		thick 'A'	50/box
FCFGA75-Cu-TB		thick 'B'	50/box	FCFGA75-Ni-TB		thick 'B'	50/box
FCFGA75-Cu-TC		thick 'C'	50/box	FCFGA75-Ni-TC		thick 'C'	50/box
FCFGA75-Cu-EA		extra thick 'A'	50/box	FCFGA75-Ni-EA		extra thick 'A'	50/box
FCFGA75-Cu-EB	extra thick 'B'	50/box	FCFGA75-Ni-EB	extra thick 'B'	50/box		
FCFGA75-Cu-EC	extra thick 'C'	50/box	FCFGA75-Ni-EC	extra thick 'C'	50/box		

SUPPORT FILM ON GRIDS

► Formvar/Carbon Single Hole (continued)

NEW Thickness Ranges (continued)

				COPPER		NICKEL			
Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty		
FCFGA100-Cu-SB	100 micron	standard 'B'	50/box	FCFGA100-Ni-SB	100 micron	standard 'B'	50/box		
FCFGA100-Cu-SC		standard 'C'	50/box	FCFGA100-Ni-SC		standard 'C'	50/box		
FCFGA100-Cu-UA		ultra-thin 'A'	50/box	FCFGA100-Ni-UA		ultra-thin 'A'	50/box		
FCFGA100-Cu-UB		ultra-thin 'B'	50/box	FCFGA100-Ni-UB		ultra-thin 'B'	50/box		
FCFGA100-Cu-UC		ultra-thin 'C'	50/box	FCFGA100-Ni-UC		ultra-thin 'C'	50/box		
FCFGA100-Cu-TA		thick 'A'	50/box	FCFGA100-Ni-TA		thick 'A'	50/box		
FCFGA100-Cu-TB		thick 'B'	50/box	FCFGA100-Ni-TB		thick 'B'	50/box		
FCFGA100-Cu-TC		thick 'C'	50/box	FCFGA100-Ni-TC		thick 'C'	50/box		
FCFGA100-Cu-EA		extra thick 'A'	50/box	FCFGA100-Ni-EA		extra thick 'A'	50/box		
FCFGA100-Cu-EB		extra thick 'B'	50/box	FCFGA100-Ni-EB		extra thick 'B'	50/box		
FCFGA100-Cu-EC		extra thick 'C'	50/box	FCFGA100-Ni-EC		extra thick 'C'	50/box		
FCFGA150-Cu-SB		150 micron	standard 'B'	50/box		FCFGA150-Ni-SB	150 micron	standard 'B'	50/box
FCFGA150-Cu-SC			standard 'C'	50/box		FCFGA150-Ni-SC		standard 'C'	50/box
FCFGA150-Cu-UA	ultra-thin 'A'		50/box	FCFGA150-Ni-UA	ultra-thin 'A'	50/box			
FCFGA150-Cu-UB	ultra-thin 'B'		50/box	FCFGA150-Ni-UB	ultra-thin 'B'	50/box			
FCFGA150-Cu-UC	ultra-thin 'C'		50/box	FCFGA150-Ni-UC	ultra-thin 'C'	50/box			
FCFGA150-Cu-TA	thick 'A'		50/box	FCFGA150-Ni-TA	thick 'A'	50/box			
FCFGA150-Cu-TB	thick 'B'		50/box	FCFGA150-Ni-TB	thick 'B'	50/box			
FCFGA150-Cu-TC	thick 'C'		50/box	FCFGA150-Ni-TC	thick 'C'	50/box			
FCFGA150-Cu-EA	extra thick 'A'		50/box	FCFGA150-Ni-EA	extra thick 'A'	50/box			
FCFGA150-Cu-EB	extra thick 'B'		50/box	FCFGA150-Ni-EB	extra thick 'B'	50/box			
FCFGA150-Cu-EC	extra thick 'C'		50/box	FCFGA150-Ni-EC	extra thick 'C'	50/box			
FCFGA200-Cu-SB	200 micron		standard 'B'	50/box	FCFGA200-Ni-SB	200 micron		standard 'B'	50/box
FCFGA200-Cu-SC			standard 'C'	50/box	FCFGA200-Ni-SC			standard 'C'	50/box
FCFGA200-Cu-UA		ultra-thin 'A'	50/box	FCFGA200-Ni-UA	ultra-thin 'A'		50/box		
FCFGA200-Cu-UB		ultra-thin 'B'	50/box	FCFGA200-Ni-UB	ultra-thin 'B'		50/box		
FCFGA200-Cu-UC		ultra-thin 'C'	50/box	FCFGA200-Ni-UC	ultra-thin 'C'		50/box		
FCFGA200-Cu-TA		thick 'A'	50/box	FCFGA200-Ni-TA	thick 'A'		50/box		
FCFGA200-Cu-TB		thick 'B'	50/box	FCFGA200-Ni-TB	thick 'B'		50/box		
FCFGA200-Cu-TC		thick 'C'	50/box	FCFGA200-Ni-TC	thick 'C'		50/box		
FCFGA200-Cu-EA		extra thick 'A'	50/box	FCFGA200-Ni-EA	extra thick 'A'		50/box		
FCFGA200-Cu-EB		extra thick 'B'	50/box	FCFGA200-Ni-EB	extra thick 'B'		50/box		
FCFGA200-Cu-EC		extra thick 'C'	50/box	FCFGA200-Ni-EC	extra thick 'C'		50/box		
FCFGA300-Cu-SB		300 micron	standard 'B'	50/box	FCFGA300-Ni-SB		300 micron	standard 'B'	50/box
FCFGA300-Cu-SC			standard 'C'	50/box	FCFGA300-Ni-SC			standard 'C'	50/box
FCFGA300-Cu-UA	ultra-thin 'A'		50/box	FCFGA300-Ni-UA	ultra-thin 'A'	50/box			
FCFGA300-Cu-UB	ultra-thin 'B'		50/box	FCFGA300-Ni-UB	ultra-thin 'B'	50/box			
FCFGA300-Cu-UC	ultra-thin 'C'		50/box	FCFGA300-Ni-UC	ultra-thin 'C'	50/box			
FCFGA300-Cu-TA	thick 'A'		50/box	FCFGA300-Ni-TA	thick 'A'	50/box			
FCFGA300-Cu-TB	thick 'B'		50/box	FCFGA300-Ni-TB	thick 'B'	50/box			
FCFGA300-Cu-TC	thick 'C'		50/box	FCFGA300-Ni-TC	thick 'C'	50/box			
FCFGA300-Cu-EA	extra thick 'A'		50/box	FCFGA300-Ni-EA	extra thick 'A'	50/box			
FCFGA300-Cu-EB	extra thick 'B'		50/box	FCFGA300-Ni-EB	extra thick 'B'	50/box			
FCFGA300-Cu-EC	extra thick 'C'		50/box	FCFGA300-Ni-EC	extra thick 'C'	50/box			
FCFGA400-Cu-SB	400 micron		standard 'B'	50/box	FCFGA400-Ni-SB	400 micron		standard 'B'	50/box
FCFGA400-Cu-SC			standard 'C'	50/box	FCFGA400-Ni-SC			standard 'C'	50/box
FCFGA400-Cu-UA		ultra-thin 'A'	50/box	FCFGA400-Ni-UA	ultra-thin 'A'		50/box		
FCFGA400-Cu-UB		ultra-thin 'B'	50/box	FCFGA400-Ni-UB	ultra-thin 'B'		50/box		
FCFGA400-Cu-UC		ultra-thin 'C'	50/box	FCFGA400-Ni-UC	ultra-thin 'C'		50/box		
FCFGA400-Cu-TA		thick 'A'	50/box	FCFGA400-Ni-TA	thick 'A'		50/box		
FCFGA400-Cu-TB		thick 'B'	50/box	FCFGA400-Ni-TB	thick 'B'		50/box		
FCFGA400-Cu-TC		thick 'C'	50/box	FCFGA400-Ni-TC	thick 'C'		50/box		
FCFGA400-Cu-EA		extra thick 'A'	50/box	FCFGA400-Ni-EA	extra thick 'A'		50/box		
FCFGA400-Cu-EB		extra thick 'B'	50/box	FCFGA400-Ni-EB	extra thick 'B'		50/box		
FCFGA400-Cu-EC		extra thick 'C'	50/box	FCFGA400-Ni-EC	extra thick 'C'		50/box		

continues >>>>

SUPPORT FILM ON GRIDS

► Formvar/Carbon Single Hole (continued)

COPPER

NICKEL

NEW Thickness Ranges (continued)

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
FCFGA600-Cu-SB	600 micron	standard 'B'	50/box	FCFGA600-Ni-SB	600 micron	standard 'B'	50/box
FCFGA600-Cu-SC		standard 'C'	50/box	FCFGA600-Ni-SC		standard 'C'	50/box
FCFGA600-Cu-UA		ultra-thin 'A'	50/box	FCFGA600-Ni-UA		ultra-thin 'A'	50/box
FCFGA600-Cu-UB		ultra-thin 'B'	50/box	FCFGA600-Ni-UB		ultra-thin 'B'	50/box
FCFGA600-Cu-UC		ultra-thin 'C'	50/box	FCFGA600-Ni-UC		ultra-thin 'C'	50/box
FCFGA600-Cu-TA		thick 'A'	50/box	FCFGA600-Ni-TA		thick 'A'	50/box
FCFGA600-Cu-TB		thick 'B'	50/box	FCFGA600-Ni-TB		thick 'B'	50/box
FCFGA600-Cu-TC		thick 'C'	50/box	FCFGA600-Ni-TC		thick 'C'	50/box
FCFGA600-Cu-EA		extra thick 'A'	50/box	FCFGA600-Ni-EA		extra thick 'A'	50/box
FCFGA600-Cu-EB		extra thick 'B'	50/box	FCFGA600-Ni-EB		extra thick 'B'	50/box
FCFGA600-Cu-EC		extra thick 'C'	50/box	FCFGA600-Ni-EC		extra thick 'C'	50/box
FCFGA800-Cu-SB		800 micron	standard 'B'	50/box		FCFGA800-Ni-SB	800 micron	standard 'B'	50/box
FCFGA800-Cu-SC	standard 'C'		50/box	FCFGA800-Ni-SC	standard 'C'	50/box	
FCFGA800-Cu-UA	ultra-thin 'A'		50/box	FCFGA800-Ni-UA	ultra-thin 'A'	50/box	
FCFGA800-Cu-UB	ultra-thin 'B'		50/box	FCFGA800-Ni-UB	ultra-thin 'B'	50/box	
FCFGA800-Cu-UC	ultra-thin 'C'		50/box	FCFGA800-Ni-UC	ultra-thin 'C'	50/box	
FCFGA800-Cu-TA	thick 'A'		50/box	FCFGA800-Ni-TA	thick 'A'	50/box	
FCFGA800-Cu-TB	thick 'B'		50/box	FCFGA800-Ni-TB	thick 'B'	50/box	
FCFGA800-Cu-TC	thick 'C'		50/box	FCFGA800-Ni-TC	thick 'C'	50/box	
FCFGA800-Cu-EA	extra thick 'A'		50/box	FCFGA800-Ni-EA	extra thick 'A'	50/box	
FCFGA800-Cu-EB	extra thick 'B'		50/box	FCFGA800-Ni-EB	extra thick 'B'	50/box	
FCFGA800-Cu-EC	extra thick 'C'		50/box	FCFGA800-Ni-EC	extra thick 'C'	50/box	
FCFGA1000-Cu-SB	1000 micron		standard 'B'	50/box	FCFGA1000-Ni-SB	1000 micron		standard 'B'	50/box
FCFGA1000-Cu-SC		standard 'C'	50/box	FCFGA1000-Ni-SC	standard 'C'		50/box
FCFGA1000-Cu-UA		ultra-thin 'A'	50/box	FCFGA1000-Ni-UA	ultra-thin 'A'		50/box
FCFGA1000-Cu-UB		ultra-thin 'B'	50/box	FCFGA1000-Ni-UB	ultra-thin 'B'		50/box
FCFGA1000-Cu-UC		ultra-thin 'C'	50/box	FCFGA1000-Ni-UC	ultra-thin 'C'		50/box
FCFGA1000-Cu-TA		thick 'A'	50/box	FCFGA1000-Ni-TA	thick 'A'		50/box
FCFGA1000-Cu-TB		thick 'B'	50/box	FCFGA1000-Ni-TB	thick 'B'		50/box
FCFGA1000-Cu-TC		thick 'C'	50/box	FCFGA1000-Ni-TC	thick 'C'		50/box
FCFGA1000-Cu-EA		extra thick 'A'	50/box	FCFGA1000-Ni-EA	extra thick 'A'		50/box
FCFGA1000-Cu-EB		extra thick 'B'	50/box	FCFGA1000-Ni-EB	extra thick 'B'		50/box
FCFGA1000-Cu-EC		extra thick 'C'	50/box	FCFGA1000-Ni-EC	extra thick 'C'		50/box
FCFGA1500-Cu-SB		1500 micron	standard 'B'	50/box	FCFGA1500-Ni-SB		1500 micron	standard 'B'	50/box
FCFGA1500-Cu-SC	standard 'C'		50/box	FCFGA1500-Ni-SC	standard 'C'	50/box	
FCFGA1500-Cu-UA	ultra-thin 'A'		50/box	FCFGA1500-Ni-UA	ultra-thin 'A'	50/box	
FCFGA1500-Cu-UB	ultra-thin 'B'		50/box	FCFGA1500-Ni-UB	ultra-thin 'B'	50/box	
FCFGA1500-Cu-UC	ultra-thin 'C'		50/box	FCFGA1500-Ni-UC	ultra-thin 'C'	50/box	
FCFGA1500-Cu-TA	thick 'A'		50/box	FCFGA1500-Ni-TA	thick 'A'	50/box	
FCFGA1500-Cu-TB	thick 'B'		50/box	FCFGA1500-Ni-TB	thick 'B'	50/box	
FCFGA1500-Cu-TC	thick 'C'		50/box	FCFGA1500-Ni-TC	thick 'C'	50/box	
FCFGA1500-Cu-EA	extra thick 'A'		50/box	FCFGA1500-Ni-EA	extra thick 'A'	50/box	
FCFGA1500-Cu-EB	extra thick 'B'		50/box	FCFGA1500-Ni-EB	extra thick 'B'	50/box	
FCFGA1500-Cu-EC	extra thick 'C'		50/box	FCFGA1500-Ni-EC	extra thick 'C'	50/box	

► 4. Formvar/Silicon Monoxide

A formvar film stabilized with a thin film of Silicon Monoxide. Silicon Monoxide produces a desirable support film because it offers low background contrast and it is stable under the electron beam and it is more hydrophilic than carbon film.

Cat. #	Type	Qty	Cat. #	Type	Qty
FSF200-Cu	200 mesh	50/box	FSF200-Ni	200 mesh	50/box
FSF300-Cu	300 mesh	50/box	FSF300-Ni	300 mesh	50/box
FSF400-Cu	400 mesh	50/box	FSF400-Ni	400 mesh	50/box

► 5. Silicon Monoxide Film Only

A thin film of pure Silicon Monoxide (15–30 nm) is deposited directly on top of the grid.

Cat. #	Type	Qty	Cat. #	Type	Qty
SF200-Cu	200 mesh	50/box	SF200-Ni	200 mesh	50/box
SF300-Cu	300 mesh	50/box	SF300-Ni	300 mesh	50/box
SF400-Cu	400 mesh	50/box	SF400-Ni	400 mesh	50/box

SUPPORT FILM ON GRIDS

➤ 6. Lacey Carbon Film

This carbon coated film on a broken pattern consists of woven-mesh-like holes of different sizes and shapes. Average hole sizes are 50, 100 and 150 microns. This type of pattern provides support but does not interfere when observing specimen sections.

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
LC200-Cu	200 MESH	50 micron	5/box	LC200-Ni	200 MESH	50 micron	5/box	LC200-Au	200 MESH	50 micron	5/box
LC200-Cu-25			25/box	LC200-Ni-25			25/box	LC200-Au-25			25/box
LC300-Cu	300 MESH	50 micron	5/box	LC305-Ni	300 MESH	50 micron	5/box	LC300-Au	300 MESH	50 micron	5/box
LC325-Cu			25/box	LC325-Ni			25/box	LC325-Au			25/box
LC400-Cu	400 MESH	50 micron	5/box	LC400-Ni	400 MESH	50 micron	5/box	LC400-Au	400 MESH	50 micron	5/box
LC400-Cu-25			25/box	LC400-Ni-25			25/box	LC400-Au-25			25/box

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
LC200-Cu-100	200 MESH	100 micron	25/box	LC200-Ni-100	200 MESH	100 micron	25/box	LC200-Au-100	200 MESH	100 micron	25/box
LC200-Cu-150		150 micron	25/box	LC200-Ni-150		150 micron	25/box	LC200-Au-150		150 micron	25/box
LC300-Cu-100	300 MESH	100 micron	25/box	LC300-Ni-100	300 MESH	100 micron	25/box	LC300-Au-100	300 MESH	100 micron	25/box
LC300-Cu-150		150 micron	25/box	LC300-Ni-150		150 micron	25/box	LC300-Au-150		150 micron	25/box
LC400-Cu-100	400 MESH	100 micron	25/box	LC400-Ni-100	400 MESH	100 micron	25/box	LC400-Au-100	400 MESH	100 micron	25/box
LC400-Cu-150		150 micron	25/box	LC400-Ni-150		150 micron	25/box	LC400-Au-150		150 micron	25/box

➤ 7. NEW Lacey Formvar with Carbon Film

This formvar and carbon coated film on a broken pattern consists of woven-mesh-like holes of different sizes and shapes. Average hole sizes are 50, 100 and 150 microns. This type of pattern provides support but does not interfere when observing specimen sections.

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
LFC200-Cu-50		50 micron	25/bx	LFC200-Ni-50		50 micron	25/bx	LFC200-Au-50		50 micron	25/bx
LFC200-Cu-100	200 MESH	100 micron	25/bx	LFC200-Ni-100	200 MESH	100 micron	25/bx	LFC200-Au-100	200 MESH	100 micron	25/bx
LFC200-Cu-150		150 micron	25/bx	LFC200-Ni-150		150 micron	25/bx	LFC200-Au-150		150 micron	25/bx
LFC300-Cu-50		50 micron	25/bx	LFC300-Ni-50		50 micron	25/bx	LFC300-Au-50		50 micron	25/bx
LFC300-Cu-100	300 MESH	100 micron	25/bx	LFC300-Ni-100	300 MESH	100 micron	25/bx	LFC300-Au-100	300 MESH	100 micron	25/bx
LFC300-Cu-150		150 micron	25/bx	LFC300-Ni-150		150 micron	25/bx	LFC300-Au-150		150 micron	25/bx
LFC400-Cu-50		50 micron	25/bx	LFC400-Ni-50		50 micron	25/bx	LFC400-Au-50		50 micron	25/bx
LFC400-Cu-100	400 MESH	100 micron	25/bx	LFC400-Ni-100	400 MESH	100 micron	25/bx	LFC400-Au-100	400 MESH	100 micron	25/bx
LFC400-Cu-150		150 micron	25/bx	LFC400-Ni-150		150 micron	25/bx	LFC400-Au-150		150 micron	25/bx

➤ 8. Holey Carbon Film

A thin piece of carbon. The average hole sizes are 50, 100 and 150 microns.

Cat. #	Type	Qty	Cat. #	Type	Qty	Cat. #	Type	Qty
HC200-Cu	200 MESH	25/box	HC200-Ni	200 MESH	25/box	HC200-Au	200 MESH	25/box
HC300-Cu	300 MESH	25/box	HC300-Ni	300 MESH	25/box	HC300-Au	300 MESH	25/box
HC400-Cu	400 MESH	25/box	HC400-Ni	400 MESH	25/box	HC400-Au	400 MESH	25/box

NEW Thickness Ranges

Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty	Cat. #	Type	Thickness	Qty
HC200-Cu-100	200 MESH	100 micron	25/box	HC200-Ni-100	200 MESH	100 micron	25/box	HC200-Au-100	200 MESH	100 micron	25/box
HC200-Cu-150		150 micron	25/box	HC200-Ni-150		150 micron	25/box	HC200-Au-150		150 micron	25/box
HC300-Cu-100	300 MESH	100 micron	25/box	HC300-Ni-100	300 MESH	100 micron	25/box	HC300-Au-100	300 MESH	100 micron	25/box
HC300-Cu-150		150 micron	25/box	HC300-Ni-150		150 micron	25/box	HC300-Au-150		150 micron	25/box
HC400-Cu-100	400 MESH	100 micron	25/box	HC400-Ni-100	400 MESH	100 micron	25/box	HC400-Au-100	400 MESH	100 micron	25/box
HC400-Cu-150		150 micron	25/box	HC400-Ni-150		150 micron	25/box	HC400-Au-150		150 micron	25/box

➤ 9. Beryllium Support Films

A deposition of 250 Angstroms thick Beryllium onto the 0.005" thick, 25x25mm squares of a Cu substrate. The Be can be removed by dissolving the substrate in nitric acid (50:50). The Be film will then be removed from the acid, washed in distilled water and mounted on TEM grids. A Be support film will reduce background interference to a minimum and it is particularly useful where analyses for C or Si are required, so that these alternative supports cannot be used. Another advantage of the Be support is its very fine grain size which produces a very sharp ring pattern for in-situ calibration.

Cat #	Description	Qty
76030	Beryllium Support Film, 25x25mm	each

➤ C-flat™ Holey Carbon Grids for Cryo-TEM

The premier holey carbon grid for cryo-transmission electron microscopy

Overview

C-flat™ is an ultra-flat, holey carbon-coated TEM support grid for transmission electron microscopy (TEM). Unlike competing holey carbon films, C-flat™ is manufactured without plastics, so it is clean upon arrival and the user has no residue to contend with.

The C-flat™ Advantage

C-flat™ leads to better data sets.

Made with patent pending technology, C-flat™ provides an ultra-flat surface that results in better particle dispersion and more uniform ice thickness. Patterning is done using deep-UV projection lithography, ensuring the most accurate and consistent hole shapes and sizes down to submicron features. The precise methods by which C-flat™ is manufactured eliminate artifacts such as excess carbon and edges around holes.

C-flat™ is affordable

C-flat™ is available in 25, 50, and 100 packs at a per-grid price less than competing products.

Applications

C-flat™ holey carbon grids provide the ideal specimen support to achieve high resolution data in cryo-TEM making them an ideal choice for single particle analysis, cryo electron tomography and automated TEM analysis.

Cryo-electron tomography (cryoET) and Single Particle Analysis (SPA):

Numerous researchers have reported that the ultra-flat surface of C-flat™ leads to even ice thickness and uniform particle distribution within the hole areas. This optimal particle distribution results in superior data being collected as compared with other holey support films. 2µm hole sizes are standard but custom hole sizes are available so C-flat™ can accommodate the common magnifications used for quantitative TEM analysis.

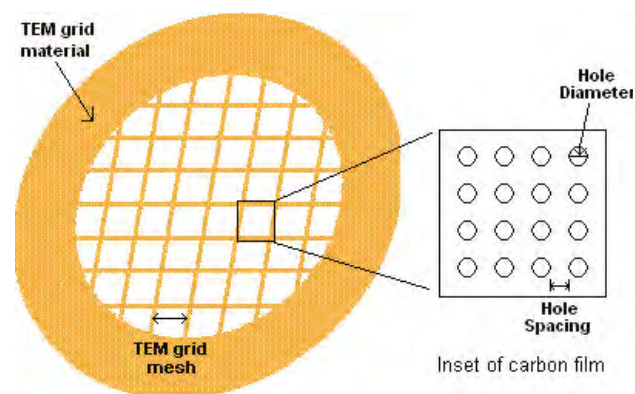
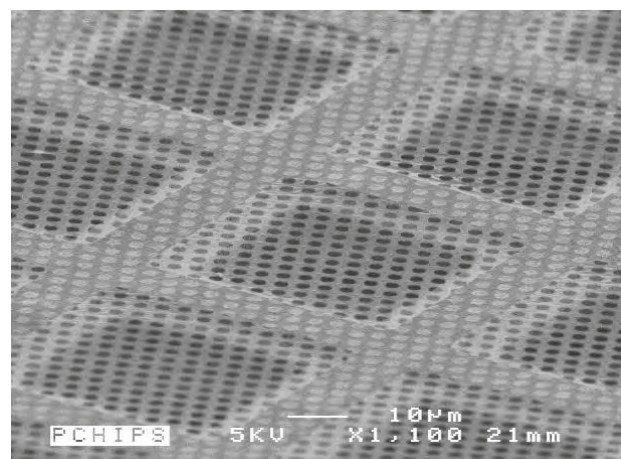
Automated TEM:

C-flat™ provides a regular array of analysis sites compatible with automated data collection software such as Legikon. This compatibility, in combination with the more uniform ice thickness and particle distribution reported by numerous researchers, results in more high-quality target sites per grid.

Publications using C-flat™:

Does contamination buildup limit throughput for automated cryoEM? , Journal of Structural Biology, Volume 154, Issue 3, June 2006, Pages 303-311 Anchi Cheng, Denis Fellmann, James Pulokas, Clinton S. Potter and Bridget Carragher

Automated cryoEM data acquisition and analysis of 284 742 particles of GroEL , Journal of Structural Biology, In Press, Uncorrected Proof, Available online 22 May 2006, Scott M. Stagg, Gabriel C. Lander, James Pulokas, Denis Fellmann, Anchi Cheng, Joel D. Quispe, Satya P. Mallick, Radomir M. Avila, Bridget Carragher and Clinton S. Potter



Product Line

C-flat™ is a holey carbon film supported by a standard TEM grid. C-flat™ products are fully specified by 4 parameters: the hole diameter and pitch of the holey carbon film and the material type and mesh size of the TEM grid. The following image illustrates these parameters:

Standard Products

The breadth of applications in cryoTEM necessitate a wide range of holey carbon film patterns. And now, with the recent expansion of the product line, a C-flat™ holey carbon film is available for almost any application. Whether 600nm holes are needed for very high magnifications with ultra-high resolution cameras or large open areas are needed for larger specimens, C-flat™ is the perfect holey carbon grid.

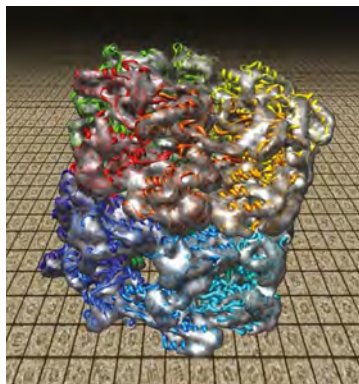
C-flat™ is immediately available in several standard array patterns including hole diameters/hole spacings of 0.6/2, 1/1, 1/2, 1/4, 1.2/1.3, 2/1, 2/2, 2/4, 4/2, and a multihole pattern. C-flat™ is supported by your choice of a 200 mesh or 400 mesh copper TEM grid and sold in quantities of 25, 50, or 100.

Thick Products

C-Flat™ is available in a thick option that doubles the carbon thickness from approximately 20nm to 40nm. Thick C-flat product numbers end in -T, catalog numbers contain "CFT". Available in quantities of 50 and 100 per pack.



Frozen-Hydrated Bacteriophage Capsid (data acquired on CF-1.2/1.3-4C)



250,000 particles of GroEL in 24 hours. Image Courtesy of Scott Stagg and Mike Pique NRAMM, The Scripps Research Institute (data acquired on CF-2/2-4C)

Articles

An improved holey carbon film for cryo-electron microscopy. Quispe J, Damiano J, Mick SE, Nackashi DP, Fellmann D, Ajero TG, Carragher B, Potter CS, (2007). *Microscopy and microanalysis*, 13(5), 365-371.

Improving the technique of vitreous cryo-sectioning for cryo-electron tomography: electrostatic charging for section attachment and implementation of an anti-contamination glove box.

Pierson J, Fernández JJ, Bos E, Amini S, Gnaegi H, Vos M, Bel B, Adolfsen F, Carrascosa JL, Peters PJ., *J Struct Biol.* 2010 Feb;169(2): 219-25. Epub 2009 Oct 12.

Cryo Preparation Using C-flat™

Product Overview

C-flat™ is a holey carbon support film, manufactured using a patent pending semiconductor-based technology without plastics, resists or other soft materials. As a result, the carbon films are flat, uniform and free of residues or plastics. C-flat™ is designed to be an "out of the box" solution, and should require minimal sample preparation. Extensive plasma cleaning is not needed, and could potentially thin the carbon, making it too fragile for blotting or freezing.

Plasma Preparation

If you are using C-flat™ for the first time, it is recommended that no plasma preparation be used initially. As with any carbon film, plasma preparation is sometimes necessary to make the surface more hydrophilic. If your initial results dictate making the films more hydrophilic, below are some guidelines for preparation using several common systems.

Fischione Model 1020

- 25% Oxygen/75% Argon
- Use 5 grid holder and dampening shield
- Plasma clean grids for 10-30 seconds

Note: It is recommended that the dampening shield be used when cleaning C-flat™ using the Fischione Model 1020 plasma cleaner. The shield will dampen the effect of the plasma, reducing the erosion rate of the carbon while allowing the film to become more hydrophilic.

Gatan Solarus™

- 25% Oxygen/75% Argon
- Place grids on a support (e.g. glass slide)
- Set slide in the bottom of the chamber
- Set RF power to 25 watts
- Plasma clean grids for 10-20 seconds

Glow Discharge

These systems vary widely depending on the manufacturer. Typically, keep the glow from the plasma dim and the clean time approximately 10-30 seconds.

Plunge Freezing

Recommended settings for plunge freezing with the Vitrobot™

- **Temperature:** 4°C
- **Humidity:** 100% (can vary between 90–100%)
- **Blot Time:** 3-5 seconds
- **Volume on Grid:** 3µL (can vary)
- **Drain Time:** 0 seconds
- **Offset:** 0 for regular samples, -1 for viscous

When using the Vitrobot™, it is recommended that the filter paper be changed regularly (generally after freezing 4-5 grids or 10 minutes, whichever comes first.) The filter paper can become saturated in the high humidity environment of the chamber.

Working with Viscous Samples

Generally, lowering the volume of solution on the grid can help to eliminate the need for multiple blots, which can damage the carbon film. As little as 1µL of solution can cover a 3mm grid area if the pipette tip is used to spread the drop, but reducing the volume to 1.5 or 2.0µL will help as well. Once the sample is on the grid, it should be blotted within a few minutes before further evaporation occurs. If a Vitrobot™ is used, changing the offset from 0mm to -1 or -2mm can also help.

Hydrophilicity/Hydrophobicity

Increasing the hydrophilicity of the carbon film will help a droplet spread evenly over the carbon, rather than pool on the surface. The most common method for achieving this is by plasma or glow discharge; recommended settings for various equipment are given. Keep in mind that C-flat™ is manufactured without any plastics or soft materials in the process, therefore plasma or glow discharge steps are only needed to make the surface more hydrophilic, not to clean. For this reason, a lower power and time is generally used.

Adding Carbon to C-flat™

Many C-flat™ parts are now offered in both the standard as well as a thicker carbon film, designed to give each lab the option to choose not only the most appropriate hole geometry and size, but also the ideal carbon thickness for their application. In addition, carbon can be added to C-flat™ either to thicken the existing hole pattern, or as a thin continuous overlay across the hole pattern. Overlays are often used when particles have a strong affinity towards the carbon material.

Keeping the Carbon Intact

C-flat™ is designed to be an "out of the box" solution. Extensive sample preparation steps are generally not required, and often carbon that is torn or broken is a sign of plasma cleaning that is too long and/or at too high a power setting. Please refer to the suggestions on plasma cleaner settings, as well as on working with viscous samples.



▶ Plunging Tweezers for the CP3 (Cryoplunge™)

Custom tweezers specifically made to fit the Gatan Cryoplunge™ an instrument used in the preparation of frozen hydrated specimens for cryoEM.

CP3690 Plunging Tweezers each



Cryo Preparation using C-flat™ (continued)

Publications using C-flat™:

Near-atomic resolution using electron cryomicroscopy and single-particle reconstruction. Proceedings of the National Academy of Sciences, Volume 105, Number 6, pp. 1867-1872, 2008. X. Zhang, E. Settembre, C. Xu, P. R. Dormitzer, R. Bellamy, S. C. Harrison, and N. Grigorieff

Preparation of macromolecular complexes for cryo-electron microscopy. Nature Protocols, Volume 2, pp. 3239 - 3246, 2007. R. A. Grassucci, D. J. Taylor, and J. Frank

Segrosome structure revealed by a complex of ParR with centromere DNA. Nature, Volume 450, pp. 1268-1271, 2007. M. A. Schumacher, T. C. Glover, A. J. Brzoska, S. O. Jensen, T. D. Dunham, R. A. Skurray and N. Firth

Automation of random canonical tilt and orthogonal tilt data collection using feature-based correlation. Journal of Structural Biology, Volume 159, Issue 3, pp. 335-346, September 2007. C. Yoshioka, J. Pulokas, D. Fellmann, C. S. Potter, R. A. Milligan and B. Carragher

Automated cryoEM data acquisition and analysis of 284 742 particles of GroEL. Journal of Structural Biology, Volume 155, Issue 3, pp. 470-481, September 2006. S. M. Stagg, G. C. Lander, J. Pulokas, D. S. Fellmann, A. Cheng, J. D. Quispe, S. P. Mallick, R. M. Avila, B. Carragher and C. S. Potter

Does contamination buildup limit throughput for automated cryoEM? Journal of Structural Biology, Volume 154, Issue 3, pp. 303-311, June 2006. A. Cheng, D. Fellmann, J. Pulokas, C. S. Potter and B. Carragher

C-flat™ is a trademark of Protochips, Inc. All rights reserved

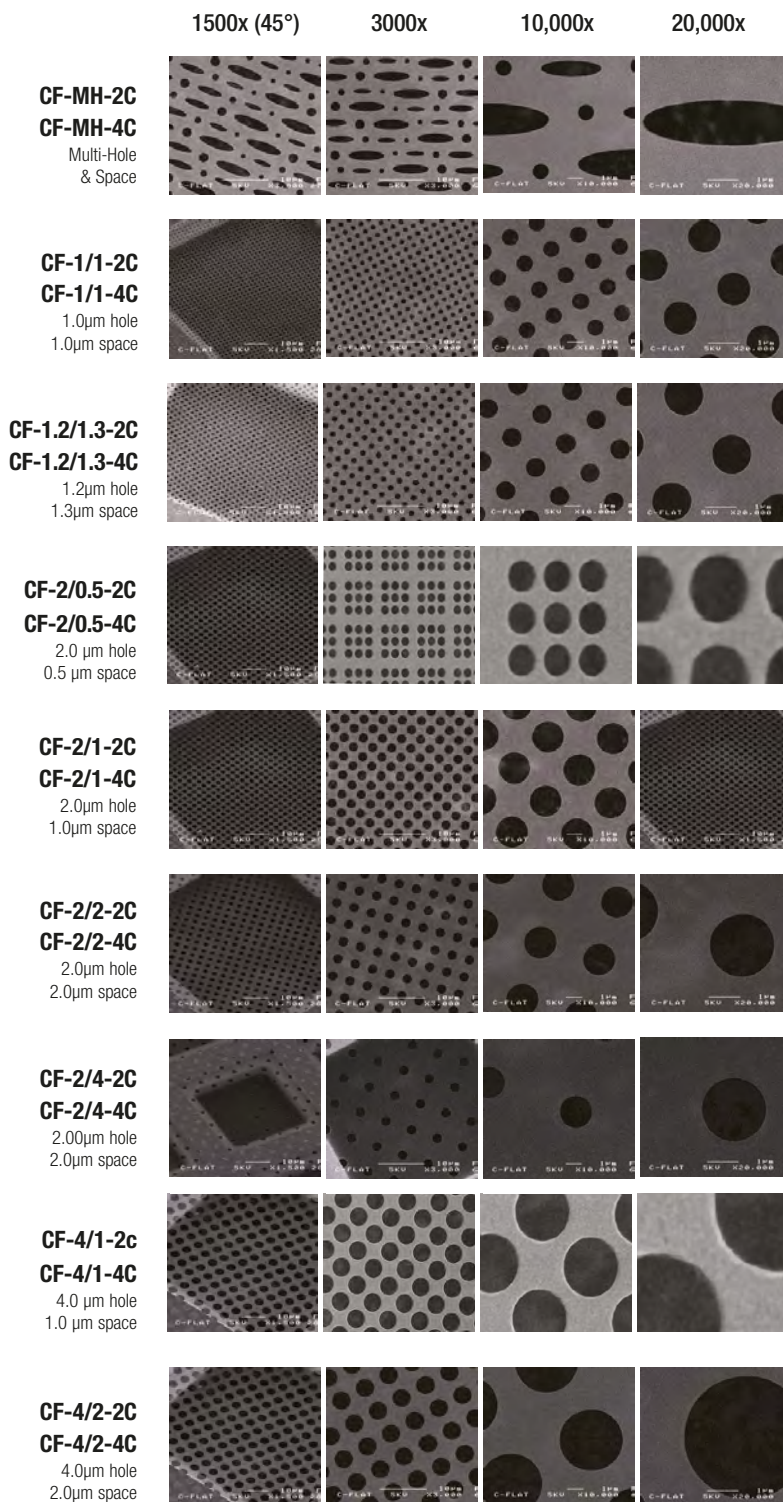
C-flat™ Customization

We realize that each customer has unique needs since specimens vary greatly in composition and size. To meet the diverse and demanding needs of the cryoTEM community, C-flat™ can be customized to meet a user's specific requirements. For example, C-flat™ can be manufactured on other grid types such as Gold grids, 100x400 mesh grids, or London Finder grids. The size, shape and spacing of the holes perforating the carbon film can also be customized. For examples, those using electron tomography techniques might desire a larger hole size to allow for increased tilt angles; those using very high magnifications might find a smaller hole size desirable; 2D crystallographers might prefer a sparse hole pattern to take advantage of the clean and ultra flat surface of C-flat™; and based upon the specimen preparation and imaging protocols, grid metals other than copper might be required.

C-flat™ can be customized to meet all of these needs.

Please contact EMS with any custom C-flat™ requests. We will be glad to provide you with a quote for specialized C-flat™ grids. Requests for customized parts can be made directly to EMS via e-mail to sgkcck@aol.com

► C-flat™ Holey Carbon Grids for cryo-TEM (continued)



C-flat™ mounted on a stub using carbon tape and imaged with a Field Emission Scanning Electron Microscope

► C-flat™ Holey Carbon Grids for cryo-TEM (continued)

Ordering Information:

 C-Flat™ is now available in the standard version and a new thick version that doubles the carbon thickness from approximately 20nm to 40nm.

Product Code	Cat. # Standard	Cat. # Thick	Hole Size	Hole Spacing	TEM Mesh	TEM Grid	Qty.
CF-1.2/1.3-2C	CF213-25	—	1.2 µm	1.3 µm	200	Cu	25/pk.
	CF213-50	CFT213-50	1.2 µm	1.3 µm	200	Cu	50/pk.
	CF213-100	CFT213-100	1.2 µm	1.3 µm	200	Cu	100/pk.
CF-1.2/1.3-4C	CF413-25	—	1.2 µm	1.3 µm	400	Cu	25/pk.
	CF413-50	CFT413-50	1.2 µm	1.3 µm	400	Cu	50/pk.
	CF413-100	CFT413-100	1.2 µm	1.3 µm	400	Cu	100/pk.
CF-2/0.5-2c	CF205-25	—	2.0 µm	0.5 µm	200	Cu	25/pk
	CF205-50	CFT205-50	2.0 µm	0.5 µm	200	Cu	50/pk
	CF205-100	CFT205-100	2.0 µm	0.5 µm	200	Cu	100/pk
CF-2/0.5-4C	CF405-25	—	2.0 µm	0.5 µm	400	Cu	25/pk
	CF405-50	CFT405-50	2.0 µm	0.5 µm	400	Cu	50/pk
	CF405-100	CFT405-100	2.0 µm	0.5 µm	400	Cu	100/pk
CF-2/1-2C	CF212-25	—	2.0 µm	1.0 µm	200	Cu	25/pk.
	CF212-50	CFT212-50	2.0 µm	1.0 µm	200	Cu	50/pk.
	CF212-100	CFT212-100	2.0 µm	1.0 µm	200	Cu	100/pk.
CF-2/1-4C	CF412-25	—	2.0 µm	1.0 µm	400	Cu	25/pk.
	CF412-50	CFT412-50	2.0 µm	1.0 µm	400	Cu	50/pk.
	CF412-100	CFT412-100	2.0 µm	1.0 µm	400	Cu	100/pk.
CF-2/2-2C	CF-222C-25	—	2.0 µm	2.0 µm	200	Cu	25/pk.
	CF-222C-50	CFT-222C-50	2.0 µm	2.0 µm	200	Cu	50/pk.
	CF-222C-100	CFT-222C-100	2.0 µm	2.0 µm	200	Cu	100/pk.
CF-2/2-4C	CF-224C-25	—	2.0 µm	2.0 µm	400	Cu	25/pk.
	CF-224C-50	CFT-224C-50	2.0 µm	2.0 µm	400	Cu	50/pk.
	CF-224C-100	CFT-224C-100	2.0 µm	2.0 µm	400	Cu	100/pk.
CF-2/4-2C	CF242-25	—	2.0 µm	4.0 µm	200	Cu	25/pk.
	CF242-50	CFT242-50	2.0 µm	4.0 µm	200	Cu	50/pk.
	CF242-100	CFT242-100	2.0 µm	4.0 µm	200	Cu	100/pk.
CF-2/4-4C	CF442-25	—	2.0 µm	4.0 µm	400	Cu	25/pk.
	CF442-50	CFT442-50	2.0 µm	4.0 µm	400	Cu	50/pk.
	CF442-100	CFT442-100	2.0 µm	4.0 µm	400	Cu	100/pk.
CF-4/1-2C	CF241-25	—	4.0 µm	1.0 µm	200	Cu	25/pk
	CF241-50	CFT241-50	4.0 µm	1.0 µm	200	Cu	50/pk
	CF241-100	CFT241-100	4.0 µm	1.0 µm	200	Cu	100/pk
CF-4/1-4C	CF441-25	—	4.0 µm	1.0 µm	400	Cu	25/pk
	CF441-50	CFT441-50	4.0 µm	1.0 µm	400	Cu	50/pk
	CF441-100	CFT441-100	4.0 µm	1.0 µm	400	Cu	100/pk
CF-4/2-2C	CF422-25	—	4.0 µm	2.0 µm	200	Cu	25/pk.
	CF422-50	CFT422-50	4.0 µm	2.0 µm	200	Cu	50/pk.
	CF422-100	CFT422-100	4.0 µm	2.0 µm	200	Cu	100/pk.
CF-4/2-4C	CF424-25	—	4.0 µm	2.0 µm	400	Cu	25/pk.
	CF424-50	CFT424-50	4.0 µm	2.0 µm	400	Cu	50/pk.
	CF424-100	CFT424-100	4.0 µm	2.0 µm	400	Cu	100/pk.
CF-MH-2C	CF2MH-25	—	Multihole*	—	200	Cu	25/pk.
	CF2MH-50	CFT2MH-50	Multihole*	—	200	Cu	50/pk.
	CF2MH-100	CFT2MH-100	Multihole*	—	200	Cu	100/pk.
CF-MH-4C	CF4MH-25	—	Multihole*	—	400	Cu	25/pk.
	CF4MH-50	CFT4MH-50	Multihole*	—	400	Cu	50/pk.
	CF4MH-100	CFT4MH-100	Multihole*	—	400	Cu	100/pk
CF-1/1-2C	CF21-25	—	1.0 µm	1.0 µm	200	Cu	25/pk.
	CF21-50	CFT21-50	1.0 µm	1.0 µm	200	Cu	50/pk.
	CF21-100	CFT21-100	1.0 µm	1.0 µm	200	Cu	100/pk.
CF-1/1-4C	CF41-25	—	1.0 µm	1.0 µm	400	Cu	25/pk.
	CF41-50	CFT41-50	1.0 µm	1.0 µm	400	Cu	50/pk.
	CF41-100	CFT41-100	1.0 µm	1.0 µm	400	Cu	100/pk.

* The Multihole device has a staggered pattern of six features consisting of three circle patterns of 1 micron, 1.4 micron and 2 micron diameter and three ellipse patterns of 1x4 microns, 1.4 x 5.6 microns and 2x8 microns.

QUANTIFOIL® – Holey Carbon Films

QUANTIFOIL® is a perforated support foil with pre-defined hole size, shape and arrangement. It has advantages in electron microscopy (EM) or low-energy electron point source (LEEPS) microscopy when compared with conventional holey film.

QUANTIFOIL® is offered with circular and square, orthogonal arranged holes. Films with different hole sizes and bar widths are available. Carbon is the standard material that makes the foil.

QUANTIFOIL® is a superior quality of holey carbon film, which facilitates the use of automation in TEM. (e.g. The National Resource for Automated Molecular Microscopy, at the Scripps Research Institute, has developed a system, called Legimon, for automatically acquiring images from a transmission electron microscope).

The surface properties of **QUANTIFOIL®** holey carbon support film, especially the wetting properties, may have to be adapted according to one's particular requirements. Untreated aging **QUANTIFOIL®** tends to be hydrophobic. Hydrophilicity of the foil can be achieved by glow discharging in residual air or by metal coating.

QUANTIFOIL® in low-energy electron point source (LEEPS) microscopy. **QUANTIFOIL®** with a regular pattern is required in order to be able to distinguish an object, which is spanned over a hole. An object cannot be discriminated from the support in the case of conventional holey support film. (H.W. Fink & C. Schonenberger, University of Basel, used **QUANTIFOIL®** for the measurement of electrical current through DNA molecules.)

The foil is ~12 nm thick and mounted on either copper, nickel or gold grids with either square or round holes of different sizes.

Holey films with 2 μ round holes are used at magnifications between 30,000x and 40,000x.

QUANTIFOIL® is generally delivered as a carbon foil; it can be reinforced with plastic film. The standard thickness for the carbon foil is 12 nm; other thicknesses between 10 and 25 nm can be made upon request.

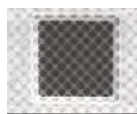
QUANTIFOIL® is supplied with 200 mesh copper, nickel or gold grids. Other meshes are also available upon request as a special order. All special orders are available in quantities of a minimum of 100 grids or multiples of 100.

➤ **QUANTIFOIL® with Circular Holes**

QUANTIFOIL® with circular holes is used in cryoelectron tomographic reconstruction. The roundness of the holes is advantageous with respect to the formation of an ice layer of constant thickness. The whole size chosen depends on the magnification used, and on whether or not one wishes to include support film in the image. Assessment of the image quality is easier when foil is included in the picture, because the power spectrum of a foil is stronger than that of unsupported ice.

QUANTIFOIL® R 3.5/1

QUANTIFOIL® R 3.5/1 may be preferred over foils with smaller holes if the carbon film should be outside the frame of the image. This option can be desirable in the case of extended objects, such as filamentous objects, for example.



QUANTIFOIL® R 1/4

QUANTIFOIL® R 1/4 may be preferred over R 1.2/1.3, when an increased tolerance with respect to the position of beam, and a larger beam diameter are desired, such as in the case of automated image acquisition.



QUANTIFOIL® R 0.6/1

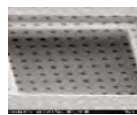
Hole size is 0.6 μ . Space between holes is 1 μ . Center to center is 1.6 μ (hole size may be as large as 1 μ).

QUANTIFOIL® R 5/20

Hole size is 5 μ . Space between holes is 20 μ . Center to center is 25 μ .

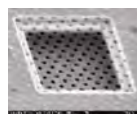
QUANTIFOIL® R 2/4

QUANTIFOIL® R 2/4 may be preferred over R 2/2, when an increased tolerance with respect to the position of beam, and a larger beam diameter are desired, such as in the case of automated image acquisition.



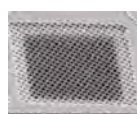
QUANTIFOIL® R 2/2

Holey films with 2 μ circular holes are used at magnifications between 30,000x and 40,000x.



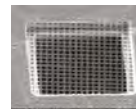
QUANTIFOIL® R 2/1

QUANTIFOIL® R 2/1 has more open area than R 2/2. It is used when focusing is carried out on the edge of a hole burnt in the ice in a neighboring hole instead of on the foil adjacent to the hole.



➤ **QUANTIFOIL® R 1.2/1.3**

A foil with ~1.2 μ circular holes and a spacing of ~2.5 μ between the holes. This type is used at magnifications around 50,000x.



➤ **QUANTIFOIL® with Square Holes**

QUANTIFOIL® with square holes and relatively narrow bars can be used in EM to support a thin carbon film, which by itself is too fragile to span a grid square.

Alternatively, this holey film can directly support an object that is larger than the holes.

QUANTIFOIL® S 7/2

QUANTIFOIL® S 7/2 constitutes an optimum between a maximum of open area on the one hand, and mechanical stability on the other hand.



➤ **QUANTIFOIL® with Different Hole Shapes**

QUANTIFOIL® Multi A

QUANTIFOIL® Multi A is a holey film, which consists of various pattern hole sizes, shapes and arrangements is repeated. In addition to round holes, the pattern includes ovalshaped ones, which appear round at high tilt angles (~70°). The diameters of the round holes are about 1, 1.4 and 2 μ , and the bar widths range from 0.5 to 4 μ . The oval holes in the foil have a dimension of 8 x 2 μ and 4 x 1 μ .

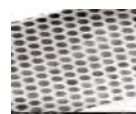


➤ **QUANTIFOIL® with Hexagonal Geometry**

This type of **QUANTIFOIL®** is meant for slot grids. It was especially designed for supporting serial thin sections. It offers an optimum between mechanical stability on the one hand and backgroundfree area on the other hand. The foil is thin enough to allow those parts of the sections that lie on the bars to be interpreted. In this way, the information in the sections can be interpreted to the maximum.

QUANTIFOIL® Hex 15

A foil with hole size of 26 μ (diameter of inscribed circle) and a repeating distance of 41 μ , the side length of the holes and the bar width are 15 μ .



► **QUANTIFOIL®** Holey Carbon Grids for cryo-TEM (continued)

Ordering Information

Hole Shape	Grid Type	Hole Size	Period	Cat. # 200 Mesh	Cat. # 300 Mesh	Cat. # 400 Mesh	Qty.	
R 3.5/1	Copper	3.5µm	4.5µm	Q225CR-35	Q325CR-35	Q425CR-35	50/pk	
				Q250CR-35	Q350CR-35	Q450CR-35	100/pk	
	Nickel	3.5µm	4.5µm	Q225NR-35	Q325NR-35	Q425NR-35	50/pk	
				Q250NR-35	Q350NR-35	Q450NR-35	100/pk	
	Gold	3.5µm	4.5µm	Q225AR-35	Q325AR-35	Q425AR-35	50/pk	
				Q250AR-35	Q350AR-35	Q450AR-35	100/pk	
R 1/4	Copper	1µm	5µm	Q225CR-14	Q325CR-14	Q425CR-14	50/pk	
				Q250CR-14	Q350CR-14	Q450CR-14	100/pk	
	Nickel	1µm	5µm	Q225NR-14	Q325NR-14	Q425NR-14	50/pk	
				Q250NR-14	Q350NR-14	Q450NR-14	100/pk	
	Gold	1µm	5µm	Q225AR-14	Q325AR-14	Q425AR-14	50/pk	
				Q250AR-14	Q350AR-14	Q450AR-14	100/pk	
R 0.6/1	Copper	0.6µm	1.6µm	Q225CR-06	Q325CR-06	Q425CR-06	50/pk	
				Q250CR-06	Q350CR-06	Q450CR-06	100/pk	
	Nickel	0.6µm	1.6µm	Q225NR-06	Q325NR-06	Q425NR-06	50/pk	
				Q250NR-06	Q350NR-06	Q450NR-06	100/pk	
	Gold	0.6µm	1.6µm	Q225AR-06	Q325AR-06	Q425AR-06	50/pk	
				Q250AR-06	Q350AR-06	Q450AR-06	100/pk	
R 5/20	Copper	5µm	25µm	Q225CR-520	Q325CR-520	Q425CR-520	50/pk	
				Q250CR-520	Q350CR-520	Q450CR-520	100/pk	
	Nickel	5µm	25µm	Q225NR-520	Q325NR-520	Q425NR-520	50/pk	
				Q250NR-520	Q350NR-520	Q450NR-520	100/pk	
	Gold	5µm	25µm	Q225AR-520	Q325AR-520	Q425AR-520	50/pk	
				Q250AR-520	Q350AR-520	Q450AR-520	100/pk	
R 2/4	Copper	2µm	6µm	Q225CR-4	Q325CR4	Q425CR4	25/pk	
				Q250CR-4	Q350CR4	Q450CR4	50/pk	
				Q2100CR-4	Q3100CR4	Q4100CR4	100/pk	
	Nickel	2µm	6µm	Q225NR-4	Q325NR4	Q425NR4	25/pk	
				Q250NR-4	Q350NR4	Q450NR4	50/pk	
				Q2100NR-4	Q3100NR4	Q4100NR4	100/pk	
	Gold	2µm	6µm	Q225AR-4	Q325AR4	Q425AR4	25/pk	
				Q250AR-4	Q350AR4	Q450AR4	50/pk	
				Q2100AR-4	Q3100AR4	Q4100AR4	100/pk	
	R 2/2	Copper	2µm	4µm	Q225CR2	Q325CR2	Q425CR2	25/pk
					Q250CR2	Q350CR2	Q450CR2	50/pk
					Q2100CR2	Q3100CR2	Q4100CR2	100/pk
Nickel		2µm	4µm	Q225NR2	Q325NR2	Q425NR2	25/pk	
				Q250NR2	Q350NR2	Q450NR2	50/pk	
				Q2100NR2	Q3100NR2	Q4100NR2	100/pk	
Gold		2µm	4µm	Q225AR2	Q325AR2	Q425AR2	25/pk	
				Q250AR2	Q350AR2	Q450AR2	50/pk	
				Q2100AR2	Q3100AR2	Q4100AR2	100/pk	
R 2/1		Copper	2µm	3µm	Q225CR1	Q325CR1	Q425CR1	25/pk
					Q250CR1	Q350CR1	Q450CR1	50/pk
					Q2100CR1	Q3100CR1	Q4100CR1	100/pk
	Nickel	2µm	3µm	Q225NR1	Q325NR1	Q425NR1	25/pk	
				Q250NR1	Q350NR1	Q450NR1	50/pk	
				Q2100NR1	Q3100NR1	Q4100NR1	100/pk	
	Gold	2µm	3µm	Q225AR1	Q325AR1	Q425AR1	25/pk	
				Q250AR1	Q350AR1	Q450AR1	50/pk	
				Q2100AR1	Q3100AR1	Q4100AR1	100/pk	
	R 1.2/1.3	Copper	~1.2µm	~2.5µm	Q225CR1.3	Q325CR1.3	Q425CR1.3	25/pk
					Q250CR1.3	Q350CR1.3	Q450CR1.3	50/pk
					Q2100CR1.3	Q3100CR1.3	Q4100CR1.3	100/pk
Nickel		~1.2µm	~2.5µm	Q225NR1.3	Q325NR1.3	Q425NR1.3	25/pk	
				Q250NR1.3	Q350NR1.3	Q450NR1.3	50/pk	
				Q2100NR1.3	Q3100NR1.3	Q4100NR1.3	100/pk	
S 7/2	Copper	7 x 7µm	9µm	Q225CS7	Q325CS7	Q425CS7	25/pk	
				Q250CS7	Q350CS7	Q450CS7	50/pk	
				Q2100CS7	Q3100CS7	Q4100CS7	100/pk	
	Nickel	7 x 7µm	9µm	Q225NS7	Q325NS7	Q425NS7	25/pk	
				Q250NS7	Q350NS7	Q450NS7	50/pk	
				Q2100NS7	Q3100NS7	Q4100NS7	100/pk	
	Gold	7 x 7µm	9µm	Q225AS7	Q325AS7	Q425AS7	25/pk	
				Q250AS7	Q350AS7	Q450AS7	50/pk	
				Q2100AS7	Q3100AS7	Q4100AS7	100/pk	
	Multi A	Copper	—	—	Q225CMA	Q325CMA	Q425CMA	25/pk
					Q250CMA	Q350CMA	Q450CMA	50/pk
					Q2100CMA	Q3100CMA	Q4100CMA	100/pk
Nickel		—	—	Q225NMA	Q325NMA	Q425NMA	25/pk	
				Q250jNMA	Q350NMA	Q450NMA	50/pk	
				Q2100NMA	Q3100NMA	Q4100NMA	100/pk	
Hole Shape	Grid Type	Hole Size	Description	Cat. #	Pack			
HEX 15	Copper 2	6µm	0.5 x 2mm slot grids	Q225CR-HEX	50/pk			
				Q250CR-HEX	100/pk			

New AND Exclusive

Overview

Graphene is a single atomic layer of carbon atoms tightly packed in a two-dimensional honeycomb lattice. This novel material is atomically thin, chemically inert, consists of light atoms, and possesses a highly ordered structure. Graphene is electrically and thermally conductive, and is the strongest material ever measured. These remarkable properties make graphene the ideal support film for electron microscopy.

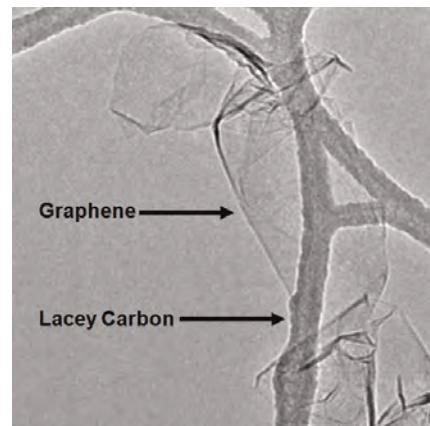
➤ Graphene Support Films for TEM

Synthesis

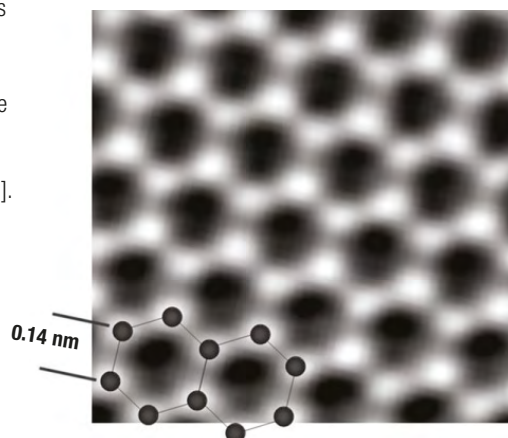
the substrate-free gas-phase method

Graphene is a single atomic layer of carbon atoms tightly packed in a two-dimensional honeycomb lattice. The novel material has generated great interest throughout the scientific and technological community because of its remarkable properties and numerous potential applications. However, obtaining pure and highly ordered graphene has been a challenge. Small quantities of ultrahigh-quality graphene have been isolated through an unwieldy and time-consuming process involving the mechanical exfoliation of highly oriented pyrolytic graphite. Alternative methods require substrates or graphite to create atomically-thin sheets, and these techniques involve multiple steps, expensive substrates, or non-ambient conditions. Furthermore, the sheets produced by these alternative methods exhibit defects, disorder, and oxygen functionalities that have a detrimental effect on the properties of graphene.

The substrate-free gas-phase method is the first and only process that can synthesize ultrahigh-quality graphene in a single step, without the use of substrates or graphite [1]. Graphene sheets are created through the delivery of liquid alcohol droplets directly into atmospheric-pressure microwave-generated plasmas. Extensive characterization of the synthesized graphene has proven that the sheets are oxygen-free and exhibit a highly ordered structure [2]. The graphene produced by this unique method can immediately be utilized for graphene applications.

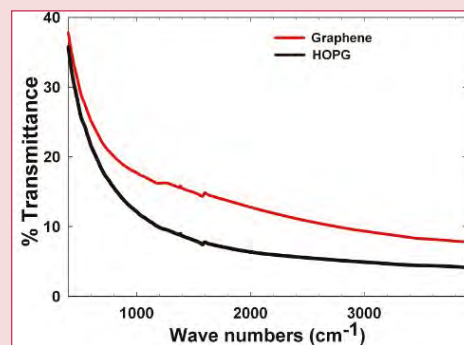


A typical TEM image of graphene sheets freely suspended on a lacey carbon TEM grid.



An atomic-resolution image of a clean and structurally perfect graphene sheet synthesized by the substrate-free gas-phase method. Individual carbon atoms appear white in the image.

Elemental analysis by FT-IR reveals that the synthesized graphene sheets are free of detrimental oxygen functionalities. The FT-IR spectrum of synthesized graphene is similar to that of highly oriented pyrolytic graphite (HOPG).



► Graphene Support Films for TEM (continued)

Application

Direct imaging of soft and hard nanomaterials

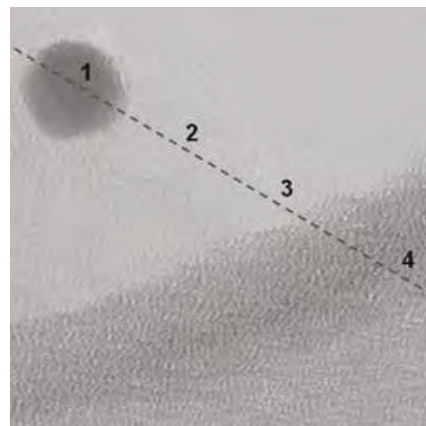
The interfaces between soft and hard nanomaterials have been the subject of extensive research.

Nanoparticles coated with molecular layers have been shown to self-assemble into novel structures that could potentially be used in electronics, sensors, and photonics. Self-assembly is influenced by the nature of molecular coatings and thus more detailed characterization of these soft materials is needed.

However, imaging surface molecules and their interfaces with nanoparticles at the atomic scale is a significant challenge. The transmission electron microscope (TEM) imaging of functionalized nanoparticles has been attempted.

However, it has not been possible to observe molecular surface layers and their interfaces with nanoparticles at the atomic level. Modern aberration-corrected TEMs can produce atomic-resolution images of soft and hard nanomaterials. However, conventional TEM support films (e.g. ultrathin amorphous carbon) limit the capabilities of these advanced microscopes because they contribute to overall electron scattering and diminish the contrast of low-atomic number specimens. The TEM imaging of the interfaces between soft and hard nanomaterials therefore requires better support films that have a lower dynamical interference with an imaging object [3].

Graphene is the ideal TEM support film. The material possesses a highly ordered structure and is atomically thin, chemically inert, structurally stable, and electrically and thermally conductive. The ultrahigh-quality graphene produced by the substrate-free gas-phase method [1, 2] has enabled the unsurpassed TEM imaging of organic molecules and the interfaces between soft and hard nanomaterials. The pure and highly-ordered sheets were used as a near-invisible support film to directly image the atoms in a gold nanoparticle and its surrounding citrate coating [3]. The results showed that the synthesized graphene can be used to directly observe nanoparticles functionalized with a diverse range of molecular coatings, such as proteins and DNA



A low-magnification image of a (1) gold nanoparticle 10 nm in diameter on a (2) transparent synthesized graphene support film, (3) the vacuum, and (4) a lacey carbon support.

We offer ultrahigh-quality graphene that is produced through the substrate-free gas-phase method[1]. The graphene created by this technique possesses a highly ordered structure that is composed of 99% carbon by mass (1% hydrogen)[2]. This graphene was used to directly image gold nanoparticles and their organic surface molecules in both conventional and atomic-resolution TEMs at a level that greatly surpasses any current TEM support film[3].

Our graphene provides an invisible, crystalline background that enables the unrivaled TEM characterization of organic and inorganic nanomaterials.

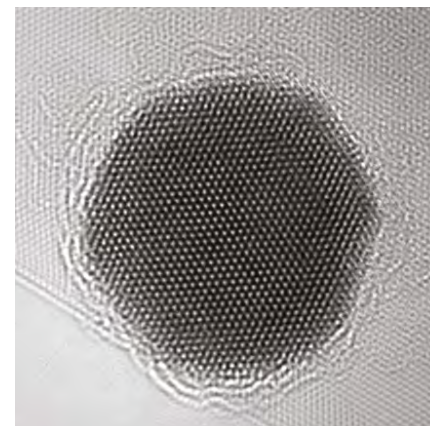
References:

[1] Dato et al., "Substrate-Free Gas-Phase Synthesis of Graphene Sheets", *Nano Letters* 8, 2012–2016 (2008).

[2] Dato et al., "Clean and highly ordered graphene synthesized in the gas phase", *Chemical Communications*, 6095–6097, (2009).

[3] Lee et al., "Direct Imaging of Soft-Hard Interfaces

Enabled by Graphene", *Nano Letters* 9, 3365–3369 (2009).



An atomic-resolution image of a 10 nm gold nanoparticle and its surrounding citrate capping agent on a synthesized graphene support film.

Ordering Information

Graphene products come available in five different ways, allowing you to choose which is best for you

a) As a solution of 0.1 mg Graphene in 1 ml of Ethanol. A homogeneous solution will take less than 30 seconds to create by sonicating the Graphene-solvent mixture. One is able to coat their own grids using this solution.

b) As Graphene-enhanced lacey carbon TEM grids. 200 and 300 mesh. These grids are created by coating our existing lacey carbon grids with graphene. Through a unique drop method, solution is dispersed onto the Lacey Carbon Grid.

c) As dry, synthesized Graphene powder, 1 mg.

EMS #	Description	Quantity
GF1200	0.1 mg Graphene in 1 ml of Ethanol	each
GF1201	Graphene-Enhanced Lacey Carbon TEM Grid 200 # Cu	each
GF1202	Graphene-Enhanced Lacey Carbon TEM Grid 200 # Ni	each
GF1203	Graphene-Enhanced Lacey Carbon TEM Grid 300 # Cu	each
GF1204	Graphene-Enhanced Lacey Carbon TEM Grid 300 # Ni	each
GF1205	Synthesized Graphene Powder, 1 mg	each

OTHER POTENTIAL APPLICATIONS:

*biodevices • single molecule gas detection • graphene nanoribbons
integrated circuits • transparent conducting electrodes • ultracapacitors*

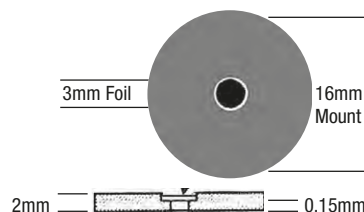
GRID PREPARATION SUPPLIES AND ACCESSORIES

► Pinholes

These pinholes are prepared from pure copper foil, 3mm in diameter, 25 microns thick. They possess very high roundness and edge retention. Blackened on one surface. Mounted in black anodized aluminum discs. Mounted in a recessed hole in an anodized holder, 16 mm in diameter.

Applications

- Spatial filtering
- Controlling the diameter of light beams
- Creating point light sources
- Image analysis
- Etc.

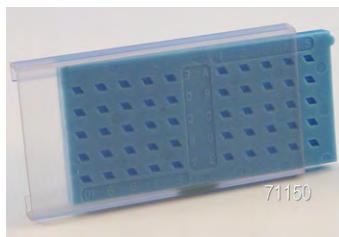


Hole Range	Tolerance
101-500µm	+/- 2µm
25-100µm	+/- 1µm
1-25µm	+/- 0.5µm

Part Number	Pin Hole	Diameter	Quantity
PH-C1	Pin Hole 0.001mm	(1µm) diameter	each
PH-C2	Pin Hole 0.002mm	(2µm) diameter	each
PH-C5	Pin Hole 0.005mm	(5µm) diameter	each
PH-10	Pin Hole 0.01mm	(10µm) diameter	each
PH-C25	Pin Hole 0.025mm	(25µm) diameter	each
PH-C50	Pin Hole 0.05mm	(50µm) diameter	each
PH-100	Pin Hole 0.1mm	(100µm) diameter	each
PH-C250	Pin Hole 0.25mm	(250µm) diameter	each
PH-C1000	Pin Hole 1.0mm	(1000µm) diameter	each

► Grid Storage Box, 50 Capacity

Storage for 50 grids in deep diamond-shaped wells. All wells are identified. The base is resistant to organics and reactions can be carried out on grid-mounted samples in the wells. Complete with grid recording card. Measures: 3"(L) x 1 1/16"(W) x 5/16"(H) (77x40x8mm)

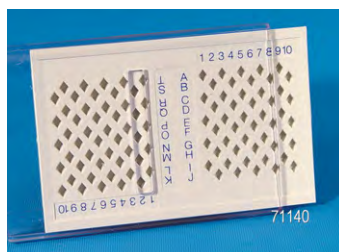


71150

71150	Grid Storage Box, 50 Capacity	each
71152	Grid Storage Box, 50 Capacity	1 dozen

► Grid Storage Box, 100 Capacity

100 grids can be stored in identified diamond-shaped wells for daily handling or long-term storage. Complete with grid recording card. Measures: 3 3/16"(L) x 2 3/16"(W) x 5/16"(H) (85x58x7mm)



71140

71140	Grid Storage Box, 100 Capacity	each
71142	Grid Storage Box, 100 Capacity	1 dozen

► TEM-Specimen Grid Box – SB50

This newly designed TEM grid storage box, for routine handling and long term storage of 50 standard size TEM grids. This new ergonomic design incorporates several features that overcome the disadvantages associated with storage boxes of the more conventional 'sliding cover' design. This new box has a unique number on the face and on one end.



Features

- The blue arrow at the 12:00 o'clock position indicates the park position for the cover when not in use. This is a firm grip 'click' position and it cannot be moved accidentally thus preventing spillage.
- The clear cover can be rotated smoothly through 360 degrees once the slight initial resistance of the park position has been overcome exposing a maximum of 2 or 3 diamond shaped slots at any one time.
- The 50 diamond shaped slots have an alphanumeric referencing system. Each box is supplied with an index record card for additional information.
- The material the bases are made from have been chosen due to their anti-static properties. The clear cover has self-lubricating properties, which reduces friction, enabling the cover to move freely while remaining in close contact with the face of the base.
- The storage boxes are designed to be stacked, the base locating precisely over the face of another box.

Specifications:

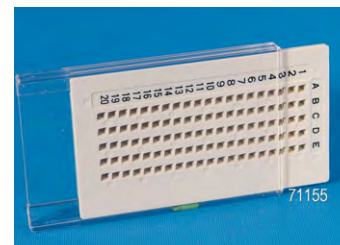
Size75mm (L) x 65mm(W) x 6.5mm(D)
 Weight.....22 grams
 Materials: Base:.....ABS-PHAT (Acrylonitrile Butadiene Styrene + Anti-Static Additive)
 Cover:CAB (Cellulose Acetal Butyrate)

71135-01	SB50 Grid Storage Box	each
71135-12	SB50 Grid Storage Box	12/bx
71136-01	SB50N Grid Storage Box with Unique Number	each
71136-12	SB50N Grid Storage Box with Unique Number	12/bx

► Grid Storage Box, 100 Capacity

A newly designed grid storage box similar to the original LKB box. Made from a special plastic that minimizes static. Complete with grid recording card.

Measures:
8cm(L) x 5cm(W) x 7mm(T)



71155

71155	Grid Storage Box, 100 Capacity	each
71156	Grid Storage Box, 100 Capacity	1 dozen

GRID PREPARATION SUPPLIES AND ACCESSORIES

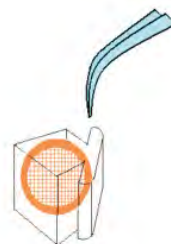
► Multipurpose Electron Microscope Specimen Box – MEM Grid Box

A newly designed Grid Box with safety, ease and convenience in mind – this multipurpose electron microscope specimen grid box is one of the most desirable boxes on the market.

- Eliminates the chances of tweezers insertion damaging the grids – The ‘tweezers slot’ and ‘grid slot’ are in a separate location. The tweezers are only able to grip the edge of the grid enabling it to be picked up
- Grids stored no longer jump out of the box while you remove the cover – Between the body of the box and the sliding lid, there is a separate plastic cover, which allows for only four slots being exposed at a time
- The Grid Record Card is stored safely by insertion along the reverse side of the box
- MEM-96 – will able to store up to 96 grids
- MEM-32 – will able to store up to 32 grids with 8 Blocks
- Measures: 81mm L x 54mm W x 6mm thick

1. Pick up a grid

Removes the problem of inserting the tweezers too deep or damaging the tissues. The tweezers slot and grid hole connect. The tweezers insertion slot grips the edge of the grid, so does not damage the tissues and membrane.



2. Move Plastic sheet

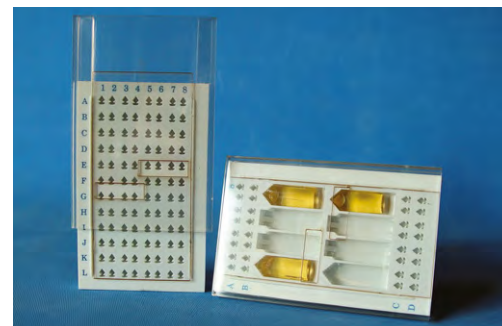
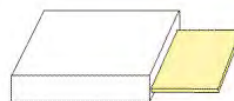
Prevents grids from jumping out of the grid hole and mixing together. Between the body of the box and lid, there is a plastic cover piece so that when you pick up the grid, only four grid holes are exposed at once; the others remain covered by the plastic cover piece and lid.



Safeguards against loss of samples, or information of stored samples becoming separated.

3. Record Card

Three different components (semi-thin section, thin section, block) and record card are all stored in one box (MEM-32 grid-8 block). You can find everything and store all of your samples in one box.



1. Record card is stored underneath the box

2. When moving lid and plastic cover pieces only four holes are exposed at once

3. The tweezers insertion slot grips the grid edge

4. Slot grids should best be gripped by curved tweezers. Mesh grids can be gripped by straight or curved tweezers.

5. MEM-96 grid contain 96 grids (left)
MEM-32 grid-8 block contain 32 grids and 8 blocks (middle).

6. Small semi-thin section can be stored by sliding into the block cavity (right).

Cat. #	Description	Qty.
71164-01	MEM-96 Grid Storage Box	Each
71164-10	MEM-96 Grid Storage Box	10/pk.
71165-01	MEM-32 Grid Storage Box	Each
71165-10	MEM-32 Grid Storage Box	10/pk.

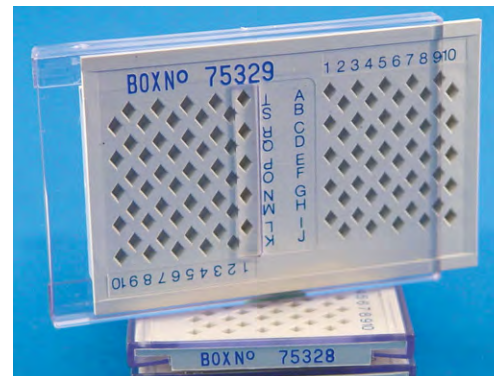
► Numbered Grid Storage Box, 100 Capacity

The standard 100 capacity grid storage box with a unique number printed on the face and on one end.

Advantages

- Eliminates the placement of the specimen grid in the wrong box.
- Easy retrieval of grid box from storage.
- Complete with grid recording card.

71137	Numbered Grid Storage Box, 100 Capacity	each
71138	Numbered Grid Storage Box, 100 Capacity	10/lot
71139	Numbered Grid Storage Box, 100 Capacity	100/lot



GRID PREPARATION SUPPLIES AND ACCESSORIES

► THE ORIGINAL LKB Grid Storage Box

For years, The LKB Grid Storage Box is the one that everyone is looking for. Now it is available again from EMS. The box is made from ABS (a copolymer of Acrylonitrile, Butadiene and Styrene) which will not tolerate temperatures above 70°C, while the lid is made of Polymethacrylate (Flexiglas, Perspex), which should not be exposed to temperatures above 45°C. Neither the box or the lid will resist organic solvents. The box consists of 100 diamond shaped holes for storing up to 100 EM grids, either 3.05mm or 2.3mm in diameter. The box measures 3" (75mm)(L) x 2½"(55mm)(W) x ¼"(7mm)(H) and it comes complete with 10 index cards.

71147-01	LKB 100-Grid Storage Box	each
71147-12	LKB 100-Grid Storage Box	10/pk



► EMS 50 and EMS 100 Capacity Inexpensive Grid Storage Boxes

The EMS50 and EMS100 TEM Grid Storage Boxes are used for the storage of TEM grids for routine grid handling, transport and long term TEM grid storage for standard grids that are 3.05mm in diameter.

The box has a simple number/letter combination printed on the side of the body. Dimensions for both boxes are: 3"(75mm) x 2½"(55mm) x ¼"(6.5mm) and they are anti static treated.

71146-01	EMS 50 Grid Box	each
71146-02	EMS 100 Grid Box	each



71146-01



71146-02

► Dial-A-Grid Storage Modules

A two tone color coded plastic box with insert which has 24 letter-labeled crossed slots, where the grids can be stored. A rotating protection plate covers the slots and allows for exposure of one grid at a time.

Measures: 2½"(L)x1¼"(W)x½"(H)
(57x45x12.5mm)



71148-01

► BEEM® Dial-A-Grid and Block Storage Modules

The same as Dial-A-Grid Module but with two additional cavities for block storage.



71149-01

71148-01	BEEM® Dial-A-Grid Storage Box	each
71148-05	BEEM® Dial-A-Grid Storage Box	50/pk
71148-10	BEEM® Dial-A-Grid Storage Box	100/pk

Beem® Is A Registered Trademark of Better Equipment For Electron Microscopy, Inc.

71149-01	BEEM® Dial-A-Grid & Block Storage	each
71149-05	BEEM® Dial-A-Grid & Block Storage	50/pk
71149-10	BEEM® Dial-A-Grid & Block Storage	100/pk

Beem® Is A Registered Trademark of Better Equipment For Electron Microscopy, Inc.

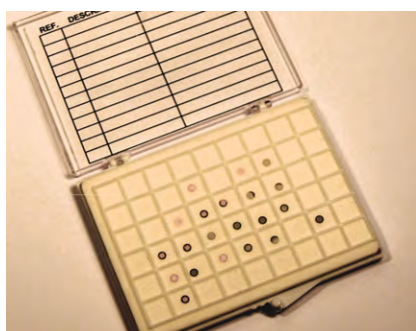
► EMS Dial-Grid-N-Block-Storage

24 slots labeled with letters from A-X where the grids can be stored and rotated for easy access as well as 3 additional cavities for block storage. Available with and without a unique identification number.

71158-01	EMS Dial-Grid-N-Block Storage	each
71158-05	EMS Dial-Grid-N-Block Storage	50/pk
71158-10	EMS Dial-Grid-N-Block Storage	100/pk
71158-15	EMS Dial-Grid-N-Block Storage/With Number	each
71158-20	EMS Dial-Grid-N-Block Storage/With Number	50/pk
71158-25	EMS Dial-Grid-N-Block Storage/With Number	100/pk



71158-01



► Grid Transporting Box

This unique Box allows for the storage and transportation of grids without any worry of them moving around or being damaged. The Plate is made from Silicone and has 54 individual compartments 10mm in size. Each compartment can hold 3 grids and the grids can be easily picked up from the Silicone surface.

71173-01	Grid Transporting Box	each
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GRID PREPARATION SUPPLIES AND ACCESSORIES

➤ **Cryogenic Grid Storage Box**

This specimen grid box is a tool for storing or transferring cryogenic TEM specimen grids.

■ Four diamond shaped slots

■ Non-static cover held in place by stainless steel screw, which is tapped in the center of the box.

■ Box fits the FEI Vitrobot™, Gatan 626™, Gatan 3500™.

Available with lid or without lid.

71166-10	Cryo Grid Box, Round, w/Lid	each
71166-20	Cryo Grid Box, Square, w/Lid	each
71166-30	Cryo Grid Box, Round, wo/Lid	each



➤ **Cryogenic Grid Box Handling Tool**

This tool has one end which is threaded and fits into the center hole of the Cryogenic Grid Storage Box (where the screw goes in to secure the lid) for moving the box in and out of the cryogenic chamber.

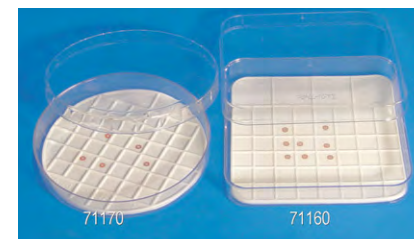
71165-50	Cryogenic Grid Box Handling Tool	each
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➤ **Grid Mats**

White silicone rubber mats, with numbered compartments. Good for organizing grids. They will not slide or jump between compartments. Also ideal for staining grids. Easy to pick up grids without damaging forcep tips. Mats are available for square and round petri dishes, (100mm diameter, 115mm high).

71160	Square Grid Mat	each
71162	Square Grid Mat	1 dozen
71170	Round Grid Mat	each
71172	Round Grid Mat	1 dozen

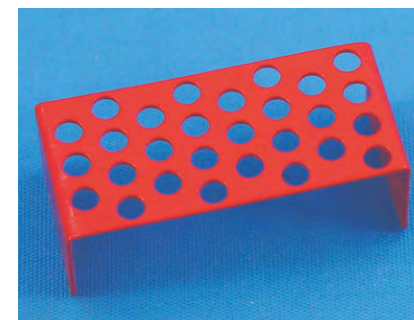


➤ **EMS Domino Rack**

The EMS Domino rack is "U" shaped and made from an aircraft alloy sheetstock with serial perforations; thermally bonded spaceage copolymer; 5mm diameter holes, 28 holes per rack. The formvar film cast on the rack will stretch across a series of smooth edged holes forming a flat, wrinkle free film that is ready for grid mounting.

The Domino Rack allows the sections within the slot to dry flat and wrinkle free; it reduces the film and section contamination to negligible levels. The size of the rack is 54mm (L) x 17.5mm(H) x 25.5mm (W) Moran, D.T., and Rowley, J.C., (1987). "Biological Specimen Preparation for Correlative Light and Electron Microscopy in Biology: Microscopy and Methods, ed. M.A. Hayat. Academic Press, New York./ pg 1-22

70620	EMS Domino Rack	each
70621	EMS Domino Rack	10/lot



➤ **Grid Staining Matrix System**

This unique staining device allows you to stain up to 25 grids at one time or as little as one. The Matrix system has a simply alpha-numeric identification system. The unit is not solvent or chemically resistant to acids so all stains should be aqueous based only.

The system requires very little stain and you may use different vessels for each stain.

The amount of Volume of stain required is as follows:

21-25 grids 11ml	11-15 grids 7ml	01-05 grids 3ml
16-20 grids 9ml	06-10 grids 5ml	

71179-01	Grid Staining Matrix System Kit	each
71179-05	Matrix Body with handle and cover	each
71179-06	Staining Vessels, 1 red and 1 blue	2/pk
71179-07	Staining Vessel, blue	each
71179-08	Staining Vessel, red	each



Each system includes the following:

- Matrix Body
- 2 each of the Staining Vessels (Red and Blue)

ARTICLE OF INTEREST

A simplified method for handling EM grids is described. This new method not only offers safety and identification of your samples but offers you improved handling, temporary storage, and identification of grids bearing ultrathin sections as well as a novel method for preparing bulk samples.

Refer to: Gorycki, M.(1992). A Simple Method for Handling Grids. Biotechnic & Histochemistry 67/5, 313-314.

TECHNICAL TIP**A Fool-proof Method for Mounting Serial Sections on Single Hole Grids**

I did serial sectioning for years on large single hole grids using a very simple technique that made the potential problems of film thickness, wrinkles and section loss very minor. I was not the original developer of the method and do not remember who originally gave it to me. It goes as follows:

- 1) Have your machine shop cut some thin pieces of Plexiglas into the size of glass slides. At one end, drill about a dozen holes, roughly 5mm in diameter, in an area about the size of a formvar film cast on glass slides. These slides will serve as your template for holding your films.
 - 2) Cast the formvar films onto glass slides using your normal method. Usually a good silver film, not gray, will work fine I routinely used 0.2% formvar in dichloroethane when casting by immersing the slide into the solution in a small jar, etc. We now use a film caster that lets us hold the slide in the dichloroethane vapors after lowering the formvar solution level. This method tends to give you thinner films consistently so the correct solution percentage and timing would have to be redetermined.
 - 3) Float the film off the glass slide and pick it up with the Plexiglas slide so the film covers the holes. Then draw the water out of the holes by pressing the plastic slide down onto filter paper, or using small pieces of filter paper and capillary action to draw the water out of individual holes. The films should hold nicely over the holes in the slide. Store slides until needed.
 - 4) Next, cut your sections using a block diameter that is fairly similar to the size of the slit in the grid. Pick up the sections on UNCOATED grids by gently lowering the grid to the surface of the knife boat. I put the dull side down on the premise that the rough surface would grab the film better during step 6. The surface tension of the water will hold the sections in the grid opening. Transfer the grid to a droplet water until you have finished sectioning. Do invert grid. It important the of grid (shiny side) stay dry so that the grid will float on all subsequent solutions.
 - 5) Transfer the grid + sections + water droplet to a drop of stain. A small amount of water will be transferred but this will not interfere with staining. If you are concerned about the dilution effect, increase your staining time slightly. Allow the section to stain, then wash by transferring through a series of droplets of clean water. Continue to if desired and wash the same way. Never let the grid dry. There is minimum problem with stain precipitation if you use very clean water and transfer the grid through a sufficient number of water droplets (6-12 recommended).
 - 6) The final step is to transfer the grid to a film suspended over the hole in a Plexiglas slide and let it dry down. The sections will now be stuck to the film with NO wrinkles and minimum breakage. When ready to view, just punch out around the grid with the tip of your forceps, grab the grid and insert into the microscope. Believe me....the sections will still be there at the end!
- I found that as long as the sections cover a substantial portion of the open area of the grid, carbon coating was not essential. I used to do 50-100 grids worth of serial sections without loosing any. The films on the plastic slides would hold for months so I could make a lot and store until needed.

Previously Published in: Sherman, D.M. (1998) A Full-proof Method for Mounting Serial Sections on Single Hole Grids. MSA Technologist's Forum Newsletter 16:2

► Plexiglas Microscope Slides

A Fool-Proof method for the mounting of serial sections on Single Hole Grids 1

These plexiglass slides are 3x1" (75-25mm) and 1 mm thick. They prevent wrinkling and section loss while mounting sections on the grid. The procedure is simple

71891-10 Plexiglass Microscope Slides 5/pk

► Five-Slide Gripper

- The Five-Slide Gripper accommodates five microscope slides in one staining procedure.
- Fits most coplin and round-open staining jars.
- No need to remove slides for drying.
- Made from a special material which is resistant to all chemicals and solvents which are used in staining.
- Withstands drying temperatures up to 80°C



71410-06 Five-Slide Gripper 6/pk

► For Mica Sheets & Glass Slides, See pages 284-285 & 314-323 >>>>**► Film Casting Device**

An all glass apparatus. It casts uniformly thin films of parlodion, formvar, or butvar directly onto 1x3 microscope slides. The film casting solution can be used repeatedly. A built-in fine-pressure-release valve helps control the speed of drainage. The thickness of the film is controlled by the concentration of the film solution and the rate of the drainage. The unit requires 100mls of film casting solution to start.

**The unit comes complete with:**

- 500 ml capacity flask with built-in valves; Air-in and Air-out.
- Film casting Cylinder with Cover.
- 75 cc Atomizer.

71305-01	Complete Film Casting Device	each
71305-04	500 ml Flask Replacement	each
71305-06	Film Casting Cylinder Replacement	each
60804	Atomizer Replacement	each

For Film Casting Solutions, see pages 30, 46 >>>>**► All Glass Nebulizer**

An all glass unit for the simple production of microdroplets. An object is held vertically in front of the nebulizer outlet and by squeezing the atomizer a fine spray is created. The nebulizer set comes with an All Glass Nebulizer bulb and Atomizer.



70505-01	Nebulizer Set	set
70505-05	Nebulizer Set	5 sets
70506-01	Nebulizer Only	each
70506-05	Nebulizer Only	5/pk
60804	Atomizer	each

GRID PREPARATION SUPPLIES AND ACCESSORIES

➤ Perfect Loop

Using this PERFECT LOOP, you can place your thin sections, cut on the ultramicrotome, easily on the grid mesh without creases.

**EMS
EXCLUSIVE**



The Perfect Loop allows you to pick up sections consistently without causing any damage to the sections. It is the only loop that is currently available where the outside diameter of the loop is the same as the grid and the inside diameter is slightly larger than the observation area of the electron microscope. The thickness is about 40 microns. Due to the fact that the loop and the grid are of the same diameter they are attracted to one another when in water and attach together through the surface tension of the water. Even if the section touches the inside of the grid during blotting the touching area is minor and, therefore, the section is not damaged. When the grid is removed from the loop the section remains in place without fail. The area equals the observation field (about 2mm diameter) of the electron microscope; thus pieces can be fully observed.

➤ Perfect Loop for Ultra thin sections

70944	Set of Handle & Loop	set
70945	Loop only	each
70946	Loop only	5/each
70948	Handle only	each

➤ Perfect Loop for Light Microscopy (large sections)

The outside diameter of the loop is 7mm.

70940	LM Set of Handle & Loop	set
70941	LM Loop only	each
70942	LM Loop only	5/each
70943	LM Loop Handle	each

➤ Grid-Stick Kit

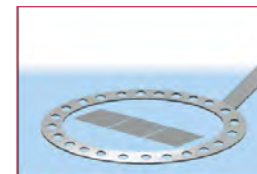
A helpful device for multi grid staining. If the instructions are followed carefully you can say good-bye to precipitate and dirt. The Grid Stick is made from a thin, but rigid alloy that does not react with commonly used organic solvents or stains. The stick itself measures 4mm wide, 75mm long and has a slot along its center with small undercut notches on one side to make grid removal simple. A small area on the top of each stick is reserved for identification. The Grid Stick is coated with a specially-formulated pressure-sensitive adhesive. This adhesive is resistant to solvents used in conventional staining methods (e.g., water, alcohol, ethanol) and aggressively holds the grids in place during staining, emulsion coating, carbon coating, shadow casting, serial section collection, etc., yet will not remain on the grid once it is removed from the stick. During staining the grids are held in the same plane as the solution flow, minimizing the risk of breaking the formvar film and, or collecting surface debris. Grids may be stored, handled, and examined with minimal effort. For example, if your grids are on SynapTek Grid Sticks you can simply place the stick on the stage of a phase microscope, identify the material (you will see outlines of large cells), and determine its condition (i.e., holes in material, dirt on grids) in only a few seconds without disturbing a single grid. In short, you will find that the SynapTek Grid Stick is simple, easy to use, and most importantly, highly reliable.

SynapTek Grid-Stick consists of:

- 5 coated Grid Sticks ■ 10 Staining Pipettes (modified)
- 2 flow-limiting Plugs and Bulbs ■ Instructions



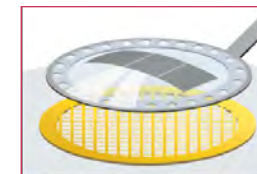
1. Center the LOOP above the sections



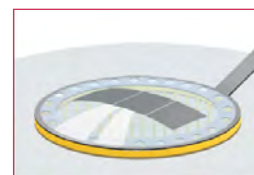
2. Slowly lower the LOOP over the sections and touch the water.



3. Gently lift up the LOOP with the sections in a droplet of water



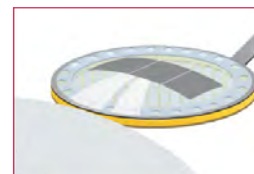
4. Lower the LOOP onto a grid and lift up again.



5. The grid holds to the LOOP by surface tension.



6. Lower the LOOP to the filter paper to remove water.



7. For coated grids, touch with the filter paper to remove water.



8. Separate the grid from the LOOP with an eyelash.



71175	Grid-Stick Kit	each
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Replacement Components:

71176	Grid-Stick, uncoated	10/pk
71177	Staining Pipettes with 2 plugs	20/pk
71178	Grid-Stick Glue (For recoating GridStick)	5ml

GRID PREPARATION SUPPLIES AND ACCESSORIES

► Hot Pen – Wax Pen; A Tool for Separating Sections or Cauterizing

Powered by AA batteries. This pen helps to flatten and separate tissue sections and reduces compression in thin sections. Available in two models: Wax Pen 1 is powered by one AA battery; Wax Pen 2 is powered by two AA batteries. Both pens are using the same tip. Replacement tip (Cat. #72679-RT) is a straight one.

Replacement tip (Cat. #72679-03) is a set of three different configurations: Straight, Hook, and 'U' Shaped Tips.

Cat #	Description	Length with Tip w/o Cap	w/Cap	Diameter	Pack
72678	Wax Pen 1 (A)	6½"	6¾"	¾", 18mm	each
72679	Wax Pen 2 (B)	8¼"	8¾"	¾", 18mm	each
72679-RT	Replacement Tip				each
72679-03	Replacement Tips			Set of Three Variable Tips	



72678



72679

► Grid Coating Pen For TEM; Coat Quick "G"

The Coat-Quick "G" pen improves the adherence of tissue sections onto the grids. With a touch of the pen to the grid, a thin layer of coating is applied to the grid. Drying takes place in approximately 1-2 minutes at room temperature.

After it has dried the grid is ready for tissue mounting. The pen is also used in pretreating grids prior to mounting supporting films such as formvar and carbon; it minimizes dislodging, widening, or breaking of the support film.

70624	Grid Coating Pen	each
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► Micro-Test Staining Dish

This staining dish is made from clear glass and has 10 cells in 2 rows of 5 each. Each cell is 2mm deep and holds 0.15ml of solution. Very useful in specimen preparation, EM staining, and Boerner-Jones-Lukens microfluocclulation test. Measurements: 108 X 57mm (4¼" x 2¼").

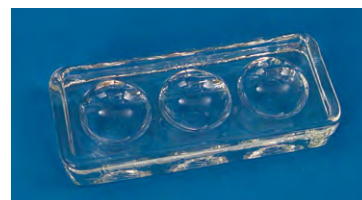
71564	Micro-Test/Staining Dish	each
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► 3-Well Glass Slide – Micro Spot Plate

Pyrex brand Micro Spot Plate is ideal for microchemical applications. With three concave depressions. Cavities measure ⅝" O.D. x ¼" Deep (22 x 7mm). Plate overall measures 3⅝"(L) x 1⅜"(W) (85 x 34mm)

Catalog #	Description	Pack
71561-01	3-Well Slide	each
71561-06	3-Well Slide	6/pk



► White Porcelain Plate

12 cavities on a white porcelain plate. Used for staining and color reactions.

They measure: 4⅝"(L)x3½"(W) (118x90mm). Cavity depth: ¼" (6.4mm).

71562-01	White Porcelain Plate	each
71562-06	White Porcelain Plate	6/pk



► Glazed Porcelain Plate

Our economical glazed porcelain plate is made from high purity raw material, uniform in quality and resistant to acids and alkalis. It can withstand sudden temperature changes without cracks, explosion or deformation. Under normal conditions, the glazed plate can sustain a temperature of up to 1050° C. Available in two models: 1. 6 well with overall measurements of 3¼"(L) x 2⅝"(W) x ⅜" thick, and 2. 12 wells with overall measurements of 4½" (L) x 3½" (W) x ½" thick.

Cat. #	Description	Well Measures	Pack
71575-06	6-Well	20mm Dia x 5mm Deep	each
71575-12	12-Well	20mm Dia x 5mm Deep	each



► 12 Cavities Spot Plate, Polypropylene

Very similar to the white porcelain plate, this PP plate comprises 12 cavities of approximately 1ml capacity and is economically priced. This plate is very high quality, unbreakable as well as autoclavable.

71572-01	12-cavities Spot Plate, Polypropylene	each
71572-10	12-cavities Spot Plate, Polypropylene	10/cs



GRID PREPARATION SUPPLIES AND ACCESSORIES

➤ 3-Cavities Spot Plates, LDPE

These spot plates have three depressions 21mm diameter x 7mm deep. The tray is 28mm x 85mm. Made from low density polyethylene and will withstand temperatures up to 80° C.

71574-05	3-cavities Spot Plate, Polypropylene	5/pk
71574-40	3-cavities Spot Plate, Polypropylene	40/cs



➤ Pyrex® Plate

A 9 cavity Pyrex pressed plate which offers a clear view for observation by transmitted light. The plate measures: 4"(L)x3¾"(W) (100x85mm). The cavity is ¼" (6.4mm) deep with a ⅜" (22mm) opening.

71563-01	Pyrex Plate	each
71563-06	Pyrex Plate	6/pk



➤ Silicone Staining Pad

Made from white silicone, a non-reactive material. Pad has 40 cells in 5 rows of 8 each. Each cell is half-sphere shaped with an opening of 6mm dia. and 5mm deep. A few drops of staining solution is added to the wells and grids are then immersed and retrieved as per staining procedure. A watch-glass plate comes with each dish to reduce oxygen and evaporation. Measures: 5"(L)x3"(W)x ½"(T) (127x76x13mm)

**EMS
EXCLUSIVE**

71565	Silicone Staining Pad	each
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➤ Syracuse Watch Glass

A clear watch glass which measures 65mm(OD)x50mm(ID)x 10mm(Deep). The glass is grooved and has a recessed bottom which allows for stacking and prevents scratching. It is ideal for staining and specimen preparation.

71570-01	Syracuse Watch Glass	each
71570-06	Syracuse Watch Glass	6/pk



➤ The EMS Staining Plate

The EMS Staining plate for Electron Microscopy was developed by Dr. Miguel Berrios, at SUNY at Stony Brook, Dept of Pharmacological Sciences, School of Medicine, New York.

The chemical etching process, antibody incubations and final staining with heavy metal salts of each grid is performed in the small cone-shaped wells on the EMS staining plate.

The EMS Staining Plate for electron microscopy post-embedding staining and immunohistochemistry offers several advantages over all other commercially available staining devices. The base plate is a solid piece of chemical-resistant silicone 127.5mm long, 85.5mm wide, 11.5mm thick with 96 cone-shaped wells organized (like the microtitration plate) in parallel rows of eight, using the lid of a 96-well Falcon 3072 Microtest™ III Plate as a cover. The base has two notches to serve for orientation and a 1.5mm X 4.4mm deep lip where the cover rests. Each well is an inverted cone 7mm in diameter and 2mm deep. Grids either float or rest at the bottom of

each well. The wells allow incubation of a grid in 12-60 microliters of solution without reagent loss due to adsorption or cross contamination, even when the plate is tilted up at 70°. Due to the shape of the well, the flat surface of the grids never come into contact with the walls of the well, both facilitating sample staining and grid recovery.

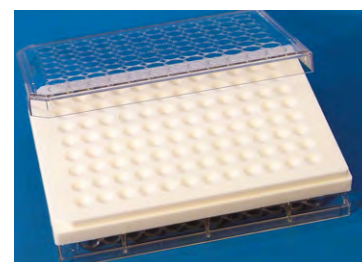
**EMS
EXCLUSIVE**

Plates made from silicone offer two advantages:

- Resistant to all chemicals and solvents
- During manipulation of the grids in the well there is no risk of damaging the fine points of the tweezers.

Reference: Berrios, Miguel; (1991), A Staining Plate For Electron Microscopy. 48: 90-92.

71568	EMS Staining Plate	each
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➤ For a complete line of Staining Dishes and Jars,

See *Histology* section, pages 518-526 >>>>

GRID PREPARATION SUPPLIES AND ACCESSORIES

► Vacuum Pick-Up System

Handle delicate miniature objects without scratching, breaking or pinching. The system avoids contamination of parts and performs functions that tweezers does such as sorting, picking up, holding, carrying, and trans-ferring. As well it is an alter-native way for handling cover slips without the use of forceps.



Features:

- Picks up grids faster and easier than tweezers –
- WARNING: Never use this device on coated grids.**
- Quiet operation.
- Eliminates all tweezer damage to grids.
- Good suction (produces 14" Hg vacuum and an air flow of 125 cubic inches/minute); Can pick up aluminum stubs.
- Can be used as a tool to pick up glass slides, cover slips, wafers, thin film samples, etc.

Double-insulated (115–120V, 60Hz, 2-wire). Light weight, completely assembled and ready for immediate operation as soon as the proper tip is selected and installed. Vacuum is created at the tip by placing the finger over the control hole on the anodized aluminum vacuum pen. To break the vacuum, just remove your finger from the hole. The vacuum generator measures 4½" (H) x 2¾" diameter (114 x 70mm), and it has an adjustable vacuum pressure control from 1" Hg to 15" Hg.

Vacuum Pick-up System complete set: Vacuum Generator, Aluminum Vacuum Pen, Five Vacuum Tips, Set of eight Rubber Vacuum Cups (size ranging: ⅜", ⅝", ½", ⅞", ⅝", ⅝", ¼" and ⅜"), an In-Line Filter, and 4 ft (122cm) of Vacuum Tubing.

Cat. #	Description	
71894	Vacuum Pick-Up System, 115V/60Hz	each
71895	Vacuum Pick-Up System, 220V/60Hz	each
71896	Vacuum Generator only, 115V/60Hz	each
71897	Vacuum Generator only, 220V/60Hz	each
71894-01	Vacuum Pick-Up Pen only	each
71904-02	In-line Vacuum Filter	each

Replacement Stainless Steel Probe Tips (1.5" Long) and Rubber Suction Cups:

Cat. #	Description	O.D.		I.D.	
		(in)	(mm)	(in)	(mm)
71898	15 gauge Probe Tip	.071	1.8	.052	1.3
71899	16 gauge Probe Tip	.065	1.7	.045	1.1
71900	21 gauge Probe Tip	.032	0.8	.020	0.5
71901	22 gauge Probe Tip	.028	0.7	.016	0.4
71902	23 gauge Probe Tip	.025	0.6	.013	0.3
71903	⅝" (14.27mm) Vacuum Suction Cup				each
71904	⅞" (11.12mm) Vacuum Suction Cup				each
71905	⅝" (9.53mm) Vacuum Suction Cup				each
71906	⅞" (7.94mm) Vacuum Suction Cup				each
71907	¼" (6.35mm) Vacuum Suction Cup				each
71908	⅞" (4.76mm) Vacuum Suction Cup				each
71909	Set of 8 Rubber Cups (⅝", ⅞", ½", ⅞", ⅝", ⅝", ¼", and ⅜")				8/set



► Pen Vac™

Pen-Vac™ is a new improved way to handle small, flat surface objects. Beside the electronics assembly industry, jewelers, model builders etc. Pen-Vac is ideal for EM work as well. It can be used to handle grids, pick up stubs, align membranes, work with glass slides, cover slips and much more. Holds up to one minute.

Features:

- Lifts up to 50 grams.
- Totally self-contained vacuum.
- Light-weight, less than one ounce.
- Fits in your pocket like a pen.
- Brushed aluminum body.
- Optional storage compartment for vacuum tips and cups.
- No power supply needed.
- Available in various sizes.
- Interchangeable vacuum probes.

Pen-Vac™ comes with:

- A variety of Vacuum Probes, complete with a vacuum cup attached and it is available with plastic or aluminum hubs. Straight and angled to suit your applications. The stainless steel needle portion of the probes are one-half inch long.
- Vacuum Cups come in a wide range of materials. We offer the Static Dissipative and the Conductive Cups that provide ESD protection for electrostatic discharge of sensitive components. Cups comes in three sizes: ⅝" (3.17mm); ⅞" (6.35mm); and ⅝" (9.52mm).

Set consists of:

One Pen with 6 Probes and Cups. (6 Probes: 3 angled, ⅝", ⅞", ⅝" and 3 straight ⅝", ⅞", ⅝")

71914	Complete Pen-Vac System	set
71915	Same as 71914 with Deluxe Case	set

Probes and Cups:

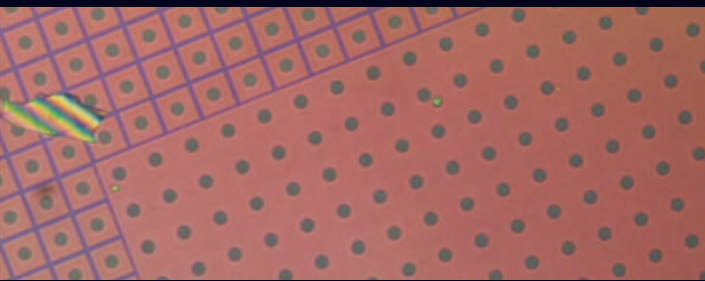
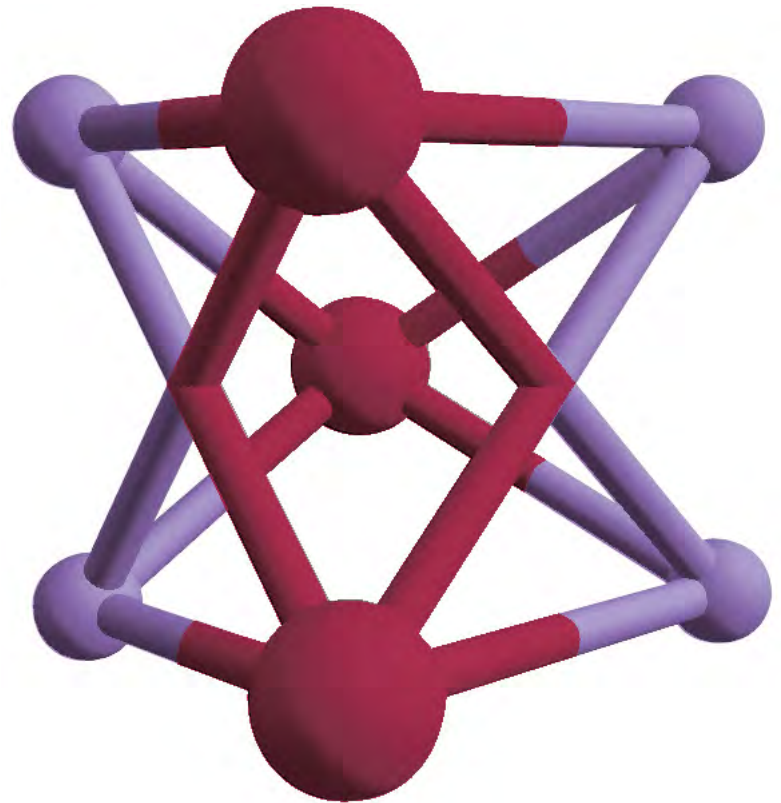
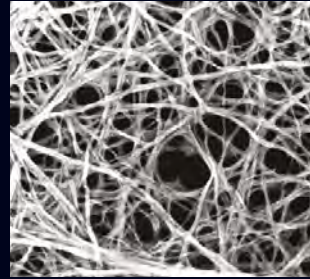
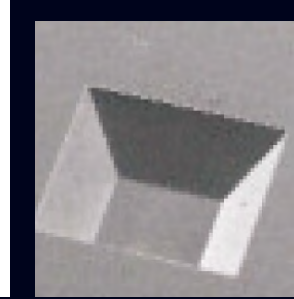
71916	⅝" Straight and Bent, Small	2/pk
71917	⅞" Straight and Bent, Medium	2/pk
71918	⅝" Straight and Bent, Large	2/pk

Silicon Nitride Mesh & Films

DuraSiN™ Film and Mesh for TEM

DuraSiN™ Customization

Pyrolytic Graphite



**Electron
Microscopy
Sciences**

► DuraSiN™ Film and Mesh for TEM

DuraSiN™ Film and Mesh products have revolutionized the way samples are prepared for and analyzed in the transmission electron microscope.

Applications

Quantitative Analysis of Carbon-Containing Specimens

- Photoresists
- Polymers
- Foods
- Oils
- Dyes

Particle Analysis

- Powders
- Aerosols
- Nanoparticles
- Airborne particles

Chemical Reactions

- Catalysis
- Active sites

Chemical Deposition and Growth

- Nanowires
- Carbon Nanotubes
- Colloids
- Self-assembled monolayers

New Material Discovery

- Multianalysis
- High Temperature
- Acidic/Basic Sample Prep

- Designed to aid microscopists and micro-analysts in TEM and multi-analysis work
- Fully customizable frame & window dimensions, hole patterns and membrane thickness
- Affordable
- Ultra-flat
- Robust to glow discharge high energy plasma cleaning
- Robust to solvents, bases, acids & high temperatures (up to 1000 °C)
- Large viewing area free of grid bars
- Compatible with integrated functionality

Introduction

DuraSiN™ Film and Mesh products are affordably-priced, durable, nonorganic, low scatter support grids for quantitative TEM and X-ray analysis. DuraSiN™ products are made of a thin, high quality, low-stress silicon nitride membrane supported around its perimeter by a rigid silicon substrate.

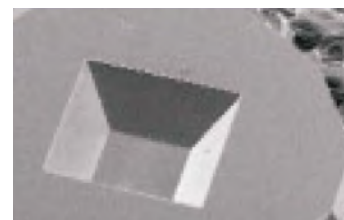
Unlike other support films and grids, DuraSiN™ Film and Mesh products can withstand harsh chemical and temperature environments. For example, DuraSiN™ Film or Mesh products could be used as a substrate onto which nanowires could be directly grown from a strong acidic solution. Once the nanowires are grown, the specimen is immediately ready for imaging and analysis in the TEM. With direct deposition, no longer will you have to prepare a sample on one substrate only to then have to transfer it to a support grid for imaging.

Overview

DuraSiN™ Film and Mesh products are affordably-priced, durable, non-organic, low scatter support grids for quantitative TEM and X-ray analysis. When seeking the highest possible resolution, DuraSiN™ Film and Mesh products provide the ideal platform for imaging and analysis.

DuraSiN™ Film

The DuraSiN™ Film support grids are composed of two materials. The area for specimen observation is fabricated from chemically robust, low-stress, planar silicon nitride films and this area is supported by a rigid silicon frame where the frame thickness available for these products ranges from 200 - 600 microns. The DuraSiN™ Film support grids provide a cost-effective and durable platform for sample preparation, cleaning, imaging and analysis.

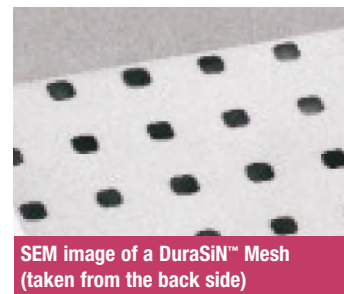


SEM image of a DuraSiN™ Film (taken from the back side)

Perfect for the analysis of colloids, powders, aerosols and polymers. The DuraSiN™ Film provides durable, non-organic, low scatter substrates for quantitative TEM and X-ray analysis at affordable prices. DuraSiN™ Film substrates are fabricated from high quality, low-stress silicon nitride and supported on a rigid silicon substrate. DuraSiN™ Film products are robust to most cleaning procedures, including acetone, alcohol and oxygen plasma/UV ozone. Products are available in sizes ranging from standard TEM (2.65mm diameter) to greater than 10mm for x-ray applications.

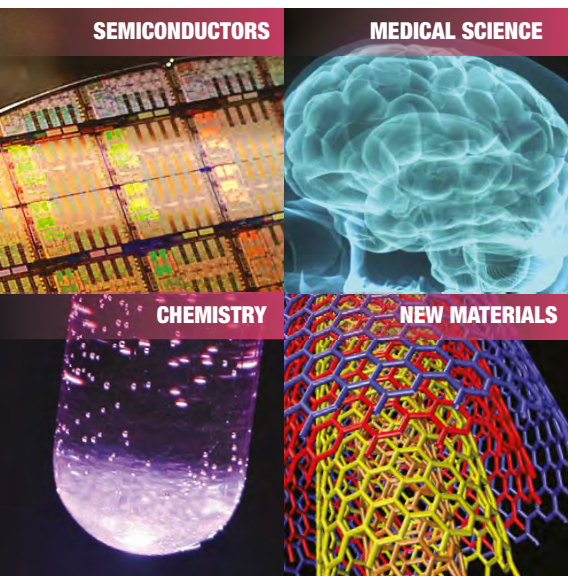
DuraSiN™ Mesh

DuraSiN™ Mesh support grids are also fabricated from chemically robust, low-stress, planar silicon nitride films and are supported by a rigid silicon frame. However, DuraSiN™ Mesh has a regular array of small, dense holes fabricated across the observation area thereby providing truly electronbeam transparent regions for specimen imaging and analysis. DuraSiN™ Mesh support substrates offer the unique combination of an inorganic support film and regions completely transparent to an electron beam.



SEM image of a DuraSiN™ Mesh (taken from the back side)

These two features provide the microscopist and micro-analyst with unparalleled capability for imaging and analysis. Like other holey or lacey support films, DuraSiN™ Mesh support substrates provide regions completely unobstructed by the support film. However, the fact that the DuraSiN™ Mesh is made from inorganic silicon nitride provides the ability to thoroughly clean (e.g. with an aggressive oxygen plasma) a specimen already fixed to the support substrate and to assure that the imaging and analysis is done only upon on the specimen rather than unintended contamination. For example, when analyzing carbon nanotubes, DuraSiN™ provides a clean, carbon-free support to isolate the specimen from carbon contamination.



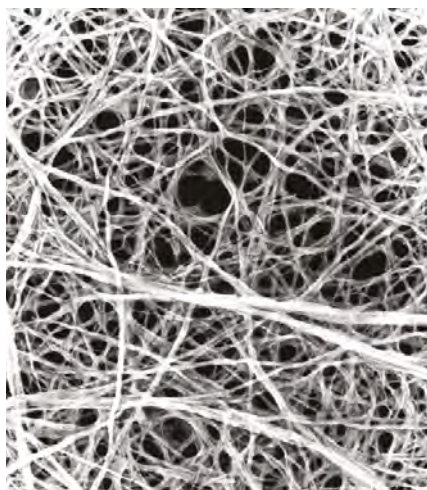
➤ DuraSiN™ Film and Mesh for TEM (continued)

Features & Advantages

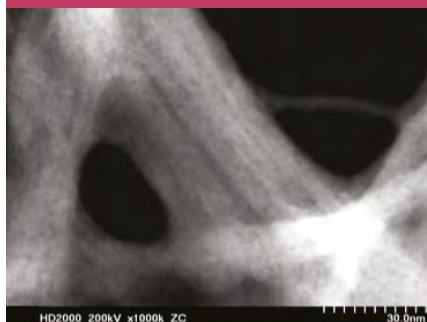
DuraSiN™ Films and Mesh products are chemically and mechanically robust support films for X-ray and TEM microscopy and they are available at more affordable prices than any other product in their class. DuraSiN™ offers unparalleled advantages over the traditional carbon-based support grids. If your research involves materials that are grown or deposited in harsh environments, DuraSiN™ may be the perfect support film for you. Capable of withstanding virtually any acid, base or solvent, DuraSiN™ allows the deposition or growth of colloids, fibers, nanoparticles, powders, polymers or wires directly onto the support film itself. Its temperature stability up to 1000 °C even allows direct deposition using standard physical and vapor deposition techniques common in the semiconductor industry, including CVD, sputtering, e-beam and resistive evaporation. With direct deposition or growth onto DuraSiN™, any ambiguity introduced from sample transfer to a less robust support film is eliminated. The temperature stability of DuraSiN™ also allows the observation of dynamic processes when several samples are removed for analysis at various times in the deposition, growth or anneal process.

The mechanical stability of DuraSiN™ offers a support film that is ideal for multi-analysis, in particular, TEM or X-ray and AFM. DuraSiN™ Film and Mesh products are not only robust enough to allow direct deposition and growth, but are also strong enough to allow AFM directly on the membrane, giving microscopists the ability to analyze both internal structure and surface detail in the exact same viewing area. In addition, DuraSiN™'s mechanical strength offers wide area membranes without the need for underlying grid bars eliminating the unwanted roughness, contamination or obstruction of other support grids.

Where cleanliness is a concern, particularly for compositional analysis using EDAX, etc., DuraSiN™ can be vigorously cleaned using processes previously not possible with carbon-based supports. DuraSiN™ can be cleaned in sulfuric acid to remove organics, as well as glow-discharge and high-energy oxygen plasma. Using these techniques, a pristine, carbon-free surface can be obtained for subsequent specimen deposition or growth and analysis.



Nanowire STEM image on DuraSiN™ Mesh at 35,000x. Image courtesy of Mike Salmon, NCSU AIF



Nanowire STEM image on DuraSiN™ Mesh at 1,000,000x. Image courtesy of Mike Salmon, NCSU AIF

DuraSiN™ is available in both continuous films and patterned meshes, in a variety of shapes and sizes, many customizable. DuraSiN™ Mesh is the only support available with hole sizes down to 1 micron in diameter, allowing the observation of the shortest fibers or wires. It is the highest quality, most affordable product in its class.

Top 10 Reasons to Use DuraSiN™ Film and Mesh Products

- 1. DuraSiN™ products are affordable**
Since they are sold in single grid quantities and in multi-grid packs, customers can try several different products at an affordable cost to optimize sample preparation and imaging conditions
- 2. DuraSiN™ products allow multiple microscopy techniques to be performed on the same specimen**
The mechanical stability of DuraSiN™ products allow direct deposition and growth of specimens and are strong enough to allow AFM directly on the membrane giving microscopists the ability to analyze both internal structure and surface detail in the exact same viewing area
- 3. DuraSiN™ products are robust to solvents, bases and acids**
Samples grown under strong acidic or basic conditions can be grown, deposited or synthesized directly onto a DuraSiN™ Film or Mesh
- 4. DuraSiN™ products can withstand high temperatures (up to 1000°C)**
Samples grown or deposited directly onto DuraSiN™ can be annealed or cured at elevated temperatures while mounted to a support grid
- 5. DuraSiN™ products are robust to glow discharge high energy plasma cleaning**
Glow discharge can be used to modify the surface of DuraSiN™ products and high energy plasmas can be used to aggressively remove any organic residuals from the sample preparation process
- 6. DuraSiN™ has an ultra-flat surface**
Reduce both specimen preparation time and imaging artifacts introduced by other non-planar support grids
- 7. DuraSiN™ provides a large viewing area free of grid bars**
Examine specimens through large tilt angles without losing data from grid bars
- 8. DuraSiN™ can be produced with extended functionality integrated onto the support film**
In-situ characterization is possible with advanced features such as integrated electrodes
- 9. DuraSiN™ Mesh products provide a regular array of micron-scale holes**
The regular array of micron-scale holes available only with DuraSiN™ Mesh enables the highest resolution possible for nanowires, carbon nanotubes, fibers, powders and colloids
- 10. DuraSiN™ can be manufactured with fully customizable frame & window dimensions, hole patterns and membrane thickness**
The DuraSiN™ product family offers the maximum flexibility to meet specific customer needs

Applications

DuraSiN™ Film and Mesh products are robust over extreme temperatures and in harsh chemical environments making them an ideal choice for many applications

NEW – Tissue Culture

-- DuraSiN is compatible with standard tissue culture techniques, sterilization procedures, and surface modification chemistries.

NEW – Solid State Nanopores

-- DuraSiN film products are ideal substrates for molecule translocation studies using solid state nanopores. Through various methods, nanopores can be applied to the 30 or 50 nm silicon nitride film for the quantitative analysis of DNA and other macromolecules.

Quantitative Analysis of Carbon Containing Specimens

-- DuraSiN™ Film and Mesh provide a carbon-free support allowing more accurate compositional analysis of carbon-containing compounds

-- The continuous, ultra-planar surface of DuraSiN™ Film is ideal for the deposition of polymers allowing the nanostructure of ordered polymer layers to be quantified

Chemical Deposition and Growth

-- Surface modification of DuraSiN™ Film or Mesh silicon nitride membranes allows attachment and analysis of target materials

-- Liquid samples can be dried on and supported by DuraSiN™ Film

-- The large, regular array of holes for imaging on DuraSiN™ Mesh provides numerous electron-transparent analysis sites

Nanoparticle Analysis

-- Fine powders can be deposited and imaged over the electron-transparent holes of DuraSiN™ Mesh

-- Atomized nanoparticles can be deposited and imaged at near-atomic resolution on continuous DuraSiN™ Film

Chemical Reactions

-- The impact of particle size & separation can be quantified with DuraSiN™

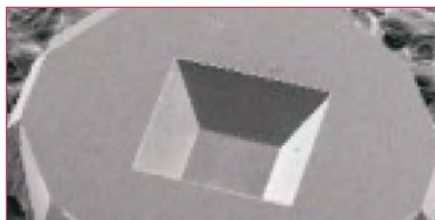
-- Oxidation and reduction reactions can be observed in-situ or ex-situ with DuraSiN™ Film and Mesh

New Material Discovery

-- Multiple analysis techniques (e.g. TEM, STEM, XRAY, SEM, XPS, AES and AFM) can all be performed on the same specimen when it is supported by DuraSiN™ Film or Mesh

► DuraSiN™ Film and Mesh for TEM (continued)

DuraSiN™ Film



DuraSiN™ Film products are specifically designed to give TEM/STEM and X-ray microscopists a support film that can withstand virtually any environment needed to grow or deposit a specimen. If your specimen requires exposure to high temperatures, acids, bases and/or solvents, consider growing them directly on DuraSiN™ Film - samples will not need to be transferred to another support for imaging and the presence of imaging artifacts introduced by specimen preparation can be virtually eliminated. Self-assembled monolayers can be formed on a DuraSiN™ Film membrane for subsequent attachment of nanoparticles.

Perfect for the analysis of colloids, powders, aerosols and polymers. The DuraSiN™ Film products provide a durable, non-organic, low scatter substrate for TEM and X-ray analysis at affordable prices. Sandwich them together and form a closed environment for wet cell applications. Our films are even robust enough to allow multianalysis, including AFM and TEM using the same grid.

DuraSiN™ Mesh



DuraSiN™ Mesh products are a completely novel product, offering all the advantages of the Film products but with the benefit of having completely electron transparent regions (holes) in the film. Holes are available in a variety of shapes and sizes, down to even submicron features.

DuraSiN™ support films are ideal for **multianalysis of samples**, including fibers, colloids, nanowires and powders. The rigid silicon frame provides an area for AFM analysis, just microns from the transparent window regions for TEM, STEM and X-ray. Remove the experimental ambiguity of analyzing different

specimens when combining microscopy techniques. A specimen can be deposited or grown directly on DuraSiN™ Films and then a single specimen can be analyzed with TEM, STEM, AFM and X-ray. Depending upon the DuraSiN™ window thickness and AFM stylus force, some users have even been able to AFM their specimen directly on the membrane itself.

Product Line

Based upon low-Z, inert silicon nitride, the DuraSiN™ Film and Mesh products are specifically designed to give TEM/STEM and X-ray microscopists a support film that can withstand virtually any environment needed to grow, deposit and/or image a specimen. DuraSiN™ Film and Mesh products are ideal if your specimen requires exposure to high temperatures, acids, bases and/or solvents. If your samples are grown in these conditions, consider synthesizing them directly on support films to prevent transferring to another support for imaging.

DuraSiN™ Film products are fully specified by 4 parameters: window size, frame thickness, film thickness and frame size. DuraSiN™ Mesh products require two additional parameters: hole size and center-center hole pitch. There are several standard and immediately available DuraSiN™ products specifically designed for TEM and X-ray applications as outlined below. Of course given their mechanical durability and robustness to temperature and chemicals, all of the DuraSiN™ products make ideal substrates for performing and then correlating the results from multiple microscopy techniques all on the same specimen.

DuraSiN™ Film for TEM

Description	DTF-05523	DTF-1523	DTF-2523
Film Thickness	50nm	100nm	200nm
Window Area	0.5mm	0.5mm	0.5mm
Frame Diameter	2.65mm	2.65mm	2.65mm
Frame Thickness	300µm	300µm	300µm

DuraSiN™ Film for X-ray

Description	DX-2513
Film Thickness	200nm
Window Area	2.5mm
Frame Diameter	5mm
Frame Thickness	300µm

DuraSiN™ Mesh for TEM

Description	DTM-25231
Film Thickness	200nm
Window Area	0.5mm
Frame Diameter	2.65mm
Frame Thickness	300µm
Hole Size	2µm
Hole Pitch	12µm

➤ **DuraSiN™ Film and Mesh for TEM (continued)**

Customization

We realize that each customer has unique needs. Because specimens vary greatly in composition and size, and because DuraSiN™ finds use in numerous analytical and imaging techniques, there is no “ideal” product shape and size. To meet the diverse and demanding needs of the research community, DuraSiN™ Film and Mesh products were designed to facilitate customization and meet a user’s specific requirements. For example, X-ray microscopists may be interested in DuraSiN™ products with a larger window area and with a thicker silicon nitride membrane. Users with microscopes that have a unique sample support fixturing may be interested in DuraSiN™ products with a larger frame diameter. Finally, for the most demanding applications, ultra-thin silicon nitride membranes (<50nm) may be required.

DuraSiN™ products can be customized to target a specific silicon nitride membrane thickness, silicon frame thickness, window area, and/or frame area. Most custom dimensional changes can be accommodated in only 3-4 weeks, and most other custom requests can be completed within 4-6 weeks. Please note that customized products may be more expensive, and minimum quantities may apply.

While almost any parameter defining the structure of DuraSiN™ products can be customized, there are ranges for these parameters that generally need to be considered:

Description	DuraSiN™ Film for TEM	DuraSiN™ Mesh for TEM	DuraSiN™ Film for X-ray
Film Thickness	30nm - 200nm	30nm - 200nm	100nm - 200nm
Window Area	0.2mm - 0.7mm	0.2mm - 0.7mm	0.5mm - 10mm
Frame Diameter	2.65mm	2.65mm	2.65mm - 15mm
Frame Thickness	200µm - 600µm	200µm - 600µm	200µm - 600µm
Hole Size	N/A	>0.8µm	N/A
Hole Pitch	N/A	depends on hole size and shape	N/A

Membrane Thickness

Standard DuraSiN™ products are available with 50nm, 100nm, and 200nm silicon nitride membrane thickness. Custom membranes can be manufactured with silicon nitride film thickness ranging from 20nm up to several microns thick. Typically, very thin windows (<50nm) are compatible with small window area while thicker windows can be used with any window area, including large area windows. It should be noted that extremely thin windows must be handled very carefully due to their fragile nature.

Window Area

Standard DuraSiN™ products have square windows are available with edge length ranging from 500µm to 5mm. Custom window areas can be manufactured with window area ranging from µm to mm. The maximum window area is a function of the membrane thickness, and larger windows can produced from thicker nitride. Very small windows can also be manufactured, but, due to process constraints, these small windows may exhibit a larger window size variation among samples, for example 50µm +/- 20µm. Rectangular windows (sometimes known as “slot grids”) with custom dimensions can also be produced.

Frame Diameter

Standard DuraSiN™ products have frame diameter ranging from 2.65mm to 10mm. Custom frame diameters can be manufactured with frame diameter ranging from 2.65mm to 10mm. Typically, larger window areas require a larger frame diameter. The minimum frame diameter that can be produced is the TEM size (2.65mm), presently offered through EMS along with 5mm and 10mm frame sizes. However, any size between 2.65mm and 15mm can be custom ordered.

Product Comparisons

DuraSiN™ vs. copper, molybdenum, formvar and carbon TEM grids

DuraSiN™ silicon nitride membranes are the “high-tech” alternative to standard metal TEM grids. Using the tools and techniques of semiconductor manufacturing, DuraSiN™ is created as a silicon nitride membrane supported by a silicon frame. Samples deposited on to the membrane can be imaged using TEM, X-ray, STEM, SEM and other techniques. Compared to standard TEM grids, DuraSiN™ offers the user several advantages. DuraSiN™ membranes are extremely thin – from 200nm down to 50nm and thinner. DuraSiN™ products are extremely planar. DuraSiN™ products are resistant to acids, bases, solvents, and plasma cleaning.

DuraSiN™ products can withstand a wide temperature range. These attributes are critical in a variety of applications. The planarity and strength of the silicon nitride membrane allows the user to perform multi-analysis (i.e. the use of several complementary microscopy and analytical techniques on the same sample, for example AFM/TEM or SEM/TEM). DuraSiN™ silicon nitride membranes also allow imaging of wet samples via SEM/TEM/XRM by placing the sample between two membranes (this configuration is commonly known as a “wet cell”). Since silicon nitride can withstand acids, bases, solvents and high temperatures, DuraSiN™ membrane supports can be used to image a wide variety of reactions on the membrane surface in-situ. In short, DuraSiN™ allows the user to obtain high-quality images in ways that are impossible with standard TEM grids.

DuraSiN™ vs. competing silicon nitride TEM grids

DuraSiN™ silicon nitride membranes have properties similar to competing silicon nitride sample supports. They are offered in standard form factors, are based on low-stress silicon nitride membrane technology, and have similar chemical resistance/temperature properties. DuraSiN™, however, offers customers two key differences.

DuraSiN™ is available through EMS in quantities as small as a single grid – this enables users to sample a variety of grids at reasonable cost without the constraint of large minimum orders. More importantly, the availability of singlegrid packs allows customers to quickly and inexpensively determine which product is ideal for their particular application.

DuraSiN™ products also offer the customer the highest level of customization. Frame size, window size, and nitride thickness can all be adjusted to meet specific research needs using a set of proprietary manufacturing techniques. Moreover, since DuraSiN™ is designed and manufactured in the United States, we can provide customization of all products faster than the competition, whose products are manufactured elsewhere. This flexibility and rapid response makes DuraSiN™ the ideal choice for silicon nitride membrane supports.

Property	DuraSiN™ Silicon Nitride Support Films	Copper TEM Grids	Molybdenum TEM Grids	Formvar/ Carbon Coated TEM Grids
Enables AFM and TEM on the same region of specimen	✓	✗	✗	✗
Robust to glow discharge & high energy plasma cleaning	✓	✓	✓	✗
Robust to solvents, bases and acids	✓	✓	✓	✗
Robust to high temperatures (up to 1000 °C)	✓	✗	✓	✗
Ultra-flat	✓	✗	✗	✗
Capable of integrated functionality directly on support film	✓	✗	✗	✗
Sold in single grid quantities	✓	✗	✗	✗
Fully customizable frame and window dimension, hole patterns and membrane thickness	✓	✗	✗	✗

► DuraSi™ Film and Mesh for TEM (continued)

Technical Data

Surface Roughness

Surface roughness AFM data for 100nm thick DuraSi™ films is shown below. The data was acquired from a 5µm scan across the surface. The average surface roughness in the boxed area (ignoring the dust particle to the left) is 3.39 angstroms. Although some variation is expected from device to device, DuraSi™ 100 and 200nm films typically have an average surface roughness in the 3.0-angstrom range.

DuraSi™ products with 50nm films typically have a slightly larger average roughness than the 100nm and 200nm films. As determined by AFM, the 50nm DuraSi™ films typically exhibit average surface roughness of about 1.2nm.

Surface Flatness

Flatness is a measure of how warped or bowed the surface is. As measured though a 20X DI microscope objective, the images do not demonstrate any measurable deformations. The regions around the 2-micron holes are completely flat, without any lip or curl around the edge of the hole allowing specimens to lay flat across the holes. The image of the film also does not show any deformations. As a reference, the pieces of dust viewable in the image stands out because of the difference in surface height with respect to the film.

Solvent and Acid Robustness

DuraSi™ Films and Meshes are robust to most solvent and acid treatments, and can be cleaned with virtually any process required by your specimen preparation protocol. Solvents such as methanol, ethanol and acetone have no effect on the film. Acids, including sulfuric and nitric, also do not affect the film. Other common cleaning procedures such as the J.T. Baker solution and RCA cleaning are also acceptable.

Plasma and Glow Discharge Robustness

DuraSi™ Film and Mesh products are made from silicon nitride and are extremely robust to glow discharge cleaning and high-energy oxygen plasma. This is particularly useful when there is a need to completely remove organic residues that could either affect the image quality or EDAX measurements. The products have been exposed to high-energy, 300W oxygen plasma systems typically used for removing up to microns of photoresist in the semiconductor industry, and no etching was observed in spectroscopic thickness measurements. In addition, no degradation was observed when inspected through a high-power optical microscope.

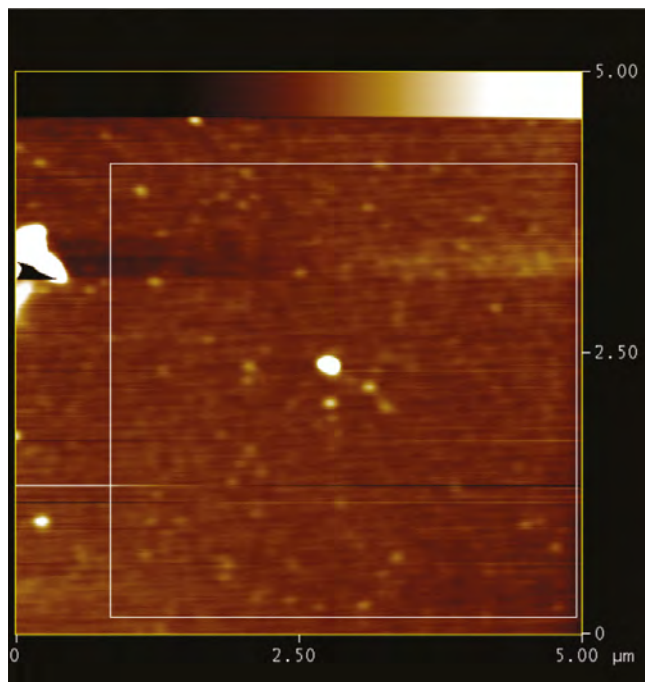
Electron Transparency

Monte Carlo simulations on models of 100nm thick DuraSi™ films, under the presence of a 120 and 200keV electron beam and probe size of 1 angstrom show almost zero electron scattering even after 10,000 trajectories are simulated. With standard available thicknesses from 50nm to 200nm and because of the amorphous structure of the film, atomic-scale resolution has been obtained with DuraSi™ products, depending on the exact specimens under evaluation.

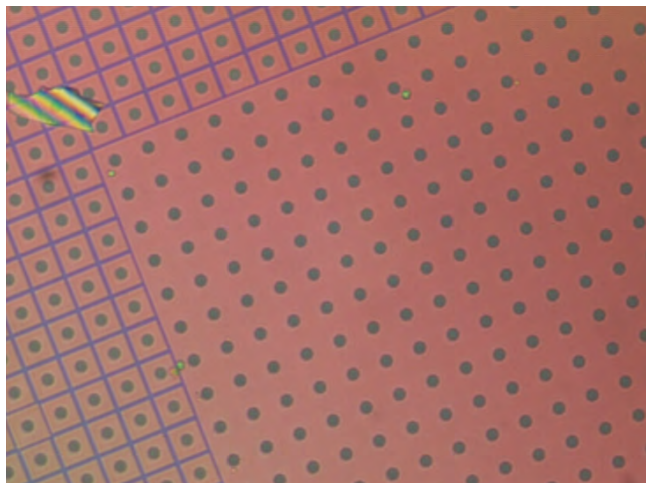
Chemical Robustness

The only acids which might adversely affect the films are 49% hydrofluoric acid when exposed for several minutes, or phosphoric acid when heated to temperatures greater than 150 °C. The need for these chemicals at these conditions is generally quite rare.

Because the films are in the nanometer thickness range, it is also not recommended that the grids be exposed to an ultrasonic bath. Cleaning



SURFACE ROUGHNESS DuraSi™ (100nm thick) AFM data



SURFACE FLATNESS DuraSi™ Mesh image taken through a DI 20x objective, white light source

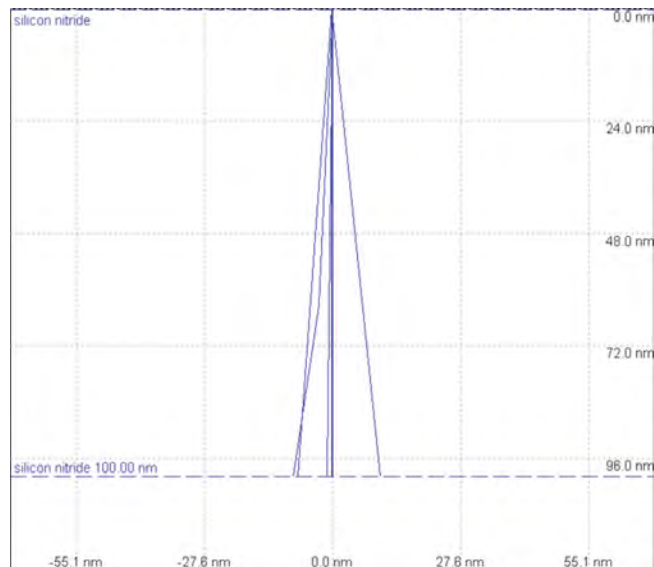
for 30 minutes in concentrated sulfuric acid will generally remove organics and dust particles. Sometimes a final treatment in oxygen plasma or glow discharge is also applied.

Temperature Robustness

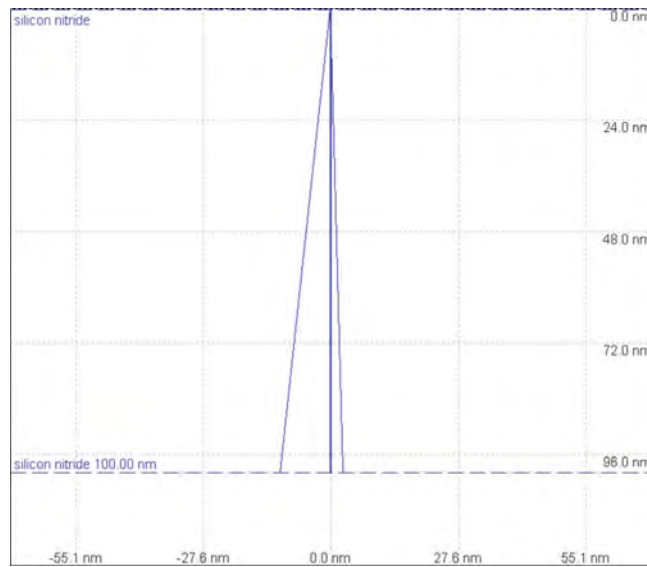
DuraSi™ has been tested to temperatures near 500 °C in ambient, and near 800 °C in vacuum. No degradation, warping or bowing was observed using a 20X DI microscope objective. DuraSi™ is expected to be stable at temperatures up to 1000 °C, which make the grids well suited for high temperature deposition steps.

➤ DuraSiN™ Film and Mesh for TEM (continued)

Technical Data (continued)



ELECTRON TRANSPARENCY
120keV electron beam, 100nm DuraSiN™ Film



ELECTRON TRANSPARENCY
200keV electron beam, 100nm DuraSiN™ Film

Ordering Information

Available in packs of 5 and 10.

DuraSiN™ Film for TEM

Catalog Number	DTF-05523	DTF-1523	DTF-2523	DTF-03523	DTF-050523	DTF-030523
Film Thickness	50nm	100nm	200nm	30nm	50nm	30nm
Window Area	0.5mm	0.5mm	0.5mm	0.5mm	0.05mm	0.05mm
Frame Diameter	2.65mm	2.65mm	2.65mm	~3mm	~3mm	~3mm
Frame Thickness	300µm	300µm	300µm	300µm	300µm	300µm

DuraSiN™ Film for X-ray

Catalog Number	DX-2513
Film Thickness	200nm
Window Area	2.5mm
Frame Diameter	5mm
Frame Thickness	300µm

DuraSiN™ Mesh for TEM

Catalog Number	DTM-25231
Film Thickness	200nm
Window Area	0.5mm
Frame Diameter	2.65mm
Frame Thickness	300µm
Hole Size	2µm
Hole Pitch	12µm

Check out our Newest and Most Revolutionary Products...

Introducing QuantomiX Wet SEM, a technological breakthrough.

Electron Microscopy Sciences and Quantomix have joined forces here in The United States to market and sell the breakthrough solutions of Quantomix's proprietary WETSEM™ Technology. This technology enables scanning electron microscopes (SEM) to image and analyze wet samples such as cells, tissue biopsies, foods and ink, in their native environment.

For more information, see page 650-664 or visit our website at www.emsdiasum.com



► PYROID® Pyrolytic Graphite Product Line – Vitreous Carbon Substrate

Our PYROID® pyrolytic graphite is a very light weight, 5'9's pure, solid crystal composition, with no granular components, extremely smooth surface, capable of withstanding cryogenic temperatures as well as temperatures in excess of 3000°C

The material is extremely anisotropic, meaning it conducts heat and electricity in the a-b plane like cooper but acts like a ceramic in the normal direction. In an annealed state, the thermal and conduction properties increase up to four to eight times that of aluminum and cooper respectively.

The material has zero porosity making it extremely stable and exhibits no outgassing. It is ideal for use in corrosive environments including acids and chlorine, and is highly transparent to organic samples and electrons, for analytical work, such as x-ray investigation, metallurgical, crystal growth, medical imaging technology etc.

Pyroid® is trade mark name of MINTEQ

Physical Properties of PYROID® Pyrolytic Graphite

Property	Direction*	Metric Units	English Units
Density	----	2.22 g/cc	1.37 lb/ft ³
Flexural Strength			
Room Temperature	a	840 kg/cm ²	12,000 psi
2750°C	a	3,500 kg/cm ²	50,000 psi
Compressive Strength			
Room Temperature	a	1,050 kg/cm ²	15,00 psi
	c	1,750 kg/cm ²	25,000 psi
Shear Strength			
Room Temperature	a	70 kg/cm ²	1, 000psi
Coefficient Thermal Expansion			
Room Temperature	a	.60 x 10 ⁻⁶ cm/cm°C	1.0 x 10 ⁻⁶ in/in°F
2200°C	a	.68 x 10 ⁻⁶ cm/cm°C	1.2 x 10 ⁻⁶ in/in°F
Room Temperature	c	6.8 x 10 ⁻⁶ cm/cm°C	12.0 x 10 ⁻⁶ in/in°F
2200°C	c	8.0 x 10 ⁻⁶ cm/cm°C	14.7 x 10 ⁻⁶ in/in°F
Thermal Conductivity			
Room Temperature	a	345 W/m ² K	200 BTU/(hr ft ²)(°F/ft)
1650°C	a	114 W/m ² K	66 BTU/(hr ft ²)(°F/ft)
Room Temperature	c	1.73 W/m ² K	1.00 BTU/(hr ft ²)(°F/ft)
3000°F	c	1.30 W/m ² K	0.75 BTU/(hr ft ²)(°F/ft)
Electric Resistivity			
Room Temperature	a	500 μΩcm	
1650°C	a	200 μΩcm	
Room Temperature	c	0.6 Ωcm	
1650°C	c	0.22 Ωcm	
Scleroscope Hardness			
	a	103	103
	c	68	68
Oxidation Threshold			
Permeability		650°C	1200°F
		Helium Leak Tight at 10 – 6 mmHg	

► Pyrolytic Graphite Stripper Film

Smooth pyrolytic graphite stripper film is used in radiation sources, nuclear particle high energy density research, and medical diagnostic imaging instruments

Pyrolytic graphite film offers major customer benefits relative to alternative materials such as amorphous carbon film or polycrystalline graphite films.

Pyrolytic graphite film is:

- Stable at high temperature and vacuum.
- Easy to flex due to inherent higher flexural modulus.
- Erodes very slowly.

Resulting in:

- Higher strength than alternative materials.
- Last 5 times longer than alternative materials.

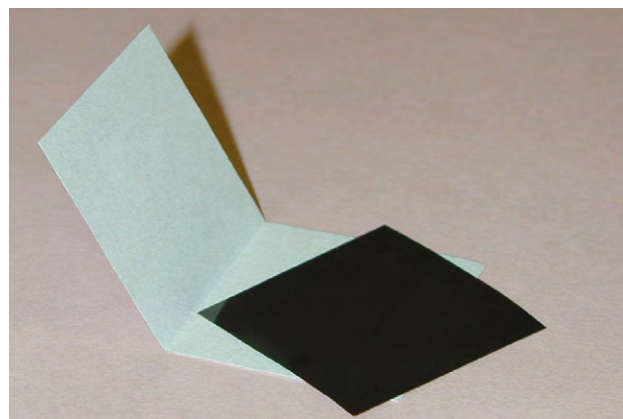
PYROID® Pyrolytic Film Thickness/Real Size Conversion

Thickness, in.	Wt/sq in.	Thickness, μm	Wt/sq cm
0.0002	0.0065 g	5	1.0 mg
0.0004	0.0129 g	10	2.0 mg

Ordering:

EMS #	Film Size, in. (mm)	Thickness, μm	Pack
76040-05	0.75 x 0.75 (19 x 19)	5	each
76040-10	0.75 x 0.75 (19 x 19)	10	each
76041-05	1.0 x 1.0 (25.4 x 25.4)	5	each
76041-10	1.0 x 1.0 (25.4 x 25.4)	10	each

We can custom make foils up to 1.5 inch wide and 3 inches long from 5μm and up thicknesses.



SECTION 6

Calibration Standards, Specimens, and Aids

Color Calibration System for Optical Microscopy

Low Magnification Calibration Standards for SEM and LM

SEM Calibration Specimens

Resolution and Gray Level Test Specimens

Back-Scattered Electron and EDS

Calibration Specimens for TEM and STEM

MAG*I*CAL®

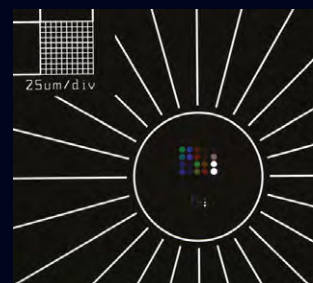
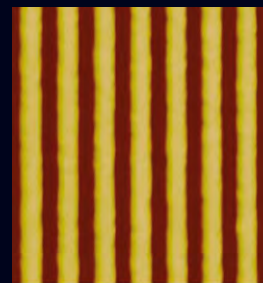
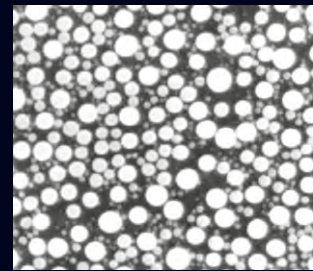
Diffraction Standards

Measuring Aids

Tip Check and Nioprobe for SPM

Magnification References SPM, AFM, SEM

SPM Calibrator



1. X-Checker Standard
2. X-Checker w/Boron
3. X-Checker Extra

**Electron
Microscopy
Sciences**



➤ Datacolor ChromaCal™ Color Calibration System for Optical Microscopy

A Calibration Standard for Brightfield Images

The Datacolor ChromaCal™ system is an innovative new solution that enables researchers, scientists and technicians to establish and preserve the color integrity of their digital transmitted, brightfield microscopy images.

Datacolor ChromaCal™ integrates three components to establish a color profile for the microscopy system:

- Proprietary software
- Color calibration microscope slide
- Computer monitor calibration device

Together, the Datacolor ChromaCal™ system establishes a color profile for the microscopy system and applies that profile to your specimen images to ensure consistent and reliable color representation. The outcome is improved comparability of images and enhanced communication and collaboration for better decision making.

Key Features

- Standardizes color reproduction in digital brightfield images
- Delivers consistent, reliable basis for evaluation, communication, quantification, documentation and publication
- Performs image and monitor calibration for consistency throughout the imaging process
- Compatible with most microscopes, scientific cameras and acquisition software

Datacolor ChromaCal™ easily integrates into your microscopy workflow.

Simply acquire your specimen images and an image of the calibration

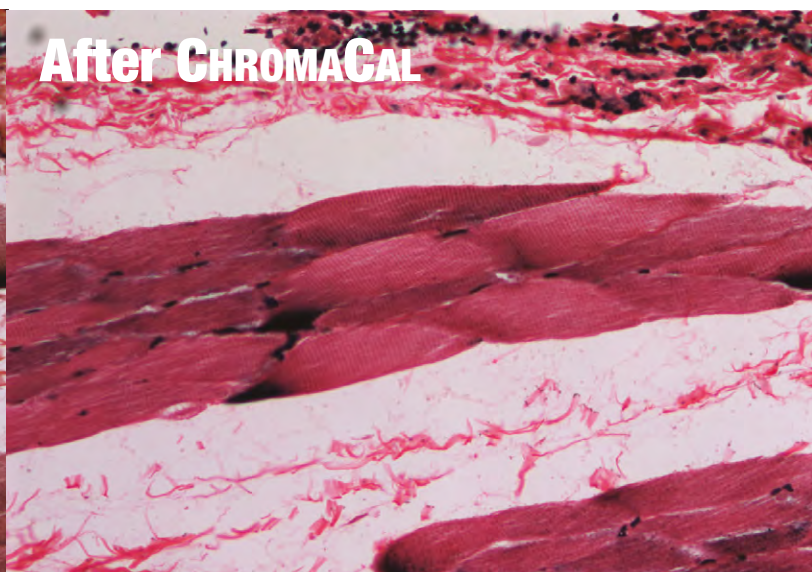
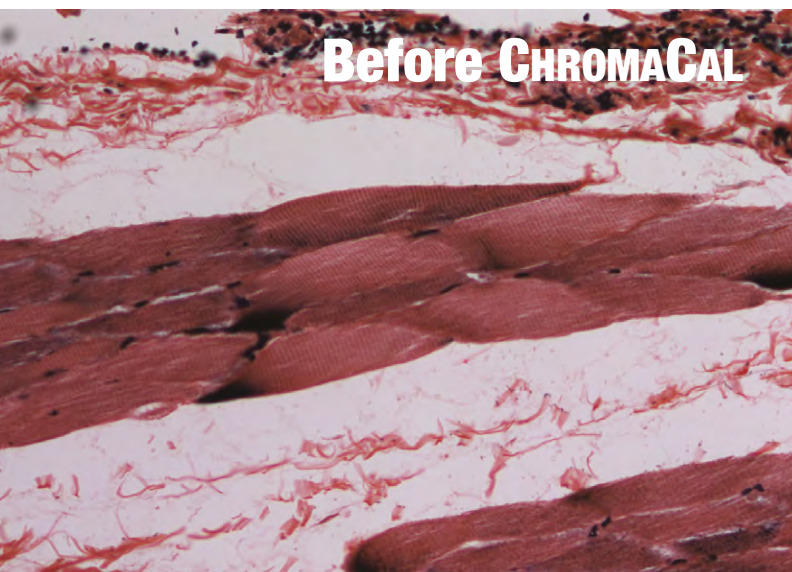
slide. Launch the Datacolor ChromaCal™ software, select the calibration image and apply the calibration to any or all of your specimen images. All original images are preserved, and "ChromaCal-ibrated" images are saved separately.



See how it works... Learn how to do it...

We've added video content to our website to help you get to know our latest products even better!

Stop by and see what it's all about.

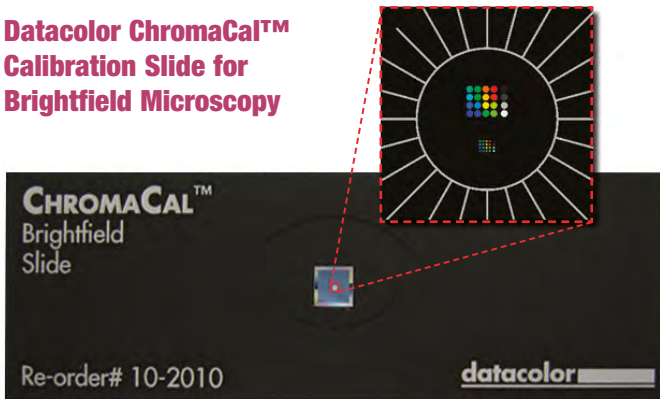




The Datacolor ChromaCal™ color calibration system for optical microscopy provides a color profile foundation from which images can be more easily compared and analyzed. Working with your existing microscope and imaging system, the calibration system fits easily into the imaging workflow - simply acquire an image of the calibration slide (required, and available separately) and using the proprietary software, apply the calibration to your specimen images. Your original files are preserved, and a complete audit trail is saved in the metadata of the calibrated images. Better consistency. Higher confidence. Color integrity for better decision making.

Includes both the image calibration software (a license to install on one workstation) as well as the monitor calibration set (a license to install on three workstations). Additional workstation installations can be purchased and activated directly through the software.

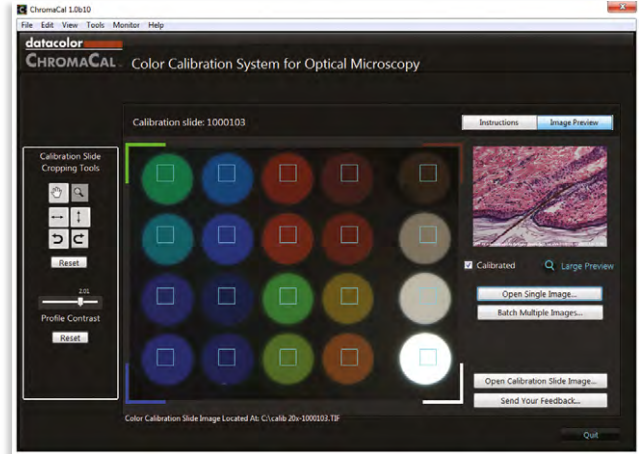
Datacolor ChromaCal™ Calibration Slide for Brightfield Microscopy



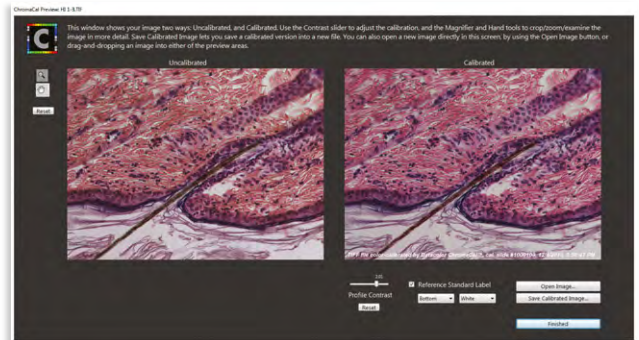
The Datacolor ChromaCal™ brightfield calibration slide is a unique, precision-engineered tool that is used in conjunction with the Datacolor ChromaCal™ brightfield microscopy calibration system and your microscope to establish a baseline color profile that is unique to your imaging session. The process is simple - acquire your specimen images and an image of the calibration slide. Using the proprietary Datacolor ChromaCal™ software just click to apply the color profile to your specimen images for a standardized approach to seeing colors.

The Datacolor ChromaCal™ Color Calibration Slide is designed exclusively for use with the Datacolor ChromaCal™ Color Calibration System for Optical Microscopy.

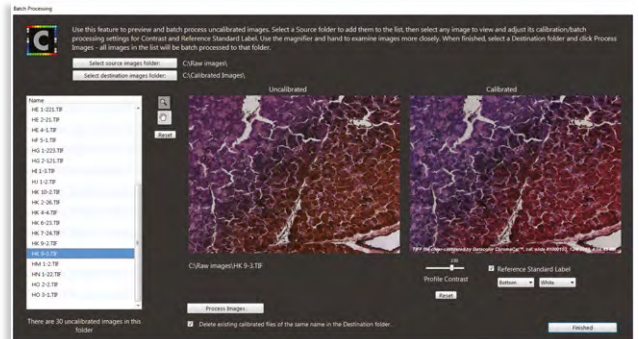
Each Datacolor ChromaCal™ slide is uniquely identified and corresponds to a specific color measurement file associated with the proprietary Datacolor ChromaCal™ chip at the center of the slide. The measurement file contains information that is utilized by the Datacolor ChromaCal™ Color Calibration System when calibrating brightfield images.



Align Calibration Matrix



Single Calibration



Batch Calibration

Applications*

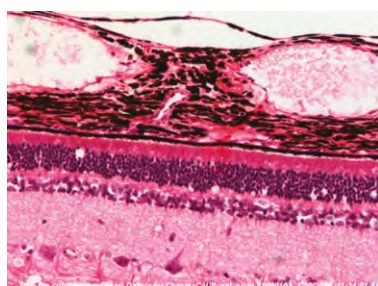
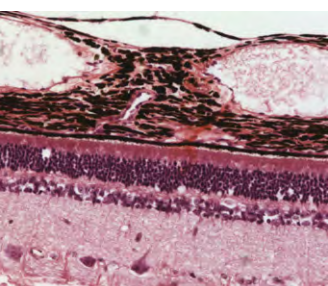
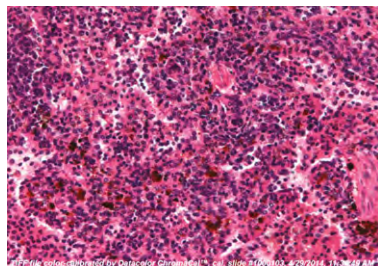
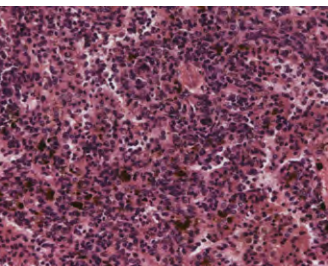
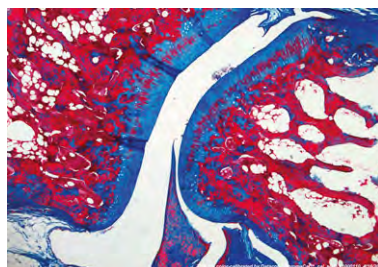
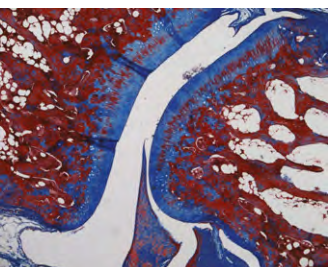
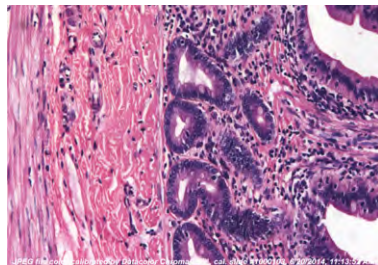
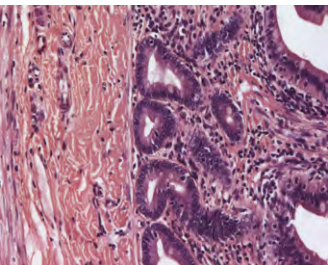
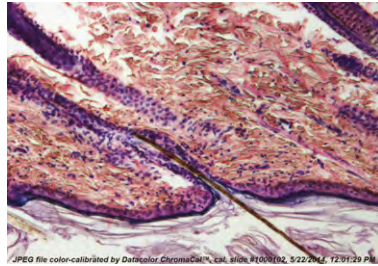
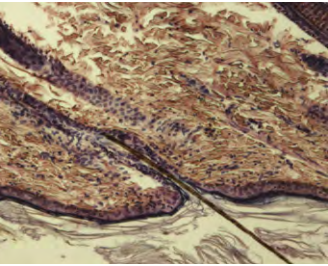
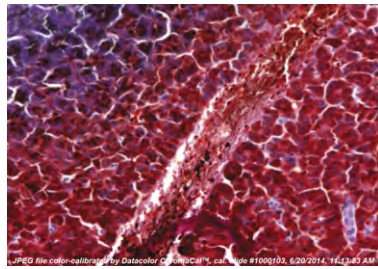
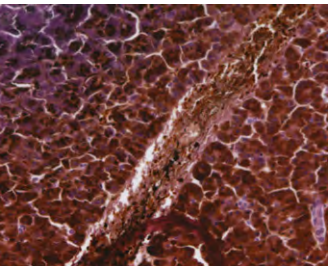
Datacolor ChromaCal™ is suitable for any specialty that utilizes brightfield images:

- Agriculture/Botany
- Histology
- Biology
- Material Science
- Bone Metabolism
- Neuroscience
- Cytology
- Pathology
- Dermatology
- Veterinary and others
- Forensics
-
- Hematology
-

*Datacolor ChromaCal™ is not intended for clinical diagnostic use in the U.S.

Before CHROMACAL

After CHROMACAL



➤ Datacolor ChromaCal™ (continued)

Located on the Datacolor ChromaCal™ chip are the following:

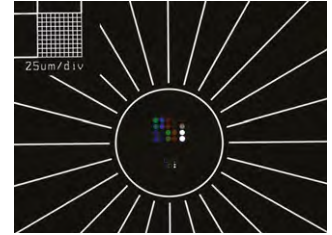
- Protective plastic slide holder
- Color calibration slide
- Color calibration slide on microscope stage
- Alignment pattern on slide
- Small grid
- Large grid
- One larger color matrix consisting of 20 color circles in a 4 x 5 configuration. This matrix is generally intended for magnifications up to 40X.
- One smaller color matrix consisting of 20 color circles in a 4 x 5 configuration. This matrix is generally intended for magnifications above 40X up to 100X.
- Numerous location lines pointing to a circle surrounding both color matrices. These are meant to assist in locating the color matrices.
- In the upper left-hand corner of the chip there is a 4 x 4 micrometer grid consisting of 250 μ divisions. Within the lower right-hand division is a 10 x 10 sub-grid with 25 μ divisions. This micrometer grid is unrelated to the color calibration system but is provided as an additional value-add.

The Datacolor ChromaCal™ slide is not suitable for use with oil immersion objectives. The Datacolor ChromaCal™ slide should be handled with care.

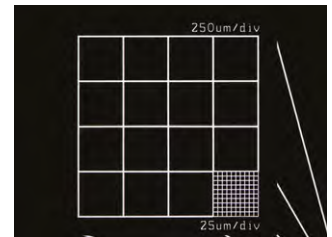
The Datacolor ChromaCal™ brightfield calibration slide is sold separately, and is required for the Datacolor ChromaCal™ Color Calibration System.



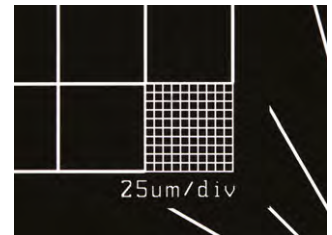
Color calibration slide on microscope stage



Alignment pattern on slide



Large grid



Small grid



Datacolor ChromaCal™ Monitor Calibration Set

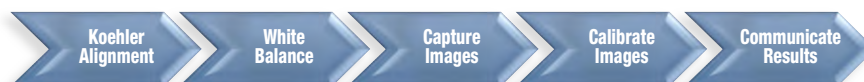
The Datacolor ChromaCal™ monitor calibration set uses a precision color sensor to ensure a consistent and standardized color profile on any computer display. With monitor calibration, your images will look the same on the display by your microscope, at an analysis workstation, on your laptop, and on a colleague's display whether down the hall or across the ocean. In contrast, just look at the variability between televisions on display in an appliance store.

Includes monitor calibration sensor, software and license to install on three workstations. Additional workstation installations can be purchased and activated directly through the software.



Monitor Calibration Sensor in use

Process



Good microscopy practices are essential to achieving quality images. Here are a few things to remember. These steps won't guarantee perfect images, but they reduce the number of variables to address in downstream image analysis.

Always be certain to clean the microscope of dust and oils as these can create artifacts and aberrations.

Establish Koehler illumination as a matter of routine - this practice sets an illumination baseline for consistency and reproducibility.

Use a scientific-grade camera (CCD or CMOS), not a consumer camera, for imaging. Scientific cameras are designed for sensitivity and the magnifications employed by microscopes.

Always white balance the camera. Simply move to a region of the slide where no specimen is located (e.g. white background) and choose white balance in the camera software, imaging software or even by pressing a white balance button on the camera head itself, if present.

System Requirements

- Windows XP 32/64, Win 7 32/64, Win 8 32/64 or Max OSX (10.6 or higher)
- USB Connection
- Monitor resolution 1024x768 or greater
- 16-bit video card (24-bit recommended)
- 128MB of available RAM; 100MB of available hard disk space
- Unaltered TIFF or JPEG images acquired with scientific-grade camera
- For maximum workflow efficiency, internet connection required

Ordering Information

10-1010	Datacolor ChromaCal™ Color Calibration System*	each
10-2010	Datacolor ChromaCal™ Color Calibration Slide	each
10-3010	Datacolor ChromaCal™ Monitor Calibration Set**	each

*System includes:

- Image calibration software (with license to install on one workstation)
- Monitor calibration software and sensor (with license to install on three workstations)

**Set includes:

- Monitor calibration software and sensor (with license to install on three workstations)

FREQUENTLY ASKED QUESTIONS

Q1. Are there any microscope requirements or restrictions?

A1. Your microscope should be configured for transmitted light illumination of the specimen. Datacolor CHROMACAL works independently from the microscope hardware and can be used with any manufacturer's microscope system.

Q2. Does Datacolor CHROMACAL work with any camera?

A2. A scientific grade camera is recommended for image acquisition. Most consumer-grade cameras are intended for landscape and portrait imaging. Also, pixel sizes in a scientific grade camera are optimized for microscope level resolutions. Datacolor CHROMACAL requires raw TIFF images for calibration.

Q3. Is white balancing sufficient to standardize the color of my images?

A3. Although white balancing is a necessary step in calibrating color, it is not sufficient. Datacolor CHROMACAL utilizes a standardized color matrix to establish and apply a color profile to white balanced images. With these capabilities, color can be standardized throughout your lab, and among your facilities.

Q4. Do I have to use a calibrated display?

A4. To achieve a consistent viewing and communication experience, it is highly recommended to calibrate all of the monitors that are used to display your specimen images.

Q5. Can I use Datacolor CHROMACAL on more than one microscope or monitor?

A5. The Datacolor CHROMACAL monitor calibration set provides three workstation installations, so you may want to calibrate the monitor at your microscope, at your analysis workstation and at your desk. Monitor calibration sets are also available separately, and they also include 3 installation licenses. The Datacolor CHROMACAL application software can only be installed on one computer, and additional licenses are available through the software. The Datacolor CHROMACAL calibration slide is highly portable and can be used on any microscope.

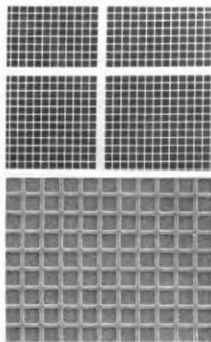
Q6. Does Datacolor CHROMACAL alter my original image file?

A6. No, your original image file is preserved. All calibration adjustments are made to a duplicate copy of your original image file. This copy is saved using the naming convention "[original file name] ChromaCal-calibrated" added to the file name.

► Low Magnification Calibration Standards Available for SEM and LM

► Silicon Test Specimen

This Test Specimen is made of a 5mmx5mm square of single crystal silicon. It is photo-etched and the squares repeat every 10 μ m. The dividing lines are 1.9 μ m wide. A broader etching line is written every 500 μ m, which is useful in light microscopy. This is an excellent test specimen for comparing magnification and assessing any distortion in the image field. It is ideally useful in the context of automated counting systems to check for unsuspected distortions. Where critical measurements must be made the sample can be mounted directly onto the calibration specimen so that an internal calibration is obtained on the micro-graph.



79502-01	Silicon Test Specimen, Unmounted	each
79502-10	Silicon Test Specimen, Unmounted	10/pk
79502-12	Silicon Test Specimen on 12.5mm Pin Stub	each
79502-20	Silicon Test Specimen for Incident LM	each
79502-30	Calibration Certificate	each

► Particle-Size Standards

See page 167 for a complete listing >>>>

ARTICLE OF INTEREST

It would be very convenient if the SEM could be inspected while in operation, with the image of the vacuum chamber visible on the SEM TV screen.

Refer to: R. Eckert, (1992) Inspecting the SEM Chamber with a Charged Polystyrene Mirror. Scanning Vol. 14, 73-75

► SEM Calibration Specimens

Magnification Calibration

► Chessy; Test Specimen

A precise SEM test specimen for most all calibration applications.

The Structure

There are more than 1.6 million gold squares of 1 μ size on silicon forming a 4-fold checkerboard pattern in an area of 5 mm square. The smallest metric checkerboard has a size of 10 x 10 μ . Such checkerboards form larger metric checkerboards of 100 x 100 μ - These again form checkerboards of 1 mm square. Finally, such 1mm squares are arranged in the same manner covering a field of 5 mm square.

The edges of the empty corners in 0.1 and 1 mm checkerboards are additionally marked. The surrounding frame is 10 μ wide and has an outer side length of 5.04 mm. The pattern was directly written by e-beam lithography using the new ZBA 31/32 from JENOPTIK.

Applications

Imaging

- Calibration of SEM magnification in all ranges between 20x and 50,000x.
- Check of equal scaling in X and Y.
- Check of orthogonality and distortion.
- Resolution test at high magnification on the edges of the gold squares.

Motorized Stages

(especially for use with ESCOSY)

- Measurement of reproducibility using stored positions.
- Calibration of stage orthogonality.
- Calibration of readings in X and Y.
- Measurement of absolute positioning accuracy.

Experimental Electron

Lithography (use with attachment ELPHY or PROXY-WRITER)

- Generation of metric writing fields between 10 μ and 5mm square via mark recognition and alignment.
- Measurement of SEM distortion at any magnification via mark recognition on different places.
- Check of defocusing in outer areas.

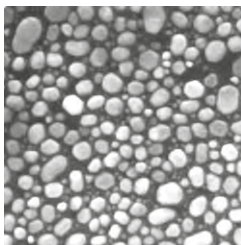
79503-01	Chessy Test Specimen	each
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► Resolution and Gray Level Test Specimens

SEM resolution is tested in terms of a combination of criteria, namely resolved gaps and the number of gray levels in the image. This is to ensure that the resolution has not been distorted by using the contrast to maximize visibility of edges. High resolution images ideally should show fine detail together with a lack of noise evidenced by a good range of gray levels.

1. High Resolution Gold on Carbon Test

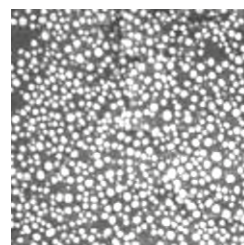
For resolution test of SE and BSE imaging and also for chemical mapping in high-resolution systems such as an Auger scanning instrument. Each test specimen has a square grid pattern with large crystals in the center of each square, and very fine crystals at the edges of each grid. Thus medium and high resolution gap tests are performed on the same specimen. Meantime, the larger crystals show facets which allow an assessment of the gray level reproduction available at high resolution. Gold particle range from 5nm to 150 nm approximately.



79510

2. Very High Resolution Gold (<2nm - 30nm) on Carbon Test

For very high resolution performance testing this specimen has a smaller gold particle size ranging from 2 nm to 30 nm as compared to the high resolution test above. Ideal for testing at instrument magnifications of 50,000x and above.



79511

79510-01	High Resolution Au-C Test on 12.5mm Pin Stub	each
79510-02	High Resolution Au-C Test on JEOL Stub	each
79510-03	High Resolution Au-C Test on ISI Stub	each
79510-04	High Resolution Au-C Test on Hitachi Stub	each
79510-05	High Resolution Au-C Test on Carbon Planchet	each

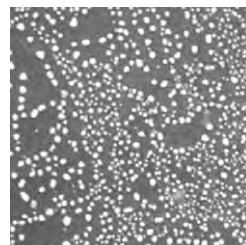
79511-01	Very High Resolution Au-C Test on 12.5mm Pin Stub	each
79511-02	Very High Resolution Au-C Test on JEOL Stub	each
79511-03	Very High Resolution Au-C Test on ISI Stub	each
79511-04	Very High Resolution Au-C Test on Hitachi Stub	each
79511-05	Very High Resolution Au-C Test on Carbon Planchet	each

► Resolution and Gray Level Test Specimens (continued)

3. Ultra High Resolution Gold (<1 nm - 20 nm) on Carbon Test

With gold particles ranging from <1 nm to 20 nm, this test is suitable for ultra high resolution SEM tests such as field emission electron source.

A magnification of at least 80,000x is required for this test.



79512

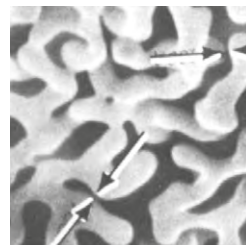
79512-01	Ultra High Resolution Au-C Test on 12.5mm Pin Stub	each
79512-02	Ultra High Resolution Au-C Test on JEOL Stub	each
79512-03	Ultra High Resolution Au-C Test on ISI Stub	each
79512-04	Ultra High Resolution Au-C Test on Hitachi Stub	each
79512-05	Ultra High Resolution Au-C Test on Carbon Planchet	each

These gold on carbon calibration specimens have been specially produced to enable the ultra high-resolution capabilities of the current generation of high performance scanning electron microscopes to be assessed. In particular, the series 79512- sample with its ultra small gold particle size (<1nm - 20nm) is designed for use with SEM 's equipped with field emission guns.

Until experience has been gained, these specimens should be used in conjunction with the standard gold on carbon specimen, 79510-series. Many of the instructions given on the 79510- technical leaflet apply also to these ultra high-resolution test specimens, but it should be noted that the instrumental magnification required to resolve the smaller particles, would be higher.

4. Medium Resolution - Aluminum-Tungsten Dendrites

The various spacings created by the dendritic structure give the gap test, and the topographical arrangement of the dendrites leads to the gray level test. The specimen is non-magnetic, vacuum clean. It is most useful for working in the probe size range of 25 to 75 nm. Supplied unmounted.

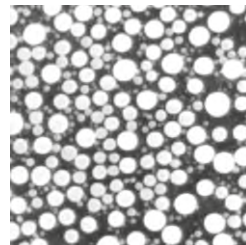


79514

79514-01	SEM Aluminum-Tungsten Dendrites Test	each
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5. Tin On Carbon

Tin on Carbon is an alternate test specimen for medium resolution, and for the daily basic checking of your instrument performance. This specimen consists of a dispersion of tin spheres, within the size range 10 - 40 nm, on a carbon substrate. Ideal for astigmatism correction, it is also recommended for use in SEM's employed in the semi-conductor industry where the usual gold on carbon specimen cannot be used because of the risk of gold poisoning.

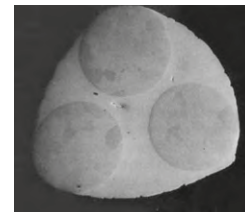


79515-01	Tin-C Test Specimen on 12.5mm Pin Stub	each
79515-02	Tin-C Test Specimen on JEOL Stub	each
79515-03	Tin-C Test Specimen on ISI Stub	each
79515-04	Tin-C Test Specimen on Hitachi Stub	each

► Reference Samples for Back-Scattered Electron Detection Systems

► Reference Standards

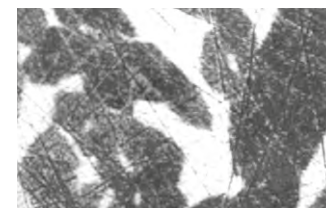
When equipped with a back-scattered electron detector, an electron microscope has the capability to produce images in which the contrast is controlled by differences in atomic number across the specimen. Three reference samples are now available for testing the differences of atomic number. Each of the reference samples consists of two high purity elements that have an atomic number difference of 1. They are in form of a wire of the low Z element embedded in a matrix of the high Z element. The samples are mounted onto 5mm diameter blocks.



79520-01	BSE Reference, Nickel(Z=28)/Copper (Z=29)	each
79520-02	BSE Reference, Palladium (Z=46)/Silver (z=47)	each
79520-03	BSE Reference, Platinum (Z=78)/Gold (Z=79)	each

► Duplex Specimen

An alternative and very sensitive test is by means of an alloy with two major Copper/Zinc phases separated by an atomic number difference of 0.1. The light phase illustrated in the micrograph has a mean atomic number of 29.47 and the dark phase a mean atomic number of 29.37.



79521-01	Duplex Reference Specimen	each
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► X-Checker™

The X-Checker was the first and remains the only complete calibration aid for SEM/EDS Systems. When time is short but you want to know how well your system is performing you need the X-Checker. Each X-Checker comes with the following:



1. X-Checker Standard
2. X-Checker w/Boron
3. X-Checker Extra

- Manganese to measure full width at half max detector resolution
- Aluminum and copper to perform spectral calibration.
- Carbon to monitor calibration at the low end of the spectra for thin window detectors.

You also get two grid sizes for checking the accuracy of your image analysis software and an easy test for monitoring the amount of vacuum pump oil contamination on your detector window.

- The X-Checker™ BN comes with boron nitride for those who need a more sensitive monitor of low end performance on thin window and windowless detectors.
- The X-Checker™ Extra is the ultimate performance monitor for the latest state of the art X-ray detectors. In addition to the standard features and boron nitride, there is a fluorine source to test resolution at the fluorine K-alpha peak (industry standard for measuring low end resolution). As well it comes with a beryllium grid for the ultimate test of detector performance.

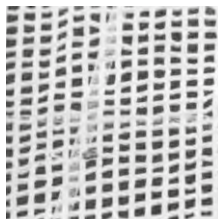
80058-ST	X-Checker™, Standard	each
80058-BN	X-Checker™, With Boron Nitride	each
80058-EX	X-Checker™, Extra	each

► Calibration Specimens for TEM & STEM

Magnification Calibration

► Fine Mesh Grids

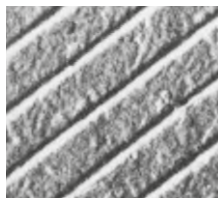
These fine mesh grids are carefully checked. They are suitable for the low magnification range of a TEM. Available as a sandwich in a folding 3.05mm mesh grid, or in a square mesh 25mm.



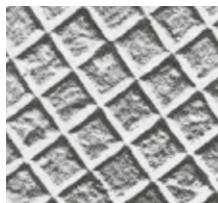
79525-01	1000 mesh on Sandwich Grid, 3.05mm dia., Copper	each
79525-02	2000 mesh on Sandwich Grid, 3.05mm dia., Copper	each
79526-10	1000 mesh, 25mm x 25mm, Nickel	each
79526-20	2000 mesh, 25mm x 25mm, Nickel	each

► Grating Replicas: Parallel and Crossed Lines

Shadowcast carbon replicas of diffraction parallel line gratings with spacing of 462.9nm, 2160 lines per millimeter onto 3.05mm grid. The same ruling 2160 lines/mm, cross at 90° to one another give additional accuracy to magnification checks and aid in checking distortion. Ideal for calibration electron-optical magnification up to the x80000/ 100000 range.



Parallel Lines



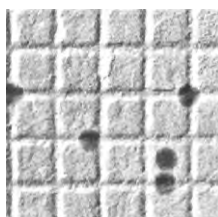
Crossed Lines

80050	Grating Replica, Parallel Lined	each
80051	Grating Replica, Crossed Lined	each

► Line Grating Replicas with Latex Spheres

The latex sphere is 0.261 microns and the grating replica is 2160 lines/mm.

This calibration aid allows you to double check the accuracy of magnification calibration.



80055	Grating Replica on Latex Spheres	each
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The addition of Latex Spheres to the Grating Replica provides a double check of the accuracy of magnification calibration. It is particularly useful at higher magnifications where only a few squares of the replica pattern can be photographed together.

Note: The latex particles in this specimen have a diameter of 0.261 micron.

To use both the Replica and Latex Spheres for Magnification Calibration:

- (1) Calculate the magnification using the diffraction grating replica pattern by the following formula:

$$\text{Magnification} = \frac{\text{Distance in mm between limiting lines} \times 2,160}{\text{Number of spaces between limiting lines}}$$

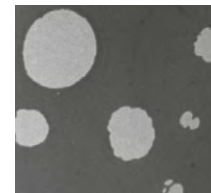
- (2) Calculate the magnification by measuring the magnified image of the 0.262 micron diameter latex spheres, applying the following formula:

$$\text{Magnification} = \text{Diameter (mm)} \times 3831.4$$

(Measure as many latex spheres as possible and calculate the average diameter. Ignore any latex spheres which are distorted.)

► Holey Carbon Film:

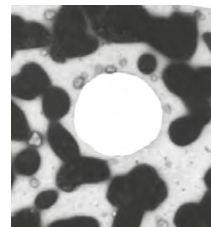
For measuring and correcting astigmatism and for evaluating the resolution of the transmission electron microscope. A thin film of carbon has been treated to obtain numerous round holes of various sizes. On a 3.05mm copper grid.



80010	Holey Carbon Film	1 grid/vial
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► Evaporated Platinum/Iridium

Evaporated Pt/Ir on Holey carbon film. Holey carbon film support provides holes for ease of focus and astigmatism correction. The dots of evaporated Pt/Ir provide dense particles for resolution checks through the particle separation test.



80020	Evaporated Platinum/Iridium	1 grid/vial
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► Polystyrene Latex

Uniform polystyrene latex (size 0.312µm) is suspended on a Formvar/Carbon grid and is useful for checking magnification and calibration.

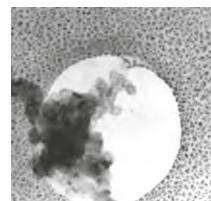


80030	Polystyrene Latex	each
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► Combined Test Specimen

A holey carbon film is shadowed with gold and graphitized carbon particles are deposited on a 3.05mm grid. These particles viewed over the holes may be used for assessment of factors limiting the microscope performance.

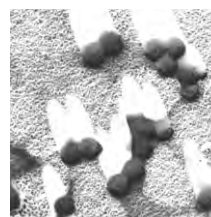
The evaporated gold forms small polycrystalline islands and within these islands lattice fringes can be resolved. Also use this specimen for the measurement of contamination rates in the EM by noting the deposition rate of carbon within the holes found in the gold film.



80043	Combined Test Specimen	each
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► Gold Shadowed Latex

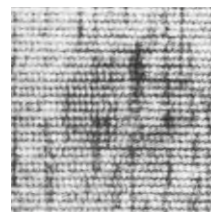
These latex particles have a diameter of 0.204µm and are shadowed with a coating of gold. Measure the finest migrated gold particles in the shadow to determine the resolution of the STEM. Gold shadowed latex on formvar/carbon film, mounted on a copper grid, 3.04mm diameter.



80040	Gold Shadowed Latex	1 grid/vial
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► Catalase Crystals

Catalase crystals are mounted on a grid (3.05mm) and negatively stained. They display very clear lattice plane spacings of approx. 8.75nm and 6.85nm. Ideal for high magnification calibration. J. Ultrastructure Res.24, 454., 1968



80014	Catalase Crystals	1 grid/vial
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► Particle-Size Standards

Particle-size standards are certified for mean diameter and are trace-able to the National Bureau of Standards (NBS). Our line of stand-ards in the submicrometer size range is called Nanosphere Size Standards™, and Monosized Polymer Microspheres.

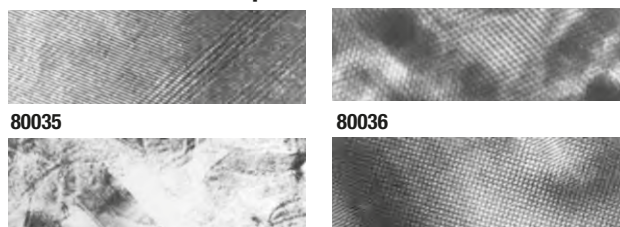
■ Nanosphere Size Standards are highly uniform polystyrene spheres calibrated in billionths of a meter (nanometer) with NBS traceable methodology.

■ Nanosphere Size Standards are used in the calibration of electron microscopes, aerosol and liquid particle studies, chromatography columns, and laser light scattering studies. The 20 to 1000 nm range is suitable for checking the size of bacteria, viruses, ribosomes and sub-cellular components. Nanosphere Size Standards are packaged as aqueous suspensions in dropper-tipped bottles.

Specific gravity :1.05g/ml
Refractive index of 1.59 @ 589nm (23°C).



► Lattice Plane Specimens



80037 80038

Since crystal lattice plane spacings is accurately known from X-ray measurements, they provide a good test of microscope stability and a calibration of magnification in the upper range of magnification of the instrument.

1) Plane Spacing 0.9nm and 0.45nm - Asbestos Crocidolite

The 0.9nm spacing (020) will be found along the axis of the crocidolite fibers. The 0.45nm spacing appears at an angle of about 60°, in suitable crystal orientations. Because of the hazard of asbestos, this sample is sandwiched between formvar and carbon films, than mounted onto a 3.05mm grid.

80035 Crocidolite Crystals each

2) Plane Spacing 0.56nm - Potassium Chloroplatinate

80036 Potassium Chloroplatinate Crystals each

3) Plane Spacing 0.34nm - Graphitised Carbon Black

80037 Graphitised Carbon Black Crystals each

4) Plane Spacing 0.204nm, 0.143nm and 0.102nm - Oriented Single Crystal Gold Foil

These gold foils are mounted on gold grids, a valuable tool to check resolution, image quality, magnification and instrument stability.

80038 Oriented Gold Crystals each

Nanosphere Size Standards Ordering Information:

Cat.#	Nominal Diameter	Certified Mean Dia.	Size Uniformity Std. Dev.&C.V	Solids Content
70881	20nm	19nm+/-1.5nm	NA	1%
70883	50nm	50nm+/-2.0nm	NA	1%
70885	100nm	102nm+/-3.0nm	7.6nm (7.5%)	1%
70886	200nm	204nm+/-3.1nm	3.1nm (1.5%)	1%
70887	300nm	304nm+/-6.0nm	4.5nm (1.5%)	1%
70888	400nm	404nm+/-4.0nm	5.9nm (1.5%)	1%
70889	500nm	486nm+/-5.0nm	5.4nm (1.1%)	1%
70890	600nm	600nm+/-5.0nm	6.6nm (1.1%)	1%
70891	700nm	701nm+/-6.0nm	9.0nm (1.3%)	1%
70892	800nm	802nm+/-6.0nm	9.6nm (1.2%)	1%
70893	900nm	895nm+/-8.0nm	9.1nm (1.0%)	1%

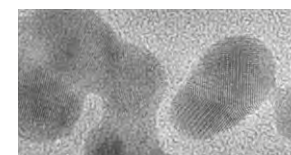
■ Monosized Polymer Microspheres are the most uniform spheres available. For the highest level of measurement accuracy in the 1 to 40 micron size, this series of size standards is recommended.

Microsphere Size Standards Ordering Information:

Cat.#	Nominal Diameter	Certified Mean Dia.	Size Uniformity Std. Dev.&C.V	Solids Content
70894	1.0µm	0.993+/-0.021µm	0.010mm (1.0%)	1.00%
70895	2.0µm	2.013+/-0.025µm	0.022mm (1.1%)	0.5%
70896	3.0µm	3.063+/-0.027µm	0.03mm (1.0%)	0.5%
70897	5.0µm	4.991+/-0.035µm	0.06mm (1.2%)	0.3%
70898	10.0µm	9.975+/-0.061µm	0.09mm (0.9%)	0.2%

► Gold Particle on Carbon Film

This high resolution TEM test specimen is an arrangement of finely-dispersed thin gold particles on carbon film. As with gold foil, image quality, magnification, and instrument stability are readily



assessed; however, for the determination of resolution capabilities this gold particle specimen is superior since it offers a choice of crystalline orientation on static or low tilt stages. In addition, the thickness of the crystalline material is easily calculated from the projected shape of the gold crystal. The background noise arising from structure in the support film helps with determinations of the operating transfer function.

80041 Gold Particles on Carbon Film each

► TEM Checker™

TEM analysts also need to monitor the performance of their x-ray detectors. The TEM Checker contains 5 manganese



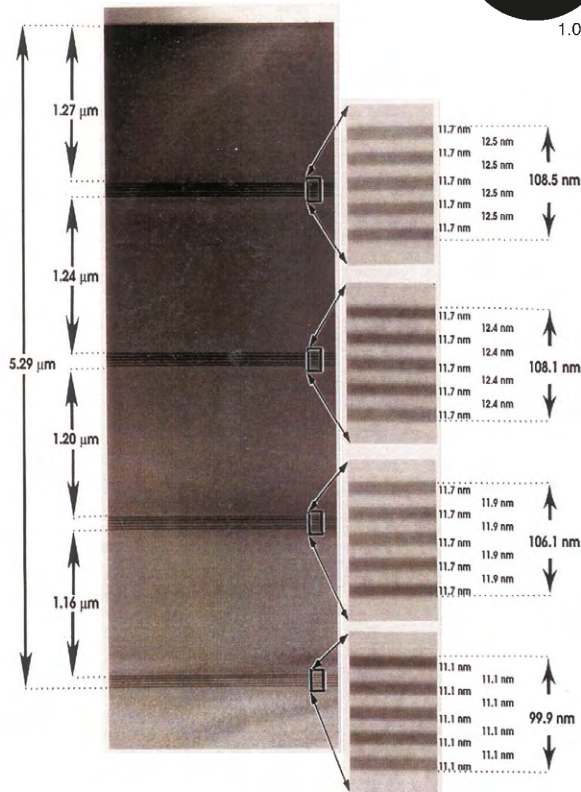
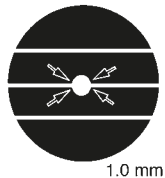
disks in a standard grid storage box. Each disk is 3 mm in diameter and fits into the sample holder. The discs are not transparent to the beam but will give you a strong manganese peak to check the resolution of your EDS detector.

80059 TEM Checker™ each

► MAGICAL™ - TEM Calibration Standard

MAG**I**CAL is the world's smallest ruler and have been inducted into the Guinness Book of World Records, A genius standard to perform the three major calibrations of a TEM:

- Image Magnification Calibration
- Camera constant Calibration for Indexing Diffraction Patterns
- Image/Diffraction Pattern Rotation Calibration (crystal relation features)



MAGNIFICATION CALIBRATION STANDARD FOR TEM
Layer Thickness Values Surface

MAG**I**CAL™ consists of an ion milled cross section of a silicon single crystal consisting of a series of atomically flat layers of Si and SiGe, which have been grown epitaxially by MBE (molecular beam epitaxy). When the calibration structure is viewed in a TEM, it appears as a series of light and dark layers where the layer thicknesses are accurately known. The calibrated thickness measurements of these light (silicon) and dark (SiGe) layers are based on careful TEM measurements of the <111> lattice spacing of silicon, which is visible on the calibration sample itself, and are supported by x-ray diffraction measurements. The layer spacing are designed so that the sample can be used to calibrate the entire magnification range in a TEM, from 1,000X to 1,000,000X. As the sample is also a single crystal of silicon, the calibrations requiring electron diffraction information such as the camera constant and image/diffraction pattern rotation can also be performed easily and unambiguously. One single calibration sample can therefore be used to provide all three of the major TEM instrument calibration at all magnifications and all camera lengths.

For a complete reference and technical information on MAGI**CAL™, see our interactive website.**

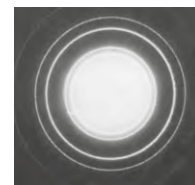
80069 MAG**I**CAL® each

► Diffraction Standards

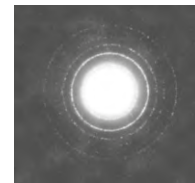
► Camera Length

The nominal value of the effective camera length of an EM operating in the selected area mode is not sufficiently accurate for any calculations of lattice spacing. The actual value of camera length must be calibrated as the same accelerating voltage and objective lens setting by reference to a known substance with well defined diffraction spacings. The normal specimens are evaporated films on a 3.05mm grid of aluminum or thallos chloride. The very small crystalline size yields ring patterns suitable for calibration purposes.

80044 Evaporated Aluminum Film each
80045 Evaporated Thallos Chloride each



80044



80045

► Image Rotation

When changing from a selected area image of a specimen to a diffraction pattern, the strength of the intermediate lens is changed, producing an image rotation between the image and the diffraction pattern. The amount of this rotation can be measured by photographing a crystal whose shape gives a clear indication of orientation. A molybdenum oxide crystal is very suitable for this purpose. Evaporated on a 3.05mm grid.

80046 Molybdenum Oxide each

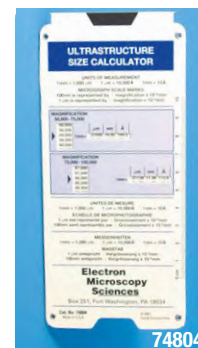


80046

► Ultrastructure Size Calculator

A slide-guide-calculator used to determine the real-life size of a structure from a micrograph in micrometer, nanometer or angstrom units. It computes the real-life dimension/mm at magnifications from 1,000 to 100,000 by introducing a multiplication factor of x2 or x½. The magnification range can be extended. Waterproof card, printed in English, German and French.

74804 each

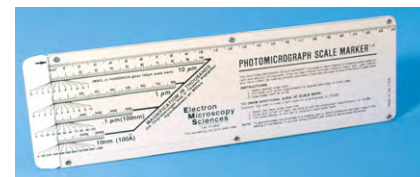


74804

► Photomicrograph Scale Marker

A slide-ruler used to apply scale marks to photomicrographs. There are four scale lines for producing scale marks of 10 microns, 1 micron, 0.1 micron (100nm) and 10nm. The scale marker is also used in measuring the real life size of an object in a micrograph. It is made from a clear flexible plastic and it is protected by an enclosed pouch. Instructions are included. Printed in English, German, and French.

74802 each



➤ Calibration Tools for Atomic Force or Scanning Probe Microscopy (AFM/SPM)

The Tipcheck device is used for examining the shaft of the tip probe or for determining the tip breakage etc.

➤ 1. TIP CHECK:

The Problem

Imaging a new sample in an AFM, it may be difficult to know whether one has obtained an accurate representation of the surface. Even in the case that a fairly clear idea of expected feature topography exists, an independent means of assessing the influence of the probe tip on the image is desirable.

Consider the following:

■ A broken or misshapen probe tip results in inaccurate rendering of samples. Extra time from an already busy schedule can be consumed in further clarification work that wouldn't have been needed otherwise. Worse, if the tip damage goes undetected, the true topographical nature of your samples may inadvertently go unnoticed.

■ Using microscopy techniques such as SEM to look for breakage in tips is neither convenient nor economical enough to be done routinely.

A simple, convenient means to prescreen all of one's AFM tips is certainly desirable! You and your team can thereby save time and effort, and avoid frustration. Fortunately, there is a simple and effective means to prescreen your tips, and assess used tips as well.

The Answer is TipCheck (TC)

TipCheck exploits reverse imaging to provide a fast and simple way to assess new and used tips without the need for SEM inspection. TipCheck helps you to categorize your tips on the spectrum at right, and permits qualitative comparisons between tips.

The microstructure of the TipCheck film is ideal for the detection of tip morphology in the vicinity of the tip apex. The AFM images shown here were obtained by imaging a TipCheck surface with (left) a broken tip and (right) a reasonably good tip.

The film is supplied on a chip of silicon, ready to be placed in your AFM. Instructions are provided with examples of images to aid you getting started with your own sample library.

80130-Ti AFM/SPM TipCheck Calibration each

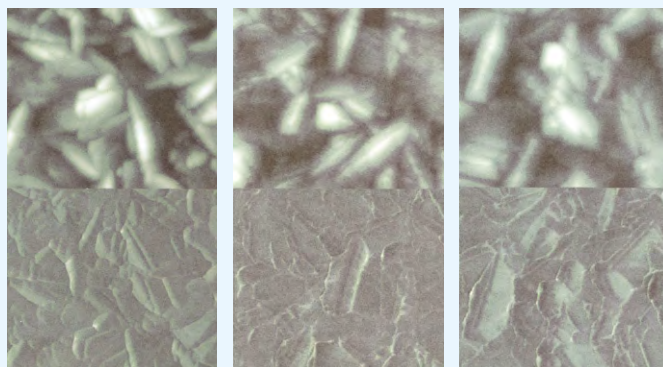


Fig. 1: This image of a TipCheck surface was acquired with an unbroken, sharp, silicon nitride contact mode tip. Note the smooth planar sides of the features, the well-defined edges & peaks, and the good correspondence between the topographical image (top) and the lateral force map (bottom).

Fig. 2: An image acquired by a used, somewhat worn tip. Topographical features are still produced reasonably well but are not quite as sharp. The lateral force map has changed in appearance. There is no evidence of tip breakage.

Fig. 3: Another image acquired by a tip duller than ideal. The tops of features are beginning to look rounded. Compared the lateral force image to that of Fig. 1.

The Nioprobe device is used to determine the shape at the very apex of the tip probe for microscopy measurements.

➤ 2. Nioprobe

The Problem

The physical probe used in AFM imaging is not ideally sharp. As a consequence, an AFM image does not reflect the true sample topography impartially, but rather represents the interaction of the tip with the sample surface. There is no avoiding this imperfection, which sets real limits on what may be validly inferred from an AFM image.

Whether one is engaged in detailed, quantitative metrology or is simply using AFM images as an interpretive aid, it is imperative be able to assess these limits. The key here is to possess a reliable estimate of the sharpness of the tip apex. Reverse imaging of the probe is the most convenient means of obtaining the effective radius of the probe. For this purpose, the ideal characterization sample would consist of small, stiff, spiked features.

The Practical Answer is NioProbe (NP)

Consider the following advantages of NioProbe

- Tiny peaks densely populate the surface structure of the NioProbe film. This makes the film very suitable for the small piezo movement's characteristic of precision AFM work.
- Feature peaks exhibits imaging radii of less than 5 nm, as sharp as anything else available. This permits one to obtain the accurate apex radius desired for medium-to small-scale work (such as biomolecular imaging).
- The random orientation of the NioProbe features is suitable for applying blind tip reconstruction methods.
- The sample is resistant to the duress of contact mode scanning.
- The film is supplied on a silicon chip, ready to be placed in your AFM. Instructions are provided to allow easy determination of the apex radius. If stored in a clean, dry place, the sample can provide years of service.

80130-NB AFM/SPM NioProbe Calibration each

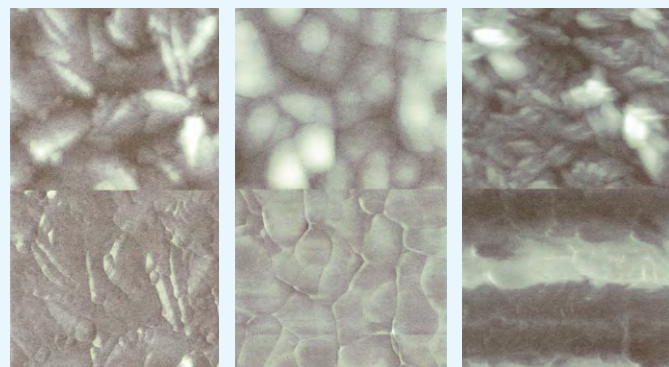


Fig. 4: Another example of an image acquired by a new, unbroken tip.

Fig. 5: If the tip becomes broken or severely worn, the features will appear very globular or flattened. As an initially new tip becomes wrong with use, the image quality will gradually degrade to this stage from that of Fig. 4.

Fig. 6: This image was acquired with a defective tip. The doubled features throughout the scan suggest that tip apex may be notched, resulting in unwanted artifacts in images.

► Magnification Reference Standards – SPM, AFM, SEM Calibration Standards

EMS offers a series of calibration standards with one and two dimension calibrated patterns. The standards come in two grid spacings – 300 nanometers and 700 nanometers. These standards are created utilizing holographic interference of a particular laser frequency. They are typically accurate to <1% across the entire surface of the standard.

Background

EMS MXS "CE" and "BE" series SEM magnification reference gratings and grids set new standards for sub-micron accuracy and ease-of-use. Designed to meet the requirements for a reasonable cost, accurate sub-micron reference standard, "CE" Series Reference Standards can be tailored to meet a variety of needs.

- They are ideal for student practice and instruction, testing new ideas or applications, or other uses where you need a good quality standard but do not want to put an expensive sample at risk.
- Exceptional accuracy, repeatability, and uniformity are assured since each individual standard is an original or master produced directly from a holographic interference pattern.

These reference standards are remarkably durable under typical operating conditions. The surface contamination behavior is also very good. There are no better sub-micron reference standard available in this price range.

One test site indicated that on a scale of 1 to 5 with respect to ease of use, contrast/brightness, durability, and accuracy, "CE" series reference standards earn a 4.7 out of 5 average in comparison to other available standards. Comments from various other test sites included "very good contrast/brightness levels at all voltages used," "easy to use," and "could become my secondary standard of choice."

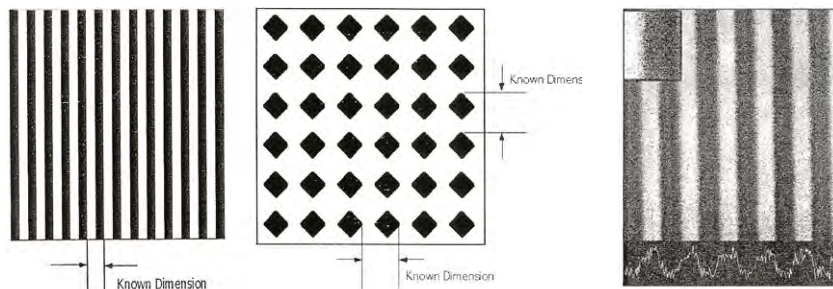
Application

EMS's MXS "CE" series reference standards provide a calibrated dimension of either 300 nm or 700 nm nominal length. ("BE" series available only 300 nm)

- The larger dimension provides accurate, multiple period measurement from about 5000X to over 45,000X, while
- The smaller dimension is useful from about 10,000X to over 100,000X.

Throughout this magnification range, these standards provide excellent image contrast, an enormous useful calibration area, and a 3-sigma accuracy of at worst 3%, with typical values around 1%.

MXS "CE" and "BE" series reference standards are available as unmounted 3 mm x 4 mm pieces to be mounted by the microscopist, or pre-mounted



White area material: Tungsten.

Black area material: Tungsten or other metal.

Materials: The calibration specimen consists of a silicon chip with a thin (100nm) thick polymer layer containing the pattern and a thin tungsten film over-coating the entire surface. The tungsten film varies from 20nm to 60nm in thickness, depending on the particular model.

This structure has been proven under a wide variety of beam conditions, from 30kV to sub 12 kV.

Dimensions: 300nm or 700nm nominal (exact dimension will be provided with sample). Measurements are made from leading edge to leading edge, etc. Width of individual bars and spaces is not calibrated.

for easy insertion in your SEM. Mounting one of these calibration standards is straightforward. The front surface of the sample and the silicon substrate are conductive. Experience indicates that there is, in general, no need to make a special effort to ground the front surface. The use of conductive silver or carbon-loaded paint, conductive epoxies, conductive tape, etc. have all been used to successfully mount "CE" Series standards.

With EMS's MXS "CE" and "BE" Series Reference Standards, you can:

- Quickly check dimensional measurements by mounting one on your specimen stage;
- Perform periodic calibration and performance checks of your microscope;
- Obtain high magnification, sub-micron scale dimensional accuracy for the first time;
- Accurately determine dimensions from 0.3 μ m to 30 μ m all with one calibration artifacts;
- Analyze your images for pincushion distortion, small-scale vibration, or small magnetic field distortions.

The accuracy of the "CE" Series Reference Standards, allows the microscopist to use them as a secondary standard. Their accuracy and uniformity make it easy to obtain and document traceability of measurements without placing an expensive, hard to obtain, difficult to use primary calibration standard at risk of contamination or damage.

Certification and Accuracy

MXS "CE" Series Reference Standards provide a calibrated dimension of either 300 nm or 700 nm nominal length. The actual dimension of the artifact as delivered will generally not be exactly

these values. Both the fabrication process determines the actual dimension and by a second, independent measurement after the calibration artifact is manufactured.

The expected accuracy of the holographic technique used in the manufacturing process is $\pm 0.1\%$. Unfortunately, subsequent processing steps degrade this initial accuracy, leading to the 3-sigma accuracy of 3% for the finished product. The second, independent measurement technique has an expected 3-sigma accuracy of 1% or better. Our experience is that the two measurement techniques applied to a particular artifact will agree with each other within 0.5mm.

It is important to remember that the certified dimension in an MXS "CE" and "BE" Series Reference Standard is not just at one unique position on the artifact, but is known at all locations on the standard.

Durability and Charging Effects

EMS MXS "CE" and "BE" Series Reference Standards have been tested and evaluated over a broad range of operating conditions, from those found in a tungsten filament system to the highest resolution FEG system. These standards have been found remarkably durable during use, with no beam-induced distortion in the calibrated pattern after as much as one-half hour of imaging time at 50,000X and 20 KV. Charging is minimal to non-existent, though edge-effect can be seen under some conditions. The high contrast and brightness, which can be obtained using these reference standards guarantees good contamination tolerance.

➤ Magnification Reference Standards – SPM, AFM, SEM Calibration Standards (continued)

➤ 1. MXS 301CE and MXS 701CE

The calibrated dimension is the spatial period of a series of parallel ribs running across the surface of the sample. The significant height of the ribs (>100 nm) provides excellent image contrast. The top surface of the rib structures is somewhat rounded rather than completely flat. The edges of the ribs are readily discernible, with over 75% of the 3 mm by 4 mm sample area exhibiting an edge location variation, which is less.

Use and Imaging

The exceptionally clean and uniform pattern provided in an MXS 301CE or MXS 701CE standard displays few imperfections, which can be used as focusing and stigmation aids. For this reason, care in setting up the image before measurement is important. To assist in the setup process, an instruction sheet is provided with each standard. This sheet provides several example images, which can be used to determine if the image of the sample is correctly set up. Especially with the MXS 301CE and MXS 701CE line-space pattern standards, obtaining the proper stigmation is crucial since improper stigmation is not readily apparent when imaging a pattern of straight line. Once a proper focus and stigmation are obtained, the image can be shifted to an appropriate area and the desired measurements made.

➤ 2. MXS 702CE

The calibrated dimension is the spatial period of a series of a 2-dimensional grid spread across the surface of the sample. This grid consists of a series of cylindrical posts rising from the surface of the sample. The significant height of the ribs (>100 nm) provides excellent image contrast. The top surface of these posts is somewhat rounded rather than flat and there are also slight departures from a perfect circle in the shape of some posts. Measurement techniques must be used which take these characteristics into account. The center-to-center distance of any pair is the most accurate measurements.

Use and Imaging

The exceptionally clean and uniform pattern provided in an MXS "CE" series 2-dimensional calibration standard displays few large scale imperfections which can be used as focusing and stigmation aids. For this reason, taking care in setting up the image before measurement is important. To assist in this process, an instruction sheet is provided with each standard. This sheet provides several example images which can be used to determine if the image of the sample is correctly set up.

The characteristics of the MXS 702CE standards make it easier to image than the 1-dimensional standards. The 2-dimensional grid facilitates setting the stigmation of the image properly. Once proper focus and stigmation are obtained, the image can be shifted to an appropriate area and the desired measurements made. Since the pattern covers the entire sample area, it is possible to make over 1,000,000 measurements utilizing the standard without using the same area twice.

Cleaning for "CE" Series

Cleaning is possible using dry air or other clean gases, high purity distilled or deionized water, and soft brushes. **Rubbing with soft tissues, or any other firm physical contact, or the use of solvents, such as acetone or alcohol will damage the surface of the reference standard.**

➤ 3. MXS 301BE

The calibrated dimension is the spatial period of alternating lines of Titanium and Silicon. The use of two different elements provides excellent image contrast, and the titanium layer thickness is kept to 20 nm to control edge distortion effects in the SEM image. These physical characteristics make the edges sharp and readily discernible. The calibrated pattern covers the entire sample, providing over 1,000,000 measurement sites. Because the pattern is a direct recording of a laser-generated interference pattern which has been transferred into the 20 nm thick Titanium film, these calibration samples are the most accurate available.

Imaging and Applications

The exceptionally clean and uniform pattern provided in an EMS MXS "BE" series calibration standard displays few imperfections which can be used as focusing and stigmation aids. For this reason, care in setting up the image before measurement is

important. To assist in this process, an instruction sheet is provided with each standard. This sheet provides several example images which can be used to determine if the image of the sample is correct. Once a proper focus and stigmation are obtained, the image can be shifted to an appropriate area and the desired measurements made.

The full screen image provided by an EMS calibration sample provides a unique advantage. Most calibration standards really verify accuracy of one portion of the image, while the entire screen is part of the measurement tool. With an image that fills the screen, you can quickly diagnose all types of image distortions, including problems due to vibrations, external fields, etc. A common problem is distortion caused by missadjusted CRT's or scanners in which the magnification in one part of the image is different from another part of the image. Such problems are easily found and corrected using these calibration samples.

Cleaning for "BE" Series

Titanium on Silicon produces a very durable calibration pattern. The calibration standard can be cleaned using common solvents such as acetone or alcohol, detergents, deionized water, etc. Gentle physical rubbing with soft tissues, brushes, etc., should not damage the sample. In extreme cases, cleaning by oxygen plasma may be possible.

Specifications

Product Data	301CE & 701CE	702CE	301BE**
Substrate	Silicon Wafer	Silicon Wafer	Silicon Wafer
Top Surface	60 nm Tungsten Film	60 nm Tungsten Film	Ti pattern on Si
Physical Size	3mm x 4mm x 0.5mm	3mm x 4mm x 0.5mm	3mm x 4mm x 0.5mm
Accuracy	± 3%	± 3%	± 1%
Nominal Dimensions	(x) 300nm for 301CE 700nm for 701CE	(x, y) — 700nm for 702CE	(x) 300nm for 301BE
Availability	mounted or unmounted*	mounted or unmounted*	mounted or unmounted*

*The cost for mounted samples using standard aluminum pin type stubs (EMS #75200). Please call us for additional expense.

**MXS-301BE Calibration sheet provided with standard contains actual dimensions to 3 significant figures. NPL traceability is also available with an additional cost.

Ordering Information

Application	Product	Pattern	Nominal Pitch	Material	Mounting	Catalog #
SEM	701CE	Parallel Ridges	700 nm	W-Coated Photoresist on Si	unmounted mounted	80110-71 80110-71M
SEM	301CE	Parallel Ridges	300 nm	W-Coated Photoresist on Si	unmounted mounted	80110-31 80110-31M
SEM	702CE	Array of Posts	700 nm	W-Coated Photoresist on Si	unmounted mounted	80110-72 80110-72M
AFM, SEM, TOF-SIMS, Auger, etc.	301BE	Parallel Ridgse	300 nm	Ti Lines on Si	unmounted mounted	80111-31 80111-31M

Special Services (Needs to be added to the standard price)

SS-301	301BE Certification	each
SS-SEM	Mount Certified Specimen for SEM	each

► SPM Calibration Specimens

Overall Benefits:

- Easier testing of your SPM.
- Improved accuracy of critical dimension measurements.
- Accuracy: 0.5% (1 std. dev.).

Features:

- Holographic fabrication - assures high accuracy and precision.
- Pattern height > 100nm - provide excellent image contrast.
- Uniform coverage of entire chip - save time (can image anywhere).

Description:

Nominal calibrated dimensions: 300 or 700nm.

Calibration certificate: supplied with each sample, stating the dimension to the nearest 1nm.

Pattern types: 1- or 2-Dimensional. The calibrated dimension is the same for both axes for the 2-D standard.

Feature geometry:

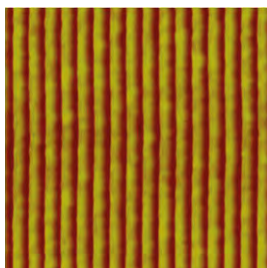
- parallel ridges (1-D, 300 or 700nm)
- cylindrical posts (2-D 300nm)
- diamond-shaped posts (2-D 700nm)

Physical Size: 3 mm x 4 mm x 0.5mm

Substrate: Silicon wafer

Top Surface: Tungsten film

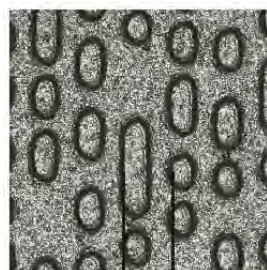
The 1-D standards can be scanned using any AFM mode, including contact mode. The 2-D standards can be scanned using modes such as Tapping Mode™, intermittent contact, and non-contact.



Model 150-1D

► Model 150-1D

Accurate measurements of sub 0.5 micron features are increasingly important as nanotechnology develops and as conventional microfabricated structures (semiconductors, magnetic data storage devices, optical data discs) shrinking. The model 150-1D with a nominal period (pitch) of 150nm, one dimensional, fabricated on a transparent substrate (Aluminum lines on glass) is the new tool to support this work.



Model 750-HD

► Model 750-HD

High Durability Calibration Reference Specimen for AFM and STM

Each specimen is supplied with a calibration certificate.

Can be used for AFM, STM and SEM. Has been used successfully in a hot water AFM.

Nominal pattern dimensions:Pitch 750 nm
Height 100 nm

Nominal specimen dimensions:6.35 m diameter,
0.3 mm thick

Composition:Solid Nickel

► Model PT

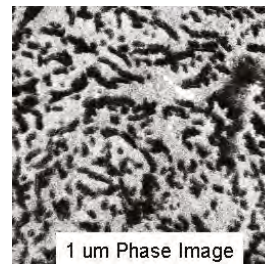
Phase Imaging Test Specimen (verify TappingMode™ phase contrast and resolution).

Phase Imaging is a sharp probe, which is brought into proximity with the specimen surface. The probe is oscillated vertically near its mechanical resonance frequency. As the probe lightly taps the surface, the amplitude of oscillation is reduced and the AFM uses this change in amplitude in order to track the surface topography. In addition to its amplitude, the probe motion can be characterized by its phase relative to a driving oscillator. The phase signal changes when the probe encounters regions of different composition. Phase shifts are registered as bright and dark regions in phase images, comparable to the way height changes are indicated in height images.

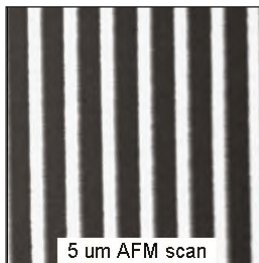
Phase images often show extraordinary contrast for many composite surfaces of technological and scientific interest. These include contamination deposits, discontinuous (i.e. defective) thin films, devices built of composite materials (e.g. magnetic recording heads), and cross-sectional specimens of composite materials. Both inorganic and organic materials can be examined. We have found that phase imaging is more convenient and gentler than other methods, which are based on contact mode operation. It routinely achieves lateral resolution of 10 nm.

► Models 300-2D, 300-1D, 700-2D and 700-1D

All mounted on 15 mm steel disk.

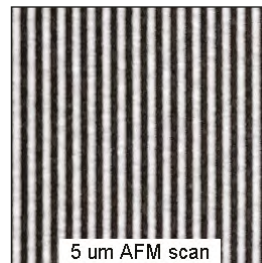


1 um Phase Image



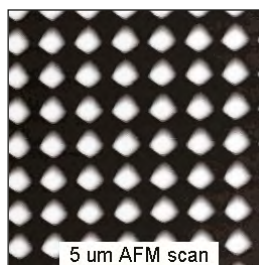
5 um AFM scan

300-1D
Parallel Ridges, Pitch 288
W-coated Photoresist on Si
Use contact or TappingMode



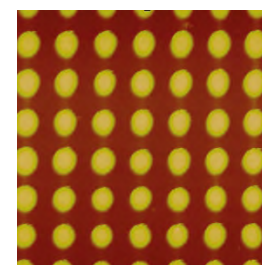
5 um AFM scan

300-2D
Array of Posts, Pitch 297
Al bumps on Si
Use contact or TappingMode



5 um AFM scan

700-1D
Parallel Ridges, Pitch 700
W-coated Photoresist on Si
use contact or TappingMode



700-2D
Array of Posts, Pitch 700
W-coated Photoresist on Si
use TappingMode

References:

1. Pereira, D.E.D. & Claudio-da-Silva, Jr., E. "Improvement of AFM as an analytical Instrument for Residual Lignin Characterization" in: Proceedings International Symposium on Wood and Pulp Chemistry, Helsinki, Finland, June 1995.
2. Pereria, D.E.D, Chernoff, D., Claudio-da-Silva, Jr. E., & Cemuner, B.J., "The use of AFM to investigate the delignification process: Part I -AFM performance by differentiating pulping processes", to be published.

► **SPM Calibration Specimens** *(continued)*

► **Model 150-2D** — *Very High Reference and Traceable Standard for Resolution Calibration AFM, SEM, Auger, and FIB*

General Purpose – High Precision

A precision, holographic pattern provides accurate calibration in the horizontal plane for very high resolution, nanometer-scale measurements.

Period: 144 nm pitch, two-dimensional array. Accurate to ± 1 nm. Refer to calibration certificate for actual pitch.

Surface: Aluminum bumps on Silicon, 4x3 mm die. Bump height (about 90 nm) and width (about 75 nm) are not calibrated.

For SEM, an independent analytical lab has tested this specimen in a FE-SEM (field emission scanning electron microscope). They found that the pattern was very uniform and the specimen was easy to image. No significant charging was observed in the voltage range 1-20 kV.

Usability: the calibrated pattern covers the entire chip. There is sufficient usable area to make tens of thousands of measurements without reusing any areas altered or contaminated by previous scans.

► **MODEL 150-2D:**

This Calibration Reference specimen comes with a non-traceable, manufacturer's certificate. These state the average period, based on batch measurements.

► **MODEL 150-2DUTC:**

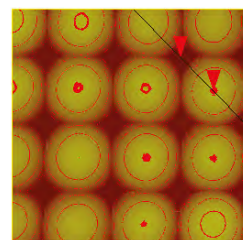
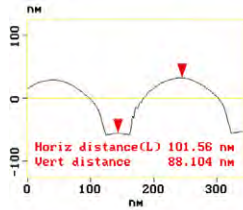
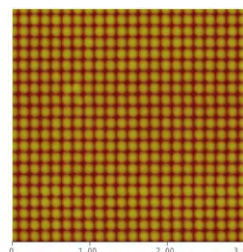
This traceable, Certified Standard is a select grade. Each standard is individually measured in comparison with a similar specimen calibrated at PTB. (PTB, Physikalisch-Technischen Bundesanstalt, is the German counterpart of NIST). The uncertainty of single pitch value is typically ±1,4 nm (95% confidence interval). Multi-pitch measurements provide the usual square-root of N improvement in precision.

Easy to use

We recommend Model 150-2D because of its unique characteristics which make it especially easy to use. The specimen is durable and it allows you can scan in contact mode, offering you faster calibration and measurements. This is the only high resolution 2D calibration specimen we have seen that offers the following characteristics:

- 2-dimensional array for simultaneous calibration of X and Y axes.
- Pitch <500 nm.
- Array of pumps mean the image contrast is high even when the probe tip is slightly dull.
- High contrast in contact mode scans.
- The pattern covers the entire die so that you don't have to hunt for the scan area.

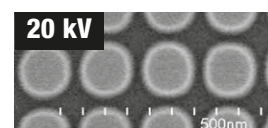
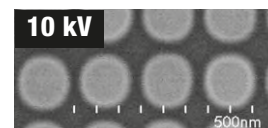
AFM Tapping Mode Scan



The bump height is about 90 nm. This specimen is not recommended as a height reference because it is not easy for the standard AFM probes to reach the substrate level between the pumps.

SEM High Magnification

The following image was captured with a magnification setting of 100kX and accelerating voltage 10 kV



SEM Medium Magnification

At 5 kX, the individual bumps were still well resolved. Large fields of view show how few defects are present. The most common defects are single missing bumps or a single extra bump inserted between lattice positions. Two vacancies are present in the image shown here.



Ordering Information:

ASM Model#	EMS Part#	
150-1D	80125-1D	Unmounted
	80125-1D-AFM	AFM
	80125-1D-Pin	SEM pin
	80125-1D-X	Choose mount
300-1D	80123-1D	Unmounted
	80123-1D-Pin	SEM pin
	80123-1D-AFM	AFM
	80123-1D-X	Choose the mount
300-2D	80123-2D	Unmounted
	80123-2D-Pin	SEM pin
	80123-2D-AFM	AFM
	80123-2D-X	Choose the mount
301BE	80111-31	Unmounted
	80111-31-Pin	SEM pin

ASM Model#	EMS Part#	
301CE	80110-31	Unmounted
	80110-31-Pin	SEM pin
700-1D	80122-1D	Unmounted
	80122-2D	Unmounted
701CE	80110-71	Unmounted
	80110-71-Pin	SEM pin
702CE	80110-72	Unmounted
	80110-72-Pin	SEM pin
750-HD	80124-HD	Unmounted
	PT	80124-PT

Ordering for Calibrator only:

Available in the following ways: unmounted, 15mm steel disk (for AFM), SEM pin stub, or any other type of SEM stub.

ASM Model#	EMS Part#	
150-2D	80125-2D	Unmounted
	80125-2D-Pin	SEM Pin
	80125-2D-AFM	AFM
	80125-2D-X	Choose mount
150-2DUTC	80126-2D	Unmounted
	80126-2D-Pin	SEM Pin
	80126-2D-AFM	AFM
	0126-2D-X	Choose mount

► Very High Resolution Calibration Reference and Traceable Standard for AFM, SEM, Auger, and FIB

For General Purpose and Metrology Microscopes

A precision pattern providing accurate calibration in the horizontal plane for very high resolution, nanometer-scale measurements.

Period: 70 nm pitch, one-dimensional array. Accurate to +/- 0.25 nm. Refer to calibration certificate for actual pitch.

Surface: Silicon Oxide ridges on Silicon, 4x3 mm die. Ridge height (about 35 nm) and width (about 35 nm) are not calibrated.

For AFM, use in contact, intermittent contact (TappingMode™) and other modes with image sizes from 100 to 3000 nm. Available unmounted or mounted on steel disks.

For SEM, this specimen works well at a wide range of accelerating voltages (1 kV to 20 kV have been tested) and calibrates images from 25 kX to 1000 kX. Normally supplied unmounted. Can be mounted on a stub of your choice.

Usability: The calibrated pattern covers a 1.2x0.5 mm area. There is sufficient usable area to make thousands of measurements without reusing any areas altered or contaminated by previous scans.

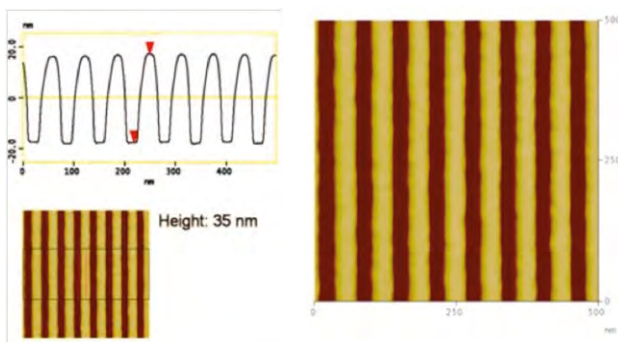
► Model 70-1D.

This Calibration Reference specimen comes with a non-traceable, manufacturer's certificate. This states the average period, based on batch measurements.

► Model 70-1DUTC.

This Traceable, Certified Standard is measured in comparison with a standard calibrated at PTB. (PTB, Physikalisch-Technischen Bundesanstalt, is the German counterpart of NIST. The standard is "NIST-Traceable" by virtue of the mutual recognition agreement between NIST and PTB.) The uncertainty of single pitch values is typically +/- 0.5 nm (95% confidence interval). Multi-pitch measurements provide the usual square-root of N improvement in precision.

AFM Tapping Mode Scan

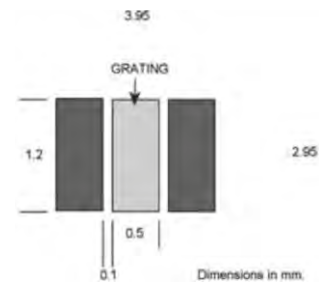


The ridge height is about 35 nm. This specimen is not recommended as a height reference because the standard AFM probes may not always reach the substrate level between the ridges. Nevertheless, the image contrast is high, even when the probe tip is slightly dull. You can scan in contact mode, which means you can calibrate and measure faster.

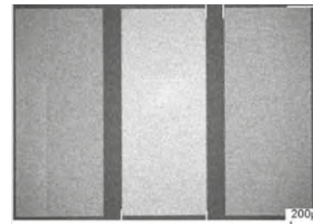
Easy to find Patterned area

The patterned area is easy to find. The three rectangles shown in the sketch below are visible in reflected light, with either the unaided eye or an optical microscope. In a low magnification SEM image, the contrast is reversed. The central rectangle, which is the grating pattern, is relatively bright. The grating lines are parallel to the long side of the rectangle, as suggested by the high magnification SEM image.

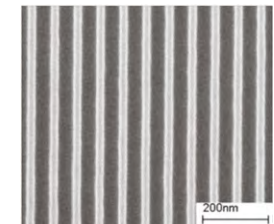
Die and location of pattern within die:



Low magnification SEM image:



SEM High Magnification Image



Magnification= 200 kX
Voltage= 5 kV.

Ordering for the Very High Calibration and Traceable Standard:

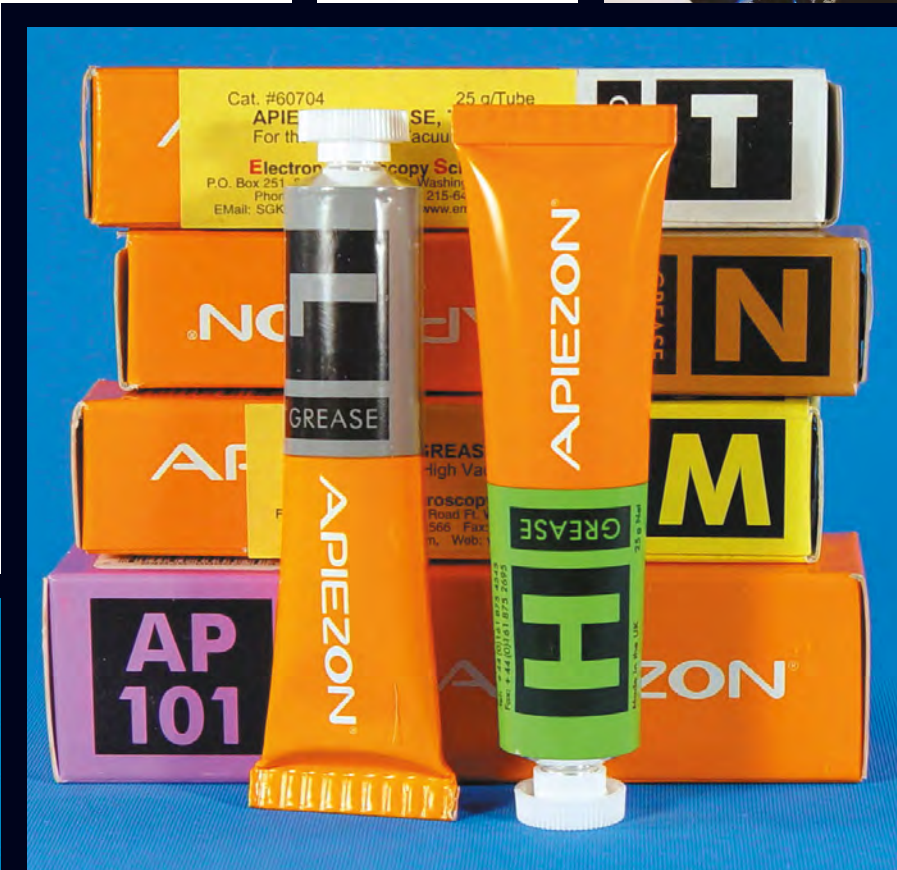
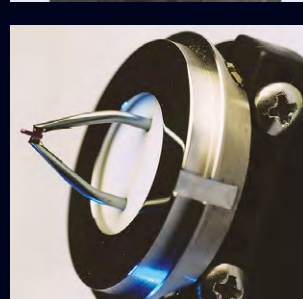
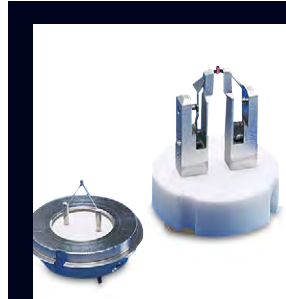
Available in the following ways: unmounted, 15mm steel disk (for AFM), SEM pin stub, or any other type of SEM stub.

Cat.#	Description	Qty
80127-1D	Calibration Standard, Model 70-1D Unmounted	each
80127-1DC	Calibration Standard, Model 70-1D with Cert, Unmounted	each
80127-1D-PIN	Same as 80127-1D but mounted on Pin Stub	each
80127-1DC-PIN	Same as 80127-1DC but Mounted on Pin Stub	each
80127-1D-AFM	Same as 80127-1D but mounted on Steel Disk for AFM	each
80127-1DC-AFM	Same as 80127-1D but mounted on Steel Disk for AFM	each
80127-1D-X	Same as 80127-1D, Choose Mount	each
80127-1DC-X	Same as 80127-1D Choose Mount	each

SECTION 7

Microscope Accessories

Apertures and Aperture Cleaning
Recoating TEM Viewing Screens
Standard Loop Filaments
Lanthanum Hexaboride LaB₆ Cathodes
Denka LaB₆ Cathodes
Applied Physics Lanthanum and Cerium
Hexaboride CeB₆ Cathodes
Pt and "PTFE" Crucibles
Apezion Vacuum Greases and
Diffusion Pump Oils



**Electron
Microscopy
Sciences**

► Self Cleaning Gold Foil Disc Apertures

Advanced techniques of thin metal film application permits the apertures to retain a clean hole edge during prolonged beam exposure. Ultra-thin, half-micron design discourages contaminant accumulation and stabilizes astigmatic conditions to provide longer life. Conventional mechanical cleaning involving costly down-time is no longer necessary. Because the foil is ultra thin, care must be taken when handling the gold foil apertures.

Gold foil aperture tolerances vary as follows:

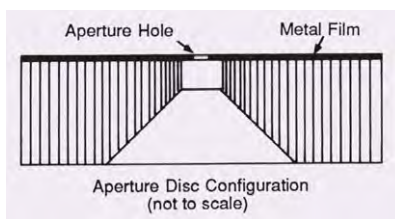
- Nominal hole size from 1 to 60 micron: +/-1micron
- Nominal hole size 70 micron and up: +/-10%

► Platinum and Molybdenum Discs, Drilled Apertures

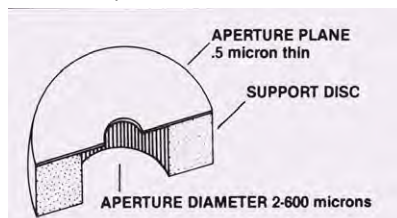
Platinum apertures are easily cleaned by either an aperture flamer or over a bunsen burner in the open air. We maintain a wide variety of Platinum Drilled Apertures in stock with different configurations suiting all of your needs.

Platinum Apertures size tolerances vary as follows:

- Nominal hole diameter: +/- 1 micron
- Disc diameter: +/- 10 microns
- Disc thickness: +/- 10 microns



Gold Foil Aperture:



Ordering information: Gold (Au); Platinum (Pt); Molybdenum (Mo)

2mm O.D. x 0.24mm thick:

Philips, Cemea

Nominal Hole Size	Cat. # Gold	Cat. # Platinum	Cat. # Molybdenum
10 microns	-	40010-Pt	40010-Mo
20 microns	-	40020-Pt	40020-Mo
30 microns	-	40030-Pt	40030-Mo
50 microns	-	40050-Pt	40050-Mo
100 microns	-	40100-Pt	40100-Mo
150 microns	-	40150-Pt	40150-Mo

2mm O.D. x 0.53mm thick:

Cambridge, Siemens, JEOL, Cemea

Nominal Hole Size	Cat. # Gold	Cat. # Platinum	Cat. # Molybdenum
5 microns	42005-Au	42005-Pt	42005-Mo
10 microns	42010-Au	42010-Pt	42010-Mo
15 microns	42015-Au	42015-Pt	42015-Mo
20 microns	42020-Au	42020-Pt	42020-Mo
30 microns	42030-Au	42030-Pt	42030-Mo
40 microns	42040-Au	42040-Pt	42040-Mo
50 microns	42050-Au	42050-Pt	42050-Mo
70 microns	42070-Au	42070-Pt	42070-Mo
100 microns	42100-Au	42100-Pt	42100-Mo

3mm O.D. x 0.12mm thick:

Zeiss, Nanolab, Novascan

Nominal Hole Size	Cat. # Gold	Cat. # Platinum	Cat. # Molybdenum
10 microns	43010-Au	43010-Pt	43010-Mo
20 microns	43020-Au	43020-Pt	43020-Mo
30 microns	43030-Au	43030-Pt	43030-Mo
50 microns	43050-Au	43050-Pt	43050-Mo
60 microns	43060-Au	43060-Pt	43060-Mo
70 microns	43070-Au	43070-Pt	43070-Mo
100 microns	43100-Au	43100-Pt	43100-Mo
150 microns	43150-Au	43150-Pt	43150-Mo
200 microns	43200-Au	43200-Pt	43200-Mo
300 microns	43300-Au	43300-Pt	43300-Mo

3mm O.D. x 0.24mm thick:

Philips, ARM, AEI, Cambridge

Nominal Hole Size	Cat. # Gold	Cat. # Platinum	Cat. # Molybdenum
5 microns	44005-Au	44005-Pt	44005-Mo
10 microns	44010-Au	44010-Pt	44010-Mo
15 microns	44015-Au	44015-Pt	44015-Mo
20 microns	44020-Au	44020-Pt	44020-Mo
25 microns	44025-Au	44025-Pt	44025-Mo
30 microns	44030-Au	44030-Pt	44030-Mo
40 microns	44040-Au	44040-Pt	44040-Mo
50 microns	44050-Au	44050-Pt	44050-Mo
60 microns	44060-Au	44060-Pt	44060-Mo
70 microns	44070-Au	44070-Pt	44070-Mo
100 microns	44100-Au	44100-Pt	44100-Mo
150 microns	44150-Au	44150-Pt	44150-Mo
200 microns	44200-Au	44200-Pt	44200-Mo
300 microns	44300-Au	44300-Pt	44300-Mo
400 microns	44400-Au	44400-Pt	44400-Mo

4mm O.D. x 0.165mm thick: ISI

Nominal Hole Size	Cat. # Gold	Cat. # Platinum	Cat. # Molybdenum
10 microns	-	45010-Pt	45010-Mo
20 microns	-	45020-Pt	45020-Mo
30 microns	-	45030-Pt	45030-Mo
50 microns	-	45050-Pt	45050-Mo
70 microns	-	45070-Pt	45070-Mo
100 microns	-	45100-Pt	45100-Mo

6mm O.D. x .24mm thick: JEOL

Nominal Hole Size	Cat. # Gold	Cat. # Platinum	Cat. # Molybdenum
10 microns	-	46010-Pt	46010-Mo
20 microns	-	46020-Pt	46020-Mo
30 microns	-	46030-Pt	46030-Mo
50 microns	-	46050-Pt	46050-Mo
100 microns	-	46100-Pt	46100-Mo

6.35mm O.D. x 0.06mm thick: ETEC

Nominal Hole Size	Cat. # Gold	Cat. # Platinum	Cat. # Molybdenum
10 microns	-	47030-Pt	47030-Mo
50 microns	-	47050-Pt	47050-Mo
100 microns	-	47100-Pt	47100-Mo
150 microns	-	47150-Pt	47150-Mo
200 microns	-	47200-Pt	47200-Mo

6.35mm O.D. x 0.14mm thick:

ETEC Spray Aperture

Nominal Hole Size	Cat. # Gold	Cat. # Platinum	Cat. # Molybdenum
500 microns	-	47500-PtS	47500-MoS
1000 microns	-	471000-PtS	471000-MoS

12.7mm O.D. x 0.25mm thick: Cambridge, Camscan Spray Aperture

Nominal Hole Size	Cat. # Gold	Cat. # Platinum	Cat. # Molybdenum
500 microns	-	48500-PtS	48500-MoS
1000 microns	-	481000-PtS	481000-MoS

* All hole sizes not listed are available upon special request.

► **Wehnelt Apertures**

Made from 0.004" tantalum foil. Replaceable tantalum apertures for some microscopes (Amray and Philips). They improve the performance of the electron gun.



49020-Ta	Wehnelt Aperture, 200µm Hole	each
49030-Ta	Wehnelt Aperture, 300µm Hole	each
49040-Ta	Wehnelt Aperture, 400µm Hole	each
49050-Ta	Wehnelt Aperture, 500µm Hole	each
49075-Ta	Wehnelt Aperture, 750µm Hole	each
49100-Ta	Wehnelt Aperture, 1000µm Hole	each

► **Strip Apertures:**



All the following multi-hole strip aperture are made from Platinum-Iridium (95:5) and are standard in our line.

► **HITACHI Strip Apertures**

Measures: 41.0 x 4.0 x 0.10mm – 4 holes

49211-01	Hole Sizes: 10-10-20-70µm	each
49211-02	Hole Sizes: 30-20-20-70µm	each
49211-03	Hole Sizes: 70-70-50-50µm	each
49211-04	Hole Sizes: 30-50-70-100µm	each
49211-05	Hole Sizes: 10-50-100-200µm	each

Measures: 45.0 x 4.0 x 0.10mm – 4 holes

49212-01	Hole Sizes: 20-20-30-30µm	each
49212-02	Hole Sizes: 30-70-100-200µm	each
49212-03	Hole Sizes: 10-30-50-70µm	each

► **JEOL Strip Apertures**

Measures: 9.0 x 2.35 x 0.10mm – 3 holes

49210-01	Holes Sizes: 10-30-80µm	each
49210-02	Hole Sizes: 10-20-100µm	each
49210-03	Hole Sizes: 30-50-150µm	each
49210-02	Hole Sizes: 100-200-300µm	each

► **Other Strip Apertures**

Measures 10.0 x 2.5 x 0.10mm – 3 holes

49213-01	Hole Sizes: 20-60-100µm	each
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Measures 31.0 x 5.0 x 0.10mm – 4 holes

49214-01	Hole Sizes: 20-30-30-50µm	each
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Note: These are our standard strip apertures. For all other strip apertures or any custom made ones please inquire.

► **Metal Foils**

For aperture cleaning, vacuum evaporation.

73820	Molybdenum foil, 0.002" thick, (0.05mm); 6x6"(15.2 x 15.2 cm)	each
73822	Tantalum Foil, 0.003" thick, (0.075mm); 6x6"	each

For All Other Evaporation Supplies And Accessories, See pages 966-970 >>>>

► **Aperture Flamer**

For holding aperture discs or strips while flaming. Small discs can be flamed in the 3/16" diameter cup made from 6 mil platinum foil with a 1/2" diameter hole in the bottom to induce a good flow of air. The cup is attached by a 30 mil platinum wire to a heat resistant handle. The aperture can be hung from the hook for flaming.

40001	Aperture Flamer	each
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For holding 1/4" to 1/2" diameter aperture discs while flaming. The flat pan is made from 6 mil platinum foil with a 1/2" diameter hole in the bottom to induce adequate air flow. A 30 mil platinum wire attaches the pan to a heat resistant handle.

40002	Aperture Flamer	each
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► **Metal Boats**

For disc aperture cleaning, vacuum evaporation.

Thickness: 0.05mm (0.002") Overall length: 75mm (3") Trough Measures: 12mm (1.2") long x 5mm (5/16") wide x 1mm deep



73810	Molybdenum Boat	5/pk
73812	Platinum Boat	1/pk
73814	Tantalum Boat	5/pk

For Our Complete Line of Metal Wires, See page 967 >>>>

► **Molybdenum Boat for Strip Apertures**

Thickness: 0.05mm (0.002") Overall Length: 75mm Trough Measures: 50mm (L) x 5mm (W) x 1mm (D)



73818	Long Molybdenum Boat	5/pk
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► **Tantalum Boats**

See Evaporation Supplies page 966-968 >>>>



► **Tungsten Boat**

Thickness: 0.05mm (0.002") Overall Length: 32mm (1 1/4") Trough measures: 12mm (1/2") long x 5mm (5/16") wide x 1mm deep.

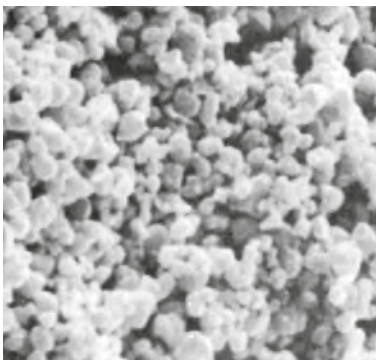
73816	Tungsten Boat	5/pk
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For our complete line of Tungsten Boats see Evaporation Supplies pages 966-967 >>>>

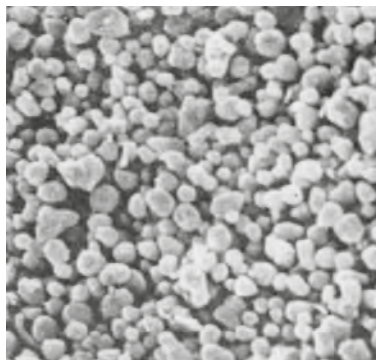
► Recoating T.E.M. Viewing Screens; Phosphor Coatings

A proprietary process where 1 to 2 micron particles of phosphor are deposited on the screen and produce the highest possible resolution. Because of our high quality, our coated viewing screens are now being supplied to many of the TEM manufactures in the market, including JEOL, Phillips, Zeiss, Hitachi, Topcon, and Siemens.

Viewing Screen Surfaces 2000 X



Typical factory-produced coating of a major electron microscope manufacturer



Surface of a GRANT recoated screen

Features of the Service

- Calibrated Screen for Asbestos Analysis (AHERA)
- TEM Viewing Screens
- Fiber Optic Plates
- CCTV Detectors
- Digital Detectors
- RHEED System Screens
- SEM Kikuchi Screens
- SEM Kikuchi Screens
- Image Intensifier Screens

Why Recoat?

Viewing screens are easily damaged by the electron beam, especially at high accelerating voltages where knock-on damage can be severe. For optimum viewing, fluorescent screens should be recoated regularly because coating efficiency decreases with prolonged electron irradiation. Burning may be evident, but also, the inefficient state of the coating may go unnoticed due to the gradual damage that occurs with use.

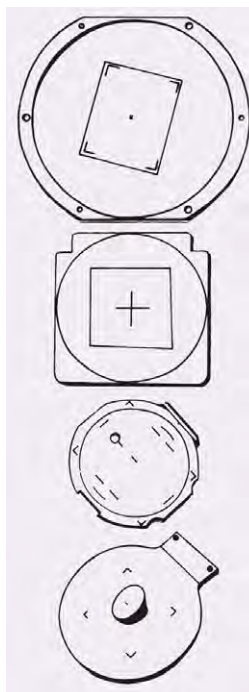
Recoating Process:

Recoating usually takes 3 to 5 days and involves:

- stripping off the old phosphors.
- polishing and cleaning the surface.
- applying a new phosphor coating.
- deposition of film format marks (factory standard) custom markings, such as asbestos analysis circles (additional charge, ranging from 130.00, dependent on your specifications).

Special Services:

For those customers whom do not have a spare screen and can not afford any down time we do offer a special weekend express service (by prior arrangement). Briefly, your screen must be received by us on Friday, and we will ship it back to you on Monday for Tuesday delivery. For this service, an additional 25% will be applied to the recoating price.



Service Information:

For custom markings, please furnish us with your specifications.

Phillips:

Cat. No.	Description
2300	Main Large (200, 300, 400, CM series)
2310	Small Focusing (all series)
2320	Alignment
2330	New Main Large (300, 301, 400, 420, CM)

Zeiss:

Cat. No.	Description
2340	EM9 Large & Small Combination
2350	EM10 Large
2360	EM10 Small
2370	EM109 Large
2380	EM109 Small
2390	EM902 Large
2400	EM902 Small
2410	EM912 Large

JEOL:

Cat. No.	Description
2420	T7, T8
2430	100B, 100C, 100CX, 100S, 200CX Outer
2440	LInner Rectangle
2450	1200, 2000-4000 Series, Large
2460	1200, 2000-4000 Series, Small
2470	New JEOL 100C, 100CX, 200CX Inner Rectangle (main Screen) with Factory Film Format Marks & Calibration

Hitachi:

Cat. No.	Description
2480	HS9, HU11, H600 Inner Main, Final all
2490	All Crescent/Outer
2500	H7000 Inner, H8000 Inner Main
2510	H7000 Outer, H8000 Outer
2520	Focusing

Siemens:

Cat. No.	Description
2530	Final IA, 102, Central Field
2540	Intermediate
2550	Focusing, Button, Penny
2560	Outer, Crescent, Outer Field

Topcon:

Cat. No.	Description
2570	Large Viewing
2580	Focusing

RCA

Cat. No.	Description
2600	Viewing

AEI

Cat. No.	Description
2610	Not Glass

* All other screens that are not listed are available upon request.

► Standard Loop Filaments

Features

- A rigid attachment of the filament wire to the post — no possibility of waving.
- Minimum tip radius for coherent beam.
- Polished post ends.
- Precise dimensioning.
- Bases can be cleaned and rebuilt many times.
- Better long-term economy.

*Rebuilding Services

The base assembly of all of our new filaments are guaranteed to be rebuildable for the lifetime of the electron beam instrument. All of our filaments, new or rebuilt, are inspected for consistent quality and performance before being shipped to you. Return the base and we will rebuild it to meet its original specifications.

Filament Rebuilding Services include: Reconditioning of the base; cleaning and/or replacement of necessary parts; Installation of new standard loop or special filament tip; Pre-centering; Vacuum normalizing; and Microscopic inspection.

Ordering Information



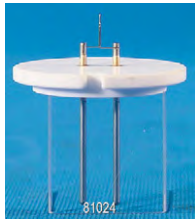
for: **AEI, Cambridge S Series, Novascan, Semco, and Nanolab**

Cat. #	Description	Qty.
81020	New Filament	10/box
*81020-R	Rebuilt Filament	each



for: **Zeiss Instruments and Tescan and LEO**

Cat. #	Description	Qty.
81040	New Filament	10/box
*81040-R	Rebuilt Filament	each



for: **All Amray instruments (except Amray 1200 Series)**

Cat. #	Description	Qty.
81024	New Filament	10/box
*81024R	Rebuilt Filament	each



for: **JEOL K-Type**

Cat. #	Description	Qty.
81041	New Filament	10/box
81041-R	Rebuilt Filament	each



for: **Amray 1200 Series, Balscan, Camscan, Siemens, Cambridge (S-410, Mark II)**

Cat. #	Description	Qty.
81028	New Filament	10/box
*81028R	Rebuilt Filament	each



for: **Jeol (JSM 35 series)**

Cat. #	Description	Qty.
81042	New Filaments	10/box
*81042R	Rebuilt Filament	each



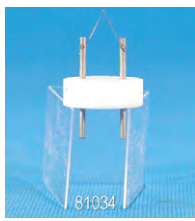
for: **ARL Instruments**

Cat. #	Description	Qty.
81030	New Filament, 4 mil wire	10/box
81032	New Filament, 5 mil wire	10/box
*81030R	Rebuilt Filament, 4 mil wire	each
*81032R	Rebuilt Filament, 5 mil wire	each



for: **Philips, FEI**

Cat. #	Description	Qty.
81044	New Filament	10/box
*81044R	Rebuilt Filament	each



for: **ETEC instruments**

Cat. #	Description	Qty.
81034	New Filament	10/box
*81034R	Rebuilt Filament	each



for: **Philips Pointed S-Type**

Cat. #	Description	Qty.
81045	New Filament	10/box
*81045R	Rebuilt Filament	each



for: **ISI, ABT, Topcon instruments**

Cat. #	Description	Qty.
81036	New Filament, 2-prong	10/box
81038	New Filament, 3-prong	10/box
*81036R	Rebuilt Filament, 2-prong	each
*81038R	Rebuilt Filament, 3-prong	each



for: **Hitachi S-Type**

Cat. #	Description	Qty.
81022	New Filament	10/box
*81022-R	Rebuilt Filament	each

► Standard Denka Model 3 Lanthanum Hexaboride (LaB₆) Cathodes

Lanthanum Hexaboride is the optimum cathode material for use in:

SEM • TEM • X-Ray Microanalysis • Electron Beam Lithography

Features

- Low potential barrier (work function)
- High melting point and stability at high temperatures
- Low vapor pressure – reduces evaporation lost
- Chemical stability
- **High brightness:** LaB₆ beam is ten times brighter than tungsten, has superior resolution – wide range of acceleration voltages. It provides sharp and clear pictures even to the smallest details. The initial brightness of a Denka Model 3 cathode (1 x 10⁶ A/cm².Str) is substantially better than that of competing mini-vogel type cathodes (typically 5x10⁵ A/cm².Str)
- **Long life:** Heat and vacuum are the final determinants of any cathode tip's life, but at 1550°C and a vacuum of 10⁻⁷ Torr, a service life of about 500 hours can be achieved.
- **Stability:** Every Denka Model 3 cathode offers a stability of better than 3% per hour at 1550°C
- **Interchangeability:** Denka Model3 LaB₆ cathodes are designed as direct replacement for tungsten filaments.



Tip Selection

Standard (Round) Tips

Provided with a 90° cone and 15μ radius round tip.

Flat (Truncated) Tips

Flat tips are recommended for applications where stability and long lifetime are the prime considerations, and where some degree of brightness can be sacrificed. Flat tips are available in eight configurations:

90° Cone Angle	60° Cone Angle
20μ radius	20μ radius
40μ radius	40μ radius
60μ radius	60μ radius
100μ radius	100μ radius







Sharp Tips

Sharp tips are recommended for applications where initial brightness is the foremost consideration and where shorter lifetime can be accepted. Sharp tips are available in two configurations.

60° Cone Angle	60° Cone Angle
5μ radius	10μ radius



Specifications	Flat Tip	Standard (Round) Tip	Sharp Tip
Brightness	About 10 times that of tungsten, 2-5 x 10 ⁶ A/cm ² . Str	About 10 times that of tungsten, 1x10 ⁶ A/cm ² . Str	Twice as bright as standard tips, 2 x 10 ⁶ A/cm ² . Str
Saturation	Monepot at about 1,400°C	Mono spot at about 1,500°C.	Almost the same as standard tips
Crossover	Large (11-13μ)	Small (7-10μ)	Small (7-10μ)
Angular Distribution	3.3 to 10 ⁻² rad	Sharp, 1.6 x 10 ⁻² rad	Sharp, 1.6 x 10 ⁻² rad
Used Temperature	temperature	Low temperature	High temperature.
Lifetime	Long life, usable at low temperatures and crystallized end changes slowly.	Long life but shorter than flat tips.	Short
Operation	Easy, thanks to its large spot size and broad adjusting range.	Not so difficult.	Difficult; Point adjustment needed!
Stability	High, vulnerable to thermal expansion or vibration.	High	Middle, vulnerable to the thermal expansion or vibration. Adjustment is sometimes necessary.
Technology Needed	Ordinary	High	Very high

	Cat. #	Description	Qty.		Cat. #	Description	Qty.		Cat. #	Description	Qty.
AMRAY 	80904	Standard	each	Hitachi 	80908	Standard	each	JEOL 	80900	Standard	each
	80904-5	Sharp	60-5 μm		80908-5	μm60-5	each		80900-5	μm60-5	each
	80904-10	KF Sharp	60-10 μm		80908-10	μm60-10	each		80900-10	μm60-10	each
	80904-20	Flat	60KF0 μm		80908-20	μm60-20	each		80900-20	μm60-20	each
	80904-40	Flat	60KF0 μm		80908-40	μm60-40	each		80900-40	μm60-40	each
	80904-60	Flat	60KF0 μm		80908-60	μm60-60	each		80900-60	μm60-60	each
	80904-80	Flat	60KF0 μm		80908-80	μm60-80	each		80900-80	μm60-80	each
	80904-100	Flat	60-KF0 μm		80908-100	μm60-100	each		80900-100	μm60-100	each
	80904-21	Flat	90KF0 μm		80908-11	μm90-20	each		80900-11	μm90-20	each
	80904-41	Flat	90KF0 μm		80908-21	μm90-40	each		80900-21	μm90-40	each
	80904-61	Flat	90KF0 μm		80908-41	μm90-60	each		80900-41	μm90-60	each
80904-81	Flat	90KF0 μm	80908-61	μm90-80	each	80900-61	μm90-80	each			
80904-101	Flat	90-KF0 μm	80908-81	90-100	each	80900-101	μm90-100	each			
Cambridge 	80906	Standard	each	ISI SEM 	80910	Standard	each	Phillips 	80902	Standard	each
	80906-5	μm60-5	each		80912	Standard	each		80914	Standard	each
	80906-10	μm60-10	each		80914-20	Flat	90-20		each		
	80906-20	μm60-20	each								
	80906-40	μm60-40	each								
	80906-60	μm60-60	each								
	80906-80	μm60-80	each								
	80906-100	60-100μm	each								
	80906-11	μm90-20	each								
	80906-21	μm90-40	each								
	80906-41	μm90-60	each								
80906-61	μm90-80	each									
80906-81	μm90-100	each									

► Kimball Physics Lanthanum Hexaboride (LaB₆) Cathodes

Features

- **Extended Life** — Thousands of hours in clean vacuum. Guaranteed life (measured in surface loss). Guaranteed against mounting structure failure.
- **Exceptional Stability** — Thermal/Chemical/Electrical. Precision machined carbon mounting. High over-temperature tolerance.
- **High Brightness/Low Energy Spread** — Oriented single crystal. Best-quality/high-purity material.
- **Accurate Microflats** — Superior optics/controlled source size standard diameter available.

For Use In:

- Scanning Electron Microscopes
- Transmission Electron Microscopes
- Electronlithography Systems
- X-Ray Sources

The new improved Kimball Physics Model ES-423E (Extended Life) LaB₆ Cathode is a high performance, resistively heated, thermionic electron source. The improvement stability of the LaB₆ crystal, results in less exposure of LaB₆, which reduces Wehnelt aperture contamination. Its lifetime is in excess of 6 months with continuous operation. Continuous operation at the full operating temperature improves the thermal stability of the gun and hence beam current stability. It is no longer necessary to wait hours for stable beam conditions in order to perform quantitative EEL or EDX measurements.

Specifications

The emitter is machined to 15+/-2µm diameter (standard), microflat alignment to the instrument base can be provided (on request), oriented single- crystal, <100> surface.

Mounted on the end of a single-piece, stress-free, carbon heater rod, held in place by a carbon ferrule.

A high degree of axial symmetry provides great mechanical stability.

The rod has a 100µm slot along the axis, which allows the heating current to go up one side and down the other.

In SEM type instruments, its lifetime is up to 3000–4000 hours In TEM instruments the lifetime can be even longer.

Mounting structure will last more than 10,000 hours.

Chemical reactivity and mechanical drift problems have been eliminated.

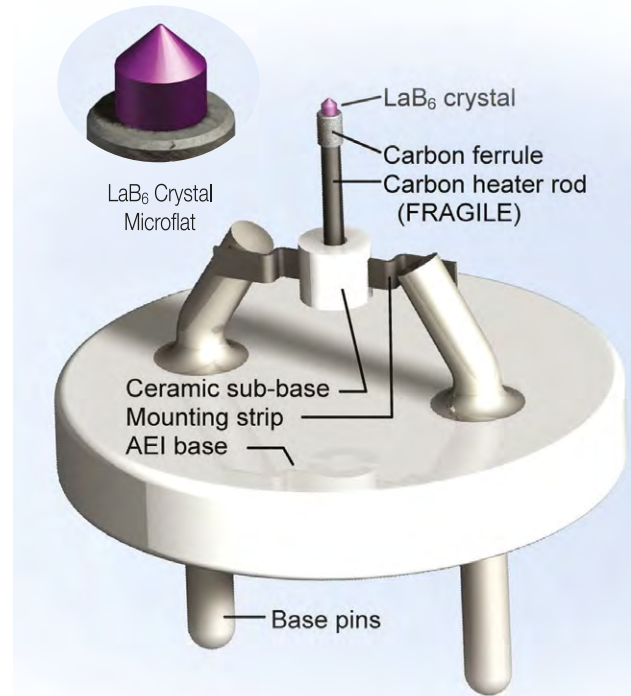
Instrument Conditions

While the cathodes can be fitted to virtually any instrument, there are several requirements needed for achieving quality results.

The most important requirement is for clean vacuum, with partial pressures of oxidizing gases being kept below 10⁻⁷ torr in the electron gun. The condition of the cathode itself, along with that of the Wehnelt aperture, may often be used to verify the partial pressures in the gun.

The cathode must be accurately and correctly positioned behind the Wehnelt aperture.

There must be controllable bias resistors which can reach adequately high values; some instruments are limited by values which are too low.



Ordering Information

For most SEMs and TEMs, the standard Styles 90-15 (90° included angle with a 15µm flat) is recommended.

Style 90-15 (90° included angle with a 15µm flat) is recommended for Leica/Cambridge.

Style 90-06 (90° included angle with a 6µm flat) is for high resolution, and selective TEMs. This cathode provides higher brightness, but with some compromise in lifetime.

To Order...

Specify Model: Model ES-423E & Style

- i.e. Style 90-15: Standard Microflat
- Style 90-20: Standard for Leica, Cambridge
- Style 90-20: 90° Angle w/non-standard microflat
- Style 60-06: 60° Angle w/non-standard microflat

Specify Instrument Manufacturer and Model No.

Specify Type of Instrument: SEM, TEM, STEM.

Example

Model ES-423E, Style 90-15 Standard for JEOL 820 TEM

Cat. #: **81080-15**

Cat. #	Description	Qty.
81080-15	Standard (90-15)	each
81080-20	Standard for Leica, Cambridge	each
81080-90	Non-Standard (90-20)	each
81080-60	Non-Standard Selective (60-06)	each

► Applied Physics Technologies Lanthanum Hexaboride (LaB₆) and Cerium Hexaboride (CeB₆) Cathodes

Building the World's Best Cathodes

LaB₆ and CeB₆ cathodes are ideal for many small spot size applications such as SEM, TEM, surface analysis and metrology, and for high current applications such as microwave tubes, lithography, electron-beam welders, X-ray sources and free electron lasers.

Applied Physics Technologies has decades of experience in research, development, and manufacturing of LaB₆ and CeB₆ cathodes.

We can provide the cathodes you need for replacement, OEM, and custom applications.



Lanthanum Hexaboride (LaB₆) and Cerium Hexaboride (CeB₆) Cathodes

The unique properties of hexaboride crystals provide stable electron-emitting media with work functions near 2.65 eV. The low work function yields higher currents at lower cathode temperatures than tungsten, which means greater brightness (or current at the beam focus) and longer cathode life. Typically, these cathodes exhibit 10 times the brightness and more than 10 times the service life of tungsten cathodes. In electron microscope applications, these characteristics translate to more beam current in a smaller spot at the sample, improved resolution, and less frequent cathode replacement.

For applications with large beam spot sizes, where large total current and current density are required, large, flat crystal faces of LaB₆ or CeB₆ can be the cathodes of choice. This regime is unsuitable for point sources such as field emitters, which are unable to provide sufficient total current, and has been thought of as the realm of the dispenser cathode. However, LaB₆ and CeB₆ may be more suitable, being particularly robust and resistant to chemical poisoning. They have modest vacuum requirements and long shelf life, and need only be brought up to operating temperature to provide emission, eliminating the activation procedure required of dispenser cathodes. They can provide long-term, stable operation at current densities up to 50 A/cm², and may be fabricated in a variety of shapes and with many different heating and mounting configurations.

LaB₆ and CeB₆ are the materials of choice for high current cathodes in a variety of advanced and custom applications.

The performance and lifetime of the hexaboride cathode are determined by several factors: vacuum level, cathode temperature, impurity level, crystal orientation, tip shape, and mount design. Vacuum requirements are more stringent for hexaboride emitters than for tungsten in order to minimize carbon contamination. In laboratory tests, CeB₆ has proven to be more

resistant to the negative impact of carbon contamination than LaB₆, which gives it an edge in potential cathode lifetime.

Excessive operating temperatures accelerate evaporation, thus decreasing the life of the cathode. Care must be taken to properly optimize cathode temperature to obtain the required emission without overheating the crystal.

CeB₆ has another advantage over LaB₆ relating to lifetime: its evaporation rate at normal operating temperatures near 1800 K is lower than that of LaB₆. So long as care is taken to operate the cathode below 1850 K, CeB₆ should maintain an optimum tip shape longer, and therefore last longer.

Crystal Growth

Impurities in the crystal will reduce both brightness and lifetime of the emitter because impurities increase both work function and volatility. We grow and fabricate our own high quality, single-crystal materials using a well-defined process called Inert Gas Arc Float Zone Refining. An electric arc melts a pressed-powder stick of LaB₆ or CeB₆ in a controlled atmosphere of inert gas, allowing the liquid-phase zone to freeze onto a selected orientation seed crystal as the arc is moved along the stick. The finished crystal assumes the desired orientation of the seed with less than 30 parts per million by weight metal impurities. Correct melt zone temperature and process speed minimize excessive boron evaporation to achieve the optimum ratio of metal to boron atoms in the grown crystal.

Crystal Orientation

Crystal orientation can be selected to match the cathode design or application. For electron microscopy, the <100> orientation is most desirable due to its brightness and crystal plane symmetry about the optical axis. As the cathode ages, the plane symmetry ensures an even evaporation rate relative to the axis, maintaining a centered, flat emitting surface (see figure). Also, the emission patterns from the symmetric crystal planes will remain consistent as they become more exposed by evaporation, contributing to a brighter beam spot.

A comparison of electron emission characteristics of LaB₆, CeB₆ and Tungsten at typical operating temperatures

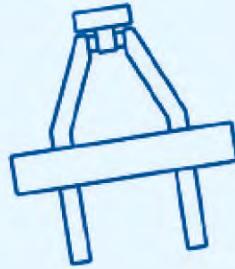
	CeB ₆ <100>	LaB ₆ <100>	Tungsten Filament
Brightness (A/cm ² -sr)	107	107	106
Short-Term Beam Current Stability % RMS	<1	<1	<1
Typical Service Life (hr)	1,500+	1000+	30-100
Operating Vacuum (torr)	10 ⁻⁷	10 ⁻⁷	10 ⁻⁵
Work Function (eV)	~2.65	~2.70	4.5
Evaporation Rate (g/cm ² -sec)	1.6 x 10 ⁻⁹	2.2 x 10 ⁻⁹	NA

Cathode Tip Design

The design of the cathode tip is critical for maximum lifetime and optimum performance. Tip design must also match the specific application's requirements for beam current, spot size, and brightness. For electron microscopy, a conical tip with a flat emitting surface at the apex has proven to be the optimum design. With the flat-tipped cone design, changes in both cone angle and flat diameter affect emission characteristics. In general, the small cone angle (60°) results in higher brightness, but a larger angle (90°) provides longer life and easier alignment. Small flat diameters also result in higher brightness plus a smaller source size, but larger flats provide longer lifetimes and more beam current.

These trends allow us to tailor our cathodes to the requirements of practically all thermionic cathode applications. For example, SEM and most transmission electron microscope (TEM) applications are best served by a 90° cone angle and a 16 mm flat tip. This combination provides high brightness, a moderate source size, and very good lifetime. High resolution TEMs require a 60° cone and a 5 mm flat tip for very high brightness and a small source size.

In applications requiring high total current in a large beam spot, a <310> oriented crystal in a "top hat" configuration may be preferred, providing a slightly lower work function and large emitting surface. We excel at developing specialized cathodes for custom applications and research purposes. Contact us for your custom cathode needs.



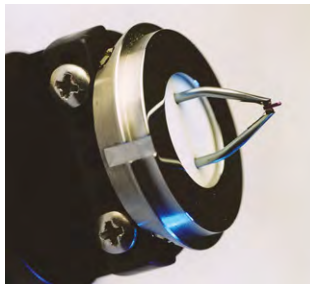
The "tophat" design cathode provides a large area crystal face electron source for maximum total current.



Hexaboride crystals are grown and purified in an inert gas atmosphere to specified crystal orientations.

The cathode's mount design has a significant impact on performance.

The design must be simple, durable and precise. It must resist any movement of the crystal, despite the high operating temperatures, yet be easy to install and align. We feel we employ the best mount design in the industry, the Mini Vogel Mount.

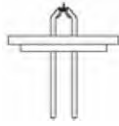
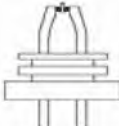

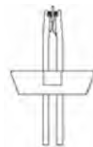

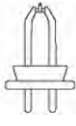




In 1988, FEI of Hillsboro, Oregon introduced the Mini Vogel Mount (MVM) to provide the benefits of the original Vogel mount in a smaller, simpler, and more elegant design. Twin posts are rigidly fixed in a thick ceramic base, and bent towards the center in an inverted "V". The posts are made of a molybdenumrhenium alloy that maintains a high modulus of elasticity even at high temperatures. The posts are spread slightly during assembly to allow placement of small pyrolytic graphite blocks between the crystal and posts. The blocks act as resistive heaters, and help thermally isolate the hot crystal from the highly conductive posts. When the compressive force of the posts is released, the crystal is held with strength and precision. The clamping force of the posts will remain near 5,000 psi for the life of the cathode.



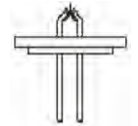


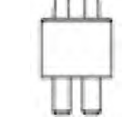
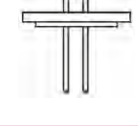
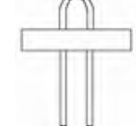
The structure of the MVM is amazingly robust, sustaining reasonable impact without deviating from structural specifications. Because the graphite pads shield evaporation of the crystal in the direction of the clamping force, the emitter crystal can be fully utilized without degradation of the mount. Structural failure of the MVM is not a concern when the cathode is operated within the correct temperature and pressure range. Typically, the beam stability of the Mini Vogel Mount cathode exceeds the specifications of the system in which it runs.



► Applied Physics Technologies Lanthanum Hexaboride (LaB₆) and Cerium Hexaboride (CeB₆) Cathodes (continued)
Ordering Information

Manufacturer	Equipment Type	Cat. #	Description	
AMRAY	SEM all LaB ₆ models	80920-L	LaB ₆ 90/16	
		80920	CeBix 90/16	
CAMECA	EPMA SX50, SX100	80921-L	LaB ₆ 90/16 nonshunted	
		80921	CeBix 90/16 nonshunted	
CAMSCAN	SEM all LaB ₆ models	80922-20-L	LaB ₆ 90/20 nonshunted	
		80922-20	CeBix 90/20 nonshunted	
		80922-16-L	LaB ₆ 90/16 nonshunted	
		80922-16	CeBix 90/16 nonshunted	
ELECTROSCAN/ PHILIPS	ESEM 2020, E-3, XL	80923-L	LaB ₆ 90/16	
		80923	CeBix 90/16	
ETEC	LITHOGRAPHY	80919-L 80919	LaB ₆ 90/30 nonshunted LaB ₆ 90/30 nonshunted	
HITACHI	SEM	80924-L-S 80924-S	LaB ₆ 90/16 CeBix 90/16	
	TEM	80924-L-T	LaB ₆ 90/16	
	High Resolution TEM Recommended for 200 kV+	80924-T	CeBix 90/16	
		80924-LHT	LaB ₆ 90/5	
		80924-HT	CeBix 60/5	
ICT/ADVANTEST	SEM	80925-L	LaB ₆ 90/16 nonshunted	
		80925	CeBix 90/16 nonshunted	
ISI/TOPCON	DS-130, DS-150, SS, IC and WB/CL series, SEM DS-701, SM-501, ABT series, SX,-40, CCCD	80926-LS1	LaB ₆ 90/16 nonshunted	
		80926-S1	CeBix 90/16 nonshunted	
		80926-LS2	LaB ₆ 90/16	
		80926-S2	CeBix 90/16	
	002B TEM	80926-L-T	LaB ₆ 60/5	
		80926-T	CeBix 60/5	
		80926-LT1	LaB ₆ 90/16	

Ordering Information

Manufacturer	Equipment Type	Cat. #	Description	
JEOL	SEM, TEM, JAMP30, JXA 8600	80927-L	LaB ₆ 90/16	
	High Resolution TEM	80927	CeBix 90/16	
		80927-LHT	LaB ₆ 60/5	
		80927-HT	CeBix 60/5	
LEICA/LEO (Cambridge SMVM base)	200, 400 Series SEM	80928-L	LaB ₆ 90/16	
	360 SEM	80928	CeBix 90/16	
		80928-L-S	LaB ₆ 90/16	
LEICA LITHOGRAPHY (Philips base)	EBIEBL, VB Series	80929-L-P	LaB ₆ 90/16	
		80929-P	CeBix 90/16	
(Cambridge MVM base)	EBMF series 1-10.5, EBML	80929-LCM	LaB ₆ 90/20 nonshunted	
		80929-CM	CeBix 90/20 nonshunted	
(Cambridge SMVM base)	EBMF constant voltage	80929-L-20	LaB ₆ 90/20	
		80929-20	CeBix 90/20	
		80929-L-20S	LaB ₆ 60/40	
		80929-20S	CeBix 60/40	
OMICRON	LEED	80930-L	LaB ₆ 90/100	
		80930	CeBix 90/100	
PHILIPS	SEM, TEM, EBPB	80931-L	LaB ₆ 90/16	
		80931	CeBix 90/16	
ZEISS/LEO	SEM, TEM	80933-L	LaB ₆ 90/16	
		80933	CeBix 90/16	

► Apiezon Greases

Apiezon Greases are unique products, designed for use in high vacuum work

- Excellent lubricants.
- High purity, low vapor pressure - non-contamination in analysis.
- The working temperature range of each grease is dependent on the grade that is used.
- Easily applied, easily cleaned off.
- Silicone free. This benefits scientific users because the risk of sample contamination and consequently the risk of interference in analytical techniques such as infra-red or mass spectrometry, etc. is avoided.
- Approved by NASA and NATO

► Apiezon AP100 Grease

Silicone-free ultra high vacuum lubricating grease



Apiezon AP100 Grease is a silicone-free vacuum grease and lubricant. Containing PTFE, AP100 exhibits extremely high levels of lubricity and has been shown to provide eight times the level of lubrication offered by standard, petroleum-based lubricating greases.

Apiezon AP100 is designed for use at ambient temperatures (generally between 10 to 30°C / 50 to 86°F). If you are looking for a grease capable of performing at higher temperatures, Apiezon AP101 or Apiezon H Grease may be more appropriate.

Benefits of Apiezon AP100 Grease

- Has anti-seize properties, making it an effective protector and lubricant in ultra-high vacuums
- Exhibits extremely high levels of lubricity
- Demonstrates an extremely low vapour pressure of 7×10^{-11} Torr at 20°C
- Recommended for use at ambient temperatures
- Does not suffer from contamination problems associated with silicone based greases such as “creep” or “carry over”
- Easy to clean and remove using hot water and an aqueous glassware detergent, hydrocarbon or chlorinated solvents

Applications of Apiezon AP100 Grease

The unique properties of Apiezon AP100 lubricating vacuum grease mean it is frequently used to protect stepping motors and gearboxes from corrosion and abrasion, particularly when they are subjected to high load conditions. AP100 is also used to prevent seizure in stopcocks, taps and small metal fastenings.

The creep resistance of Apiezon AP100 benefits scientific and semiconductor users alike. AP100 helps to increase the accuracy of analytical techniques and improve yields in semiconductor manufacture by contamination avoidance.

In addition, AP100 is used for surface coating applications where silicone contamination can lead to poor surface adhesion and incomplete coating defects

60709	Apiezon AP100 Grease L	100g tube
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► Apiezon Grease, Type AP101

Type 101 is an excellent general purpose, hydrocarbon grease, which is intended for a variety of industrial and scientific applications.

- **Anti-Seize Properties:** The AP 101 contains PTFE which confers superior anti-seize properties providing long lasting lubrication and ensuring smooth operation of stop cocks and taps. The value of AP 101 anti-seize properties are not limited to laboratory or glassware use, but are equally effective when used on metal equipment which may be subject to seizure or corrosion.
- **Non silicone Grease:** Being hydrocarbon based AP 101 does not suffer from the problems of “creep” or “carry over” which is traditionally associated with silicone greases. It reduces sample contamination and the risk of interference in analytical techniques such as infra-red and mass spectrometry.
- **Wide temperature range:** It can be used over a very wide range of temperatures, possessing its optimum consistency over the -15 to +150°C temperature range, but is usable down to -40°C and, for limited periods, up to +180°C.
- **Solvent resistant:** Both PTFE and the lithium stearate gel base in AP 101 are insoluble in most solvents. They ensure that AP 101 shows resistance to water, alcohols, ketones and esters. In addition AP 101 resists attack from aqueous acid and alkali solutions, alcoholic alkali solutions and corrosive gases.
- **Under vacuum:** AP 101 exhibits good vacuum properties, down to 10^{-4} torr.
- **Easily remove AP 101 by wiping it with a soft cloth. Any residues of grease can be washed away with an aqueous glassware detergent.**

60706-01	Apiezon Grease AP 101	50 g
60706-40	Apiezon Grease AP 101	4 kg

► Apiezon Grease; Type L

Grease L is a petroleum hydrocarbon grease, containing no additives. Very low vapor pressure (@20°C of 8×10^{-11} torr), high vacuum grade. Type L is widely used in the stationary phase of gas liquid chromatography, and may be used on all ground joints in a vacuum system (not for stopcocks). Its solubility is as follows: in Ethanol at 20°C-0.003%; 60°C-0.005%; 100°C-0.011%; 150°C-0.011%. Grease L softens and melts at about 47°C and it is not recommended for joints where temperatures exceed more than 30°C in use. Grease T is recommended for these higher temperatures.

60702	Apiezon Grease L	25g tube
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➤ Apiezon Greases (continued)

➤ Apiezon Grease; Type M

Similar to grease type L, but it contains more wax. Grease M has an estimated vapor pressure @ 20°C of 2×10^{-9} torr, higher than Type L. Type M is recommended for applications where a grease of moderately low vapor pressure is required; such as for sealing ground joints on the backing side of oil diffusion pumps.

60700 Apiezon Grease M 25g tube

➤ Apiezon Grease, Type N

Similar to Type L and Type M, but Type N grease has a special additive which gives it a tenacious, rubbery consistency and provides an extra cushioning effect which absorbs vibrations in equipment, making N grease invaluable in fragile glass to glass joints, like burette taps, which continually risk fracture. Grease N is widely recognized and recommended as the cryogenic vacuum grease of choice

60701 Apiezon Grease N 25g tube

➤ Apiezon Grease, Type H

Type H grease is designed for high temperatures (-10 to +240°C) in a wide range of applications in both science and industry. With good "friction", grease H is ideal for use with laboratory glassware, but combined with properties of high thermal conductivity, it is the perfect choice for the electronics and space industries where heat sink media require adhesion.

Grease H is a filled hydrocarbon which exhibits excellent thermal conductivity, and strong absorption properties. The capability to absorb greasy or chemical impurities on metal and glass surfaces is a value "tool" required by electronic industries.

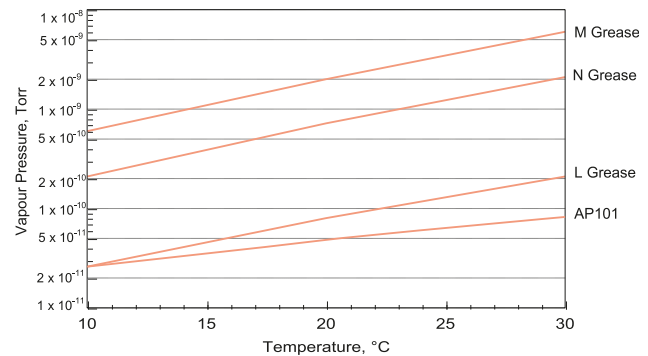
60703 Apiezon Grease, Type H 25g tube

➤ Apiezon Grease; Type T

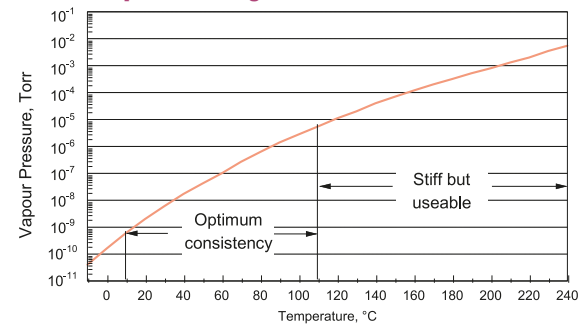
Type T is designed for lubricating glass taps and for general purposes. Has a melting point of 125°C and has an estimated vapor pressure @ 20°C of 5×10^{-9} torr. Although type T is useful at higher temperatures, it can also be used at ambient temperatures.

60704 Apiezon Grease T 25g tube

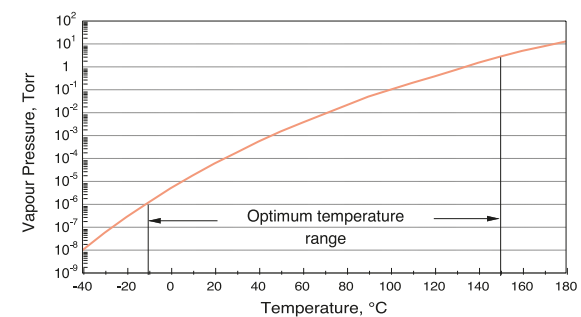
Vapor Pressure of Types L,M,N, and AP100 Greases over working temperature range



Vapor Pressure of Type H Grease over working temperature range



Vapor Pressure of Type 101 Grease over working temperature range



Complete List of Vacuum Grease Properties

Typical Property	AP101	AP100	Type H	Type L	Type M	Type N	Type T
Main Areas of Application	General	Lubricating	High Temp	High Vacuum	General Vacuum	Cryogenic	Medium Temp
Typical Working Temperature Range	°C: -40-180 °F: -40-365	10-30 50-86	-10-240 14-464	10-30 50-86	10-30 50-86	-269-30 -452-86	10-120 50-248
Dropping Point —	°C: >200 °F: >392	42-52 108-126	doesn't melt	42-52 108-126	42-52 104-140	42-52 108-126	112-137 233-278
Vapor Pressure @ 20°C / 68°F, Torr	$< 1.0 \times 10^{-5}$	7.0×10^{-11}	1.7×10^{-9}	7.0×10^{-11}	1.7×10^{-9}	6.0×10^{-10}	4.6×10^{-9}
Relative Density @ 20°C / 68°F	0.981	1.042	0.918	0.896	0.894	0.911	0.912
Resistant to Radiation	*N/R	*N/R	*N/R	Yes	Yes	*N/R	*N/R
Lubricity 4 Ball Test	450	450	250	150	140	150	N/A
ASTM.D 2596 (IP 239/97), kg							
Outgassing Characteristics	N/A	<1%	<1%	<1%	N/A	<1%	N/A
ASTM.E 595-93(2003)e1	N/A	<0.1%	<0.1%	<0.1%	N/A	<0.1%	N/A
Viscosity of Molten Grease, cSt	N/A	N/A	N/A	766	413	N/A	N/A
@ 50°C/122°F							
@ 100°C/212°F	N/A	N/A	N/A	62.3	29.8	N/A	N/A
Coefficient of Expansion per °C over 20-30°C	0.00066	N/A	N/A	0.00076	0.00075	0.00072	0.00073
Thermal Conductivity, w/m °C	N/A	N/A	N/A	0.216	0.194	0.194	N/A
@ 20°C							
@ -269°C	N/A	N/A	N/A	N/A	N/A	0.095	N/A
Specific Heat @ 25°C, J/g	N/A	1.7	N/A	N/A	N/A	N/A	N/A
Electrical Strength, V/mil (0.001)	N/A	N/A	N/A	730	850	820	730
Volume Resistivity, Ω cm	N/A	N/A	N/A	1.2×10^{16}	2.6×10^{16}	2.0×10^{16}	2.3×10^{12}
Permittivity	N/A	N/A	N/A	2.3	2.1	2.3	2.3
Loss Tangent	N/A	N/A	N/A	<0.0001	<0.0001	<0.0001	<0.0001

➤ Apiezon Greases (continued)

➤ Apiezon PFPE 501 Grease

High temperature lubricating vacuum grease, inert



EMS is happy to announce the release of a brand new revolutionary grease specifically for high temperature applications. PFPE 501 is a chemically inert, high temperature and extreme pressure lubricant. With an upper operating temperature of 250°C and vapor pressure of 1.3×10^{-12} at 25°C, it is robust, versatile and can be used for sealing and lubricating under the most extreme operating conditions. This includes environments where aggressive chemicals and strong oxidising agents are regularly used.

Why Use Apiezon PFPE 501 Grease?

- PFPE based
- High temperature lubricant
- For oxygen rich environments
- Ultra high vacuum
- Chemically inert
- Extreme pressure
- Wide temperature range

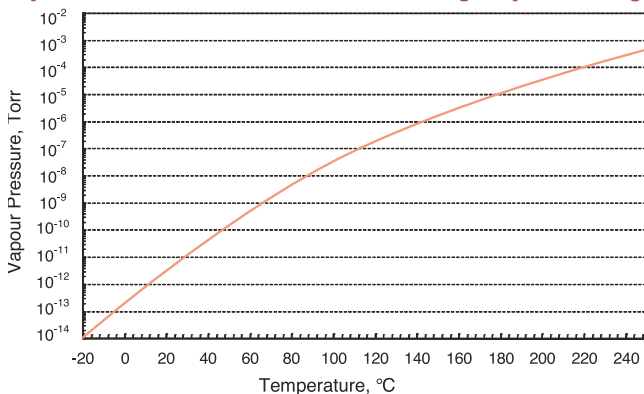
Benefits of Apiezon PFPE 501 Grease

- Extended equipment life
- High temperature lubricant
- Reduced equipment downtime
- Lower service costs
- Life-time lubrication
- Guaranteed Apiezon quality
- Expert technical support

Typical Properties

NLGI No.		2
Penetration P60		280
Typical Working Temperature Range	°C	-15 to 250
	°F	5 to 482
Vapor Pressure @ 25°C / 77°F, Torr		$<1.3 \times 10^{-12}$
Relative Density @ 25°C/77°F		2.003
4 Ball Wear Scar (mm)	ASTM D2266 (40kg)	0.94
Outgassing Characteristics	TML	<1%
	CVCM	<0.1%
Evaporation 24hrs @ 100°C / 212°F		0.02
Oil Separation 24hrs @ 100°C / 212°F		2.10
Low Temperature Torque, g/cm	25°C / 77°F Starting	162.3
	25°C / 77°F Running	64.4

Vapor Pressure of PFPE 501 Grease over working temperature range



Cat. #	Description	Qty.
60708	Apiezon PFPE 501 Grease	100 g Tube

➤ Apiezon Vacuum Sealing, Mounting, and Etching Waxes

➤ Apiezon Q Compound

Apiezon Q Compound is an effective temporary vacuum sealant that is used as a short term solution in situations which do not allow for the immediate dismantling of a system for repair.

Why Use Apiezon Q Compound?

- Temporary vacuum sealant
- Versatile product suitable for a multitude of uses
- Excellent waterproof medium
- Easy to use and to remove
- 10 year shelf life



➤ Apiezon Wax W

The Apiezon range of waxes features three products including the popular Apiezon Wax W, also known as 'Black Wax'. All three waxes in the Apiezon range can be used as permanent or semi-permanent vacuum sealants or mounting media. Apiezon Wax W is also a perfect etch resist.

Why Use Apiezon Waxes?

- Versatile products suitable for a multitude of uses
- Etch resist (Wax W only)
- High purity combined with powerful "gettering" & clean meltdown properties
- First-rate vapor pressure characteristics
- Excellent waterproof media
- Easy to use and to remove
- 10 year shelf life

Apiezon Waxes and Q Compound Applications

Apiezon Wax W.....Hard Vacuum Sealing/ Mounting Wax, Etch Resist
 Apiezon Wax W100.....Medium Hardness Vacuum Sealant/
Mounting Wax
 Apiezon Wax W40.....Soft Vacuum Sealant/ Mounting Wax
 Apiezon Q Compound.....Vacuum Sealing Compound

Waxes and Q Compound Properties

Typical Property		Wax W	Wax W100	Wax W40	Q Comp.
Approximate	°C	80-90	50-60	40-50	40-50
Softening Point	°F	176-194	122-140	104-122	104-122
Estimated Vapor Pressure @ 20°C / 68°F, torr		4.5×10^{-9}	4.5×10^{-9}	6×10^{-8}	1×10^{-4}
Temperature for Application	°C	130	110	90	Ambient
	°F	266	230	194	
Working Temperature Range	°C	-10-75	-10-45	-10-35	-10-30
	°F	14-168	14-113	14-95	14-86
Water Permeability g/cm/hr/mm Hg @ 25°C		0.8×10^{-8}	1.6×10^{-8}	1.6×10^{-8}	N/A
Pack		1 Kg block	250g tin	250g tin	1 Kg
		25 x 20g sticks	N/A	N/A	N/A

Thermal/Electrical Properties

Thermal Conductivity @ 20°C, w/m	°C	0.189	0.170	0.177	N/A
Specific Heat @ 25°C, J/g		1.8	2.7	2.9	N/A
Loss Tangent		0.015	0.016	0.015	N/A
Permittivity		2.8	2.7	2.9	N/A
Volume Resistivity, Ω cm		6.31×10^{15}	1.64×10^{15}	5.06×10^{15}	N/A

Cat. #	Description	Qty.
60710	Apiezon Wax W	500 g
60711	Apiezon Wax W100	250 g
60712	Apiezon Wax W40	250 g
60713	Apiezon Q Compound	1 kg

► **TorrLube® Vacuum Oil and Lubricant**

TorrLube® vacuum lubricants are manufactured to perform better than any other vacuum grease or oil available.

- TorrLube® has no non-metal solids, e.g. silicone ball filters
- TorrLube® has high thermal conductivity to minimize temperature difference between surface exposed to heat flux and heat sink surface
- TorrLube® is extremely stable up to 350°C
- TorrLube is 500 cSt oil at 40°C. TorrLube® has high viscosity so that no fluid flows out between the solid surfaces.

TorrLube® Oil is an extremely pure PFPE (Perfluoropolyalkether) blend which is thoroughly distilled and then filtered through a submicron screen. TorrLube® Oil has the ability to withstand thermal expansion and contraction as well as chemical and mechanical stress, while still maintaining consistent viscosity. These properties make TorrLube® the ideal lubricant for bearings, automated slides, and screws that have a tendency to gall or cold weld while working under extreme conditions.



TorrLube® Extreme Grease is white, odorless, nonflammable, and chemically inert products based on TorrLube® Oil and the most advanced PTFE thickener available. It does not contain Sodium or Iron. TorrLube® Extreme Grease remains stable and will not break down under mechanical stress and lose its ability to hold TorrLube® Oil. TorrLube® Extreme Grease helps prevent sticking, jumping, and mechanical noise, securing smooth, controlled movement.

TorrLube in 1cc syringe – Each syringe contains 1 cc of TorrLube® lubricant with a #22 gauge blunt needle attached for close application. This size is ideal for use in small research units and for maintenance and service tool kits.

Syringes are packaged in a clean room environment and the needles are sealed to prevent contaminant or leakage.

Physical Properties of TorrLube® Extreme Grease

Properties.....	Typical Values
NLGI Grade.....	2
Viscosity (base oil), cSt @ 40°C (104°F).....	500
Vapor Pressure, torr	1 x 10 ⁻⁹
Density, g/ml @23°C (74°F)	1.9
Volatility Loss (22 hrs @260°C), %	<1
Appearance	White grease

60750-01	TorrLube® 1cc Syringe	each
60750-20	TorrLube® 2 oz Cartridge	each

► **TorrLube® Oil**

A set of two small bottles, each containing 60cc of TorrLube® lubricant. Every bottle comes with a sealed cap. A luer lock cap and a #22 gauge blunt needle are provided for closed application. The bottle set is appropriate for larger manufacturing units and production fabs. Each twin pack of TorrLube® 60cc bottles is sealed to prevent leakage and contamination.

Physical Properties of TorrLube® Oil

Properties.....	Typical Values
Viscosity (base oil), cSt @ 40°C (104°F).....	500
Vapor Pressure, torr	1 x 10 ⁻⁹
Density, g/ml @23°C (74°F)	1.9
Volatility Loss (22 hrs @260°C), %	<1
Appearance	Clear Liquid

60752-01	TorrLube® Oil, 1x 60cc Bottle	each
60752-02	TorrLube® Oil, 2x 60cc Set	each

► **Dow Corning® Vacuum Grease**



A silicone lubricant for glass-to-glass joints and glass-to-rubber connections. It is resistant to most chemicals and it is inert and heat stable.

60705	Dow Corning Grease	150g tube
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► **Invoil Oils (formerly known as Apiezon Oils)**

Consists of esters or specially selected hydrocarbon fractions. They were developed for vapor-diffusion pump fluids:

- High purity, very low pressure, very stable.
- Pressures lower than 10⁻⁷ torr obtainable
- No need for cold trap.
- Good pumping speed.
- No corrosive deposits or vapors.

Physical Properties of Invoil Oils	Type B	Type BW	Type C
Vapor Pressure, torr @20°C	10 ⁶	10 ⁶	10 ⁷
Boiling Point, °C @ 1 torr	220	225	225
Flash Point (open cup) °F	470	480	510
Pour Point (ASTM) °F	15	10	5
Density, g/ml	@ 20°C	0.872	0.882
	@ 40°C	0.859	0.869
	@ 100°C	7.0	10.1
Viscosity, kinematic, cS	@ 20°C	142	361
	@ 50°C	49.3	98.1
	@ 100°C	7.0	10.1
Coefficient of Expansion per °C over 20-30°C (ASTM)	0.00073	0.00070	0.00069
Thermal Conductivity Btu/in	0.91	0.89	0.96

► **Invoil Oil B**

Good for small or large vapor diffusion pumps. Good pumping speed and high backing pressure. If a cold trap is used, oil B can obtain a higher vacuum than oil C does.

60720	Apiezon Oil B	500ml
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► **Invoil Oil BW**

A water-white oil with a higher pumping speed than oil B, although all other characteristics are similar to B. Because it has an extremely high purity it is suitable for use in the evacuation of mass spectrometers.

60722	Apiezon Oil BW	500ml
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► **Invoil Oil C**

Obtains the highest vacuum pressure (10⁻⁷ torr) of all of the oils without the need of a cold trap.

60724	Apiezon Oil C	500ml
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For all other Oils and Greases see Vacuum Pumps, Accessories and Supplies, page 965 >>>>

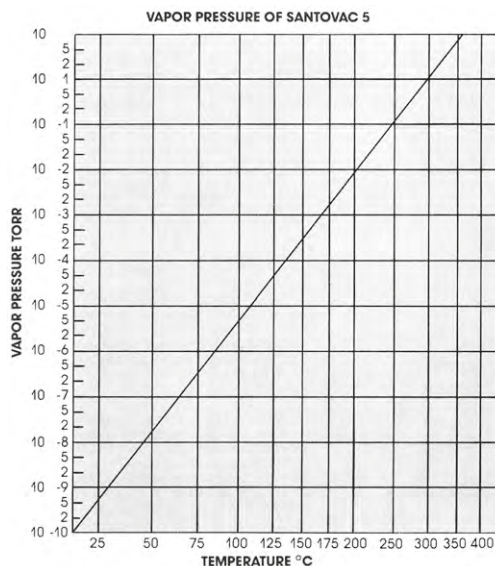
► Santovac® 5

A Polymethyl Ether, designed for an ultra high vacuum range: 10^{-10} torr.

Ultra low vapor pressure results in low ultimate pressures; there is no need for a cold trap and it is suitable for diffusion pumps. Santovac 5 may discolor with use but it will maintain its physical properties.

Typical Physical Properties of Santovac® 5

Vapor Pressure, @ 25°C	4 x 10 ⁻¹⁰ torr	
Boiling Point, @ 0.5 torr	275°C	
Density, @ 25°C	1.198	
Viscosity, cS	@ 27°C	1000
	@ 38°C	363
	@ 99°C	13.1
	@ 149°C	4.5
	@ 260°C	1.2
Flash Point (open cup)	288°C	
Pour Point	5 °C	
Autogeneous Ignition Temp.	590° C	
Refractive Index, n _D 25	1.6306	



*The information on this chart does not constitute a warranty of any kind, express or implied.

60730	Santovac 5	100ml
60732	Santovac 5	500ml

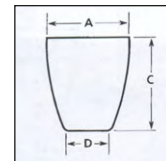
For all other Oils and Greases see Vacuum Pumps, Accessories and Supplies, page 965 >>>>

► Platinum Crucibles

Platinum has excellent resistance to chemical attack by acids and fusion mixtures. This is what has made platinum an essential tool in chemical analysis; flux fusions which are widely used on a routine basis for the preparation of samples for x-ray fluorescence etc.

All crucibles are made from platinum with an approximate weight in grams and an approximate in millimeter with a tolerance of $\pm 5\%$.

Lids are sold separately and in single units.



Crucible Cat. #	Lid Cat. #	Capacity ml	C mm	A mm	D mm	Base Thickness	Standard Weight	Lid Weight	Qty
66500-1	66501-1	1	13	12.0	7.2	----	2	0.56	each
66500-3	66501-3	3	19	17.0	10.0	----	5	1.30	each
66500-5	66501-5	5	22	20.5	12.0	----	7	1.50	each
66504-2	66505-2	10	29	26.0	15.5	0.25	8.5	2.8	each
66504-3	66505-3	10	24	29.0	17.5	0.25	8.0	3.6	each
66504-4	66505-4	15	33	29.0	17.5	0.25	11.5	3.6	each
66504-5	66505-5	15	27	32.0	19.5	0.25	13.0	4.5	each
66504-6	66505-6	20	36	32.5	18.0	0.30	18.0	4.5	each
66504-7	66505-7	20	31	37.0	22.5	0.25	17.0	6.0	each
66504-8	66505-8	25	34	41.0	25.0	0.30	25.0	7.2	each
66504-9	66505-9	25	39	35.0	21.0	0.30	19.0	5.2	each
66504-10	66505-10	30	41	37.5	22.5	0.30	24.0	6.0	each
66504-11	66505-11	35	36	43.5	26.5	0.30	26.0	8.0	each
66504-12	66505-12	35	43	39.0	23.5	0.30	29.0	6.0	each
66504-13	66505-13	40	46	41.5	25.0	0.30	31.0	7.2	each
66504-14	66505-14	50	41	49.0	30.0	0.36	39.0	10.0	each
66504-15	66505-15	50	49	44.0	26.5	0.38	42.0	8.0	each

► PTFE Crucibles

Manufactured from pure PTFE, chemically inert and usable to 280°C

Cat. #	Vol.,	Ht, mm	OD, mm	Qty
66509-5	5	16	27	each
66509-25	25	26	44	each
66509-75	75	41	56	each
66509-100	100	45	60	each



► Crucible Tongs and Tweezers

These tweezers are meant to be used with precious metal crucibles.



Cat. #	Description	Length	Pt Weight	Qty
66510	Bowed Stainless Steel Tongs with Platinum Tip	200 mm	1.25 g	each
66511	Stainless Steel Tweezers with Platinum Tip	130 mm	1.40 g	each

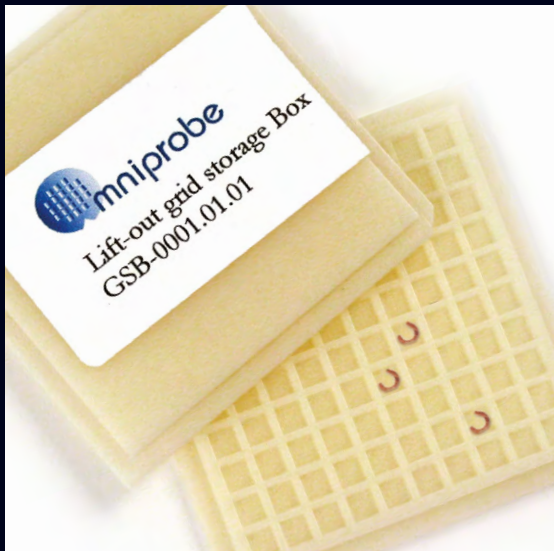
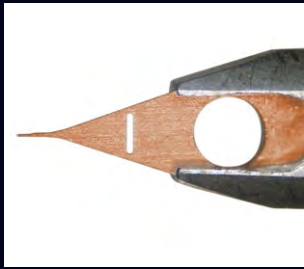
Omniprobe Accessories & Consumables

Nanomanipulation Probe Tips

Lift-Out Grids

TEM Holders

Thinning



**Electron
Microscopy
Sciences**

This section is dedicated to the accessories and consumables from the Omniprobe family of Nanomanipulation Systems, including: **AutoProbe™ 200**, **AutoProbe™ AutoProbe™ 250, 300**, **Short-Cut™**, **OmniGIS™** and **SST™ 400-1**

► Probe Tips

► Tungsten/Nickel Probe Tips

Custom tip designed with a nickel tube shank and tungsten tip. Tip radius is $0.5\mu\text{m}$ with 13° taper angle for maximum lifetime service.



75960-01 Tungsten/Nickel Probe Tip 10/bx

► Tungsten Probe Tips

Custom tip designed from tungsten. Tip radius is $0.5\mu\text{m}$ with 13° taper angle for maximum lifetime service.



75960-02 All Tungsten Probe Tip 10/bx

► In-Situ Probe Tips

Custom tungsten tip with a stainless steel shank, for use with AutoProbe™ 300, in-situ probe tip exchange systems and Short-Cut™. Tip radius is $0.5\mu\text{m}$ with $8-10^\circ$ taper angle.

[This tip is also Short-Cut™ compatible]



75960-03 in-Situ Probe Tip 20/bx

► Xtreme Access 1/2" Tungsten Probe Tips

Custom tip designed from tungsten. Tip radius is $< 0.5\mu\text{m}$ with 13° taper angle for maximum lifetime service.



75960-04 XA 1/2" Tungsten Probe Tip 10/bx

► Autoprobe 250 Tungsten Probe Tips

Custom tip designed from tungsten. Tip radius is $< 0.5\mu\text{m}$ with 6° taper angle for maximum lifetime service. [Compatible with Short-Cut™ system for direct conversion to TEM grid]



75960-05 AP250 Tungsten Probe Tip 10/bx

► Xtreme Access Short-Cut™ Probe Tips

Custom tip designed from tungsten. Tip radius is $< 0.5\mu\text{m}$ with 6° taper angle for maximum lifetime service. [Compatible with Short-Cut™ system for direct conversion to TEM grid]

75960-06 XA Short Cut Tungsten Probe Tip 10/bx

► Xtreme Access Compatible

► XA Probe Point Holder

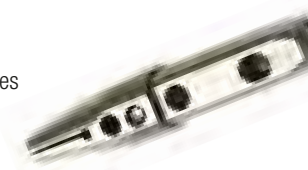
Xtreme Access Probe Tip Holder for use with 1/2" tungsten probe tip, #75960-04 and #75960-06. Comes with a storage vessel.



75961-10 XA Probe Point Holder each

► AP250 Probe Tip Holder

AutoProbe™ 250 probe tip holder uses the tungsten probe tip 75960-05. Compatible with the Short-Cut™ for direct conversion to TEM Grid. Comes with a storage vial and hand!



75961-05 AP250 Probe Tip Holder each

► XA Short-Cut™ Probe Tips

Custom tip designed from tungsten. Tip radius is $< 0.5\mu\text{m}$ with 6° taper angle for maximum lifetime service. [Compatible with Short-Cut™ system for direct conversion to a TEM grid]

75960-06 AP250 Tungsten Probe Tip 10/bx

► End Effector Type 3 (Straight)

Straight End Effector for Xtreme Access probe shaft. Available in two versions: Copper (Cu) and Molybdenum (Mo)



75981-Cu Cu Straight End Effector Type 3 12/bx

► **Omni Grids**

► **Copper Lift-Out Grids**

Custom copper lift-out grids specifically designed for in-situ lift-out. These grids include multiple indexed mounting locations with both vertical bars and "V" shaped attachment surfaces. 3mm diameter.



75964-01 Copper Lift-Out Grids 100/vial

► **Molybdenum Lift-Out Grids**

Custom molybdenum lift-out grids specifically designed for in-situ lift-out. These grids include multiple indexed mounting locations with both vertical bars and "V" shaped attachment surfaces. 3mm diameter.



75964-02 Molybdenum Lift-Out Grids 25/vial

► **Beryllium Haft-Ring Grids**

Custom beryllium haft ring grids. 3mm diameter.



75964-03 Beryllium Haft Ring Grids 10/pk

► **Copper 5-Post Lift-Out Grids**

Custom copper 5-post lift-out grids specially designed for in-situ lift-out. These grids include multiple indexed mounting locations, all with vertical bars attachment surfaces. Now with lower profile sides for easier access to outermost posts. 3mm diameter.



75964-04 Copper 5-Post Lift-Out Grids 100/vial

► **Copper 4-Post Lift-Out Grids**

Custom copper 4-post lift-out grids specially designed for in-situ lift-out. These grids include multiple indexed mounting locations, two with vertical bars attachment surfaces and two with "V" shaped alignment surfaces. Sides have lower profile for easier access to outermost posts. 3mm diameter.



75964-05 Copper 4-Post Lift-Out Grids 100/vial

► **Molybdenum 4-Post Lift-Out Grids**

Custom Molybdenum 4-post lift-out grids specially designed for in-situ lift-out. These grids include multiple indexed mounting locations, two with vertical bars attachment surfaces and two with "V" shaped alignment surfaces. Sides have lower profile for easier access to outermost posts. 3mm diameter.



75964-06 Mo 4-Post Lift-Out Grids 25/vial

► **Copper 3-Post Lift-Out Grids, Side Access**

3 post copper lift-out grids, similar to 75964-01, in design but 35 micron thick with 1 edge lower for easy access. Packaged in glass vials



75964-07 Copper 3-Post Lift-Out Grids, Side Access 100/vial

► **Copper 3-Post Lift-Out Grids, Shallow Downset**

3 post copper lift-out grids specifically designed for in-situ lift-out. These grids include multiple indexed mounting locations with both vertical bar and "V" shaped attachment surfaces. These grids have a shallower downset and slightly wider center post than 75964-01. Packaged in glass vials.



75964-08 Copper 3-Post Lift-Out Grids, Shallow Downset 100/box

► **Copper 5-Post Lift-Out Grids**

5 post copper lift-out grids specifically designed for in-situ lift-out. These grids include multiple indexed mounting locations, all with vertical bar attachment surfaces. Now with lower profile sides for easier access to outermost posts. 3mm dia. Packaged in glass vials.



75964-09 Copper 5-Post Lift-Out Grids 100/box

► **Copper 4-Post Lift-Out Grids**

4 post copper lift-out grids specifically designed for in-situ lift-out. These grids include multiple indexed mounting locations, two with vertical bar attachment surfaces and two with "V" shaped alignment surfaces. Sides have lower profile for easier access to outermost posts. 3mm dia. Packaged in plastic vials.



75964-10 Copper 4-Post Lift-Out Grids 100/box

► **Omni Grid Storage Box**

Storage box for 100 standard or haft grids—3 mm diameter – TEM grids. Box comes complete with base, lid and clips.



75965-01 Grid Storage Box each

Omniprobe TEM Grid Comparison Chart

Part Number	Number of Posts	Material	Thickness (Nominal) Microns	Nominal Post Downset Microns	Unique Feature
75964-01	3	Copper	30	10	—
75964-02	3	Molybdenum	30	10 Top Downset only	—
75964-03	0	Beryllium	25	N/A	Half Ring
75964-04	5	Copper	40	10	5th Post is E
75964-05	4	Copper	30	10	—
75964-06	4	Molybdenum	30	10 Top DS Only	—
75964-07	3	Copper	30	5	Side Access
75964-08	3	Copper	30	5	—
75964-09	5	Copper	35	5	5th Post is "E"
75964-10	4	Copper	30	5	—

► Grid & Sample Holders

► TEM Grid Dual Holders

Post Base TEM Grid Holder. Available in two versions: stainless steel (SS—very slightly magnetic), can affect imaging in UHS mode; and aluminum (Al-non-magnetic). Short post – standard is 1/8" (3.2mm) diameter x 0.15" (4mm) length.



75968-SS	EM, Grid Dual Holder, SS	each
75968-AI	TEM, Grid Dual Holder, Al	each

► TEM Grid & Sample Holders

TEM grid holder with stations for 2 TEM grids and 2 sample stubs. Available in two versions: stainless steel (SS – very slightly magnetic), and aluminum (Al-non-magnetic). Long post – standard is 1/8" (3.2mm) diameter x 0.32" (8.1mm) length. Comes with 2 sample stubs.



75969-SS	TEM Grid & Sample Holder, SS	each
75969-AI	TEM Grid & Sample Holder, Al	each

► Single Stub & Two TEM Grids Holders

This station is meant for 2 TEM grids and 1 sample Pin Stub. Available in two versions: Stainless Steel (SS – very slightly magnetic), and Aluminum (Al – non-magnetic). Long post – standard is 1/8" (3.2mm) diameter x 0.32" (8.1mm) length. Comes with an aluminum sample stub.



75971-SS	TEM Grid & Sample Holder, SS	each
75971-AI	TEM Grid & Sample Holder, Al	each

► Single TEM Grid Holders & Holder Base

Single TEM Grid Holder is made from aluminum with steel spring, holds one 3 mm TEM grid by the spring loaded vise, and has a raised edge which protects the sample from accidental damage. The holder has a 1/8" (3.2 mm) diameter x 0.32" pin (8.1 mm) length pin. It fits most standard pin stub holders. The Sample Holder Base securely holds the Single TEM Grid Holder above, under a stereomicroscope and permits viewing from two angles without changing focus.



75970-01	Single TEM Grid Holder	each
75970-50	Single TEM Grid Holder Base	each

► Short-Cut™ Coupons

► Frontside Thinning, 45°

Frontside Thinning, 45°, TEM sample grid coupon designed specially for use in the Short-Cut™ tool. The center portion is a standard 3 mm grid into which the sample loaded needle is swaged and cut 45°. Available in two versions: One is made from pure copper and the other is molybdenum coated copper.



75974-Cu	Frontside Thinning Copper, 45°	20/pk
75974-Mo	Frontside Thinning Mo/Cu, 45°	20/pk

► Backside Thinning, 45°

Backside Thinning, 45°, TEM sample grid coupon designed specially for use in the Short-Cut™ tool. The center portion is a standard 3 mm grid into which the sample loaded needle is swaged and cut 45°. Available in two versions: One made from pure copper and the other is molybdenum coated copper.



75975-Cu	Backside Thinning Copper, 45°	20/pk
75975-Mo	Backside Thinning Mo/Cu, 45°	20/pk

► Frontside Thinning, 26.5°

Frontside Thinning, 26.5°, TEM sample grid coupon designed specially for use in the Short-Cut™ tool. The center portion is a standard 3 mm grid into which the sample loaded needle is swaged and cut 26.5°. Available in two versions: One made from pure copper and the other is molybdenum coated copper.



75976-Cu	Frontside Thinning Copper, 26.5°	20/pk
75976-Mo	Frontside Thinning Mo/Cu, 26.5°	20/pk

► Backside Thinning, 26.5°

Backside Thinning, 26.5°, TEM sample grid coupon designed specially for use in the Short-Cut™ tool. The center portion is a standard 3 mm grid into which the sample loaded needle is swaged and cut 26.5°. Available in two versions: One made from pure copper and the other is molybdenum coated copper.



75977-Cu	Backside Thinning Copper, 26.5°	20/pk
75977-Mo	Backside Thinning Mo/Cu, 26.5°	20/pk

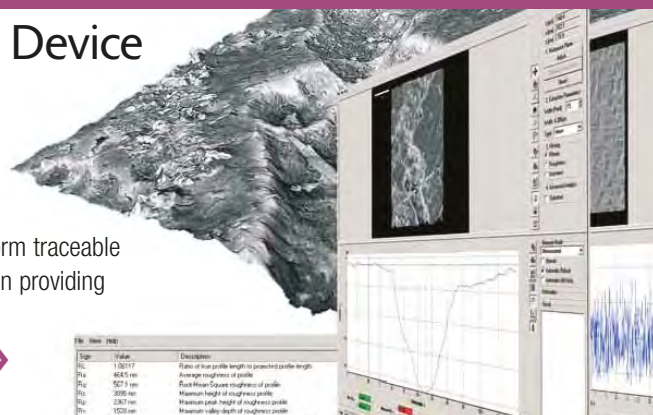
Turn Your SEM into a 3D Measurement Device

MeX 3d Surface Metrology With The SEM

MeX is a stand alone software package that turns any SEM with digital imaging into a true surface metrology device.

Using stereoscopic images the software automatically retrieves 3D information and presents a highly accurate, robust and dense 3D dataset which is then used to perform traceable metrology examination. The results are obtained irrespective of the SEM magnification providing metrology at macro and micro levels.

For more information, see pages 670–675. >>>>



SECTION 9

Microanalysis Elements Standards

MAC Reference Standards
for X-ray Microanalysis

MAC X-ray Microanalysis for TEM

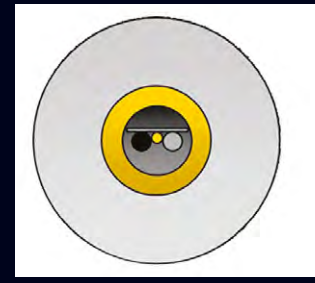
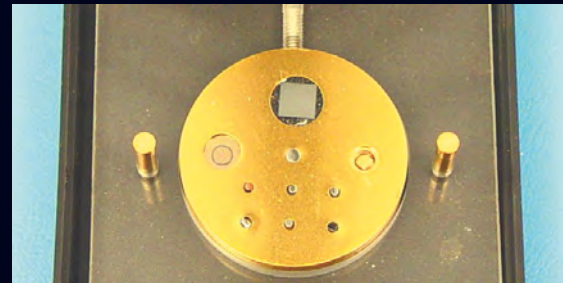
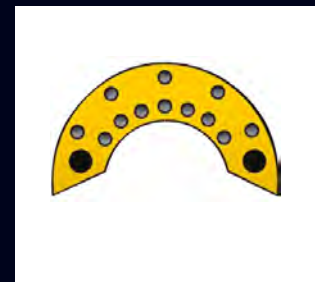
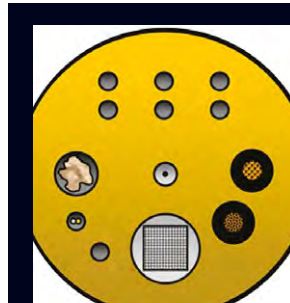
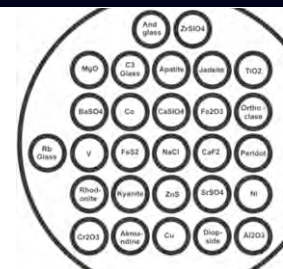
Compound, Pure Metal, NBS,
and BAS Standards

MAC Reference Materials
for Auger Electron Microscopy

MAC Standards for X-ray Fluorescence
Spectroscopy

SEM PSEM Performance Standards

Repolishing Services



Jade	Fe	SeF ₂	InAs	Ir	MgO	FeS ₂	Y	Sn
Pt	Al ₂ O ₃	Co	Zr	Sb	Au	Ortho	Ni	Nb
BaF ₂	HgTe	Wollas	Cu	Mo	LaB ₆	PbTe	Ti	Zn
Rh	CeAl ₂	Bi	V	GaP	Pd	Hf	Cr	Ge
Ag	Ta	Mn	Se	Cd	W			

**Electron
Microscopy
Sciences**

► MAC – Reference Standards for X-Ray Microanalysis

We have approximately 200 standard materials to choose from. All of our standards are suitable for electron-beam energy dispersive or wavelength dispersive X-ray microanalysis systems. All of our standards are polished to a 0.25 micron diamond finish and carbon coated. They are supplied with fully authenticated certificates of analyses and a location map for standard identification. A Faraday Cup, for accurate specimen current measurements, is available as an optional extra on all mounts. The standards are available in different sizes of brass holders:

- 25mm or 32mm diameter, containing up to 60 standards of your choice.
- Carousels, 13mm diameter blocks (to fit pin stubs), and single standards of 5mm, 3mm, 2mm diameter, are also available.
- Specials can be “tailor-made” to suit individual needs and specific stage configurations.



► Customized Multi-Element Standards

(your choice from our list of compound, pure metal, NBS, or BAS Standards, etc.).

Pure metals and compounds mounted in brass blocks

Cat.#	Description	Pack	Cat.#	Description	Pack
80070-05	Block of 5 Standards	5/set	80070-30	Block of 30 Standards	30/set
80070-10	Block of 10 Standards	10/set	80070-35	Block of 35 Standards	35/set
80070-15	Block of 15 Standards	15/set	80070-40	Block of 40 Standards	40/set
80070-20	Block of 20 Standards	20/set	80070-45	Block of 45 Standards	45/set
80070-25	Block of 25 Standards	25/set	80070-50	Block of 50 Standards	50/set

Please note: Please indicate the block size when ordering: 25mm or 32mm diameter.

Carousel configuration is supplied at an extra cost of to the above prices. Please note that for this configuration there is a maximum of 25 standards permitted.

80062	Faraday Cup	each
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► NBS Standards

NBS Glass SRM 481

Au/Ag Set of 6 Standards, comprises 4 alloys and 2 pure metals.

80076-01	NBS Standard SRM 481 Set	6/set
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NBS Glass

SRM 482 Au/Cu Set of 6 Standards, comprises 4 alloys and 2 pure metals.

80076-02	NBS Standard SRM 482 Set	6/set
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NBS Standard SRM 1872

Set of 3 glasses K-453, K491, K968.

80076-03	NBS Standard SRM 1872 Set	3/set
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► Universal Set

A set of 42 standards for general Energy Dispersive Analysis, mounted in 25mm or 32mm diameter brass stub.

Ag	Al ₂ O ₃	Au	BaF ₂	Bi	CaSiO ₃	Cd	CeAl ₂	Co
Cr	Cu	Fe	FeS ₂	GaP	Ge	Hf	HgTe	InAs
Ir	KAlSi ₃ O ₈	LaB ₆	MgO	Mn	Mo	NaAlSi ₃ O ₈	Nb	Ni
PbTe	Pd	Pt	Rh	Sb	Se	Sn	SrF ₂	Ta
Ti	V	W	Y	Zn	Zr			

Cat #	Description	Pack
80071-25	Universal Set w/25mm Dia. Block	set
80071-32	Universal Set w/32mm Dia. Block	set
80062	Faraday Cup	each

► Biological Set

A set of 18 standards, a Faraday Cup included. Mounted in 25mm or 32mm dia. brass block.

Al	BaF ₂	BaSO ₄	Bi	BN	C	CaCO ₃	CaSO ₄	FeS ₂
InP	KBr	KCl	MgO	NaCl	Se	SiO ₂	Ti	V

Cat.#	Description	Pack
80072-25	Biological Set w/25mm Dia. Block	set
80072-32	Biological Set w/32mm Dia. Block	set

► Individual Standards

Supplied in 2, 3, and 5mm diameter. Also Grains of standard materials are available and they measure approximately 2mmx2mm in size.

	Singles	Grains	
Aluminum	80074-Al	80075-Al	each
Gold	80074-Au	80075-Au	each
Arsenic	80074-As	80075-As	each
Silver	80074-Ag	80075-Ag	each
Bismuth	80074-Bi	80075-Bi	each
Beryllium	80074-Be	80075-Be	each
Boron	80074-B	80075-B	each
Cadmium	80074-Cd	80075-Cd	each
Carbon	80074-C	80075-C	each
Chromium	80074-Cr	80075-Cr	each
Copper	80074-Cu	80075-Cu	each
Cobalt	80074-Co	80075-Co	each
Iron	80074-Fe	80075-Fe	each
Gadolinium	80074-Gd	80075-Gd	each
Germanium	80074-Ge	80075-Ge	each
Hafnium	80074-Hf	80075-Hf	each
Iridium	80074-Ir	80075-Ir	each
Manganese	80074-Mn	80075-Mn	each
Magnesium	80074-Mg	80075-Mg	each
Molybdenum	80074-Mo	80075-Mo	each
Niobium	80074-Nb	80075-Nb	each
Nickel	80074-Ni	80075-Ni	each
Osmium	80074-Os	80075-Os	each
Palladium	80074-Pd	80075-Pd	each
Platinum	80074-Pt	80075-Pt	each
Rhenium	80074-Re	80075-Re	each
Ruthenium	80074-Ru	80075-Ru	each
Rhodium	80074-Rh	80075-Rh	each
Silicon	80074-Si	80075-Si	each
Scandium	80074-Sc	80075-Sc	each
Selenium	80074-Se	80075-Se	each
Antimony	80074-Sb	80075-Sb	each
Tin	80074-Sn	80074-Sn	each
Tantalum	80074-Ta	80074-Ta	each
Tellurium	80074-Te	80075-Te	each
Thallium	80074-Tl	80075-Tl	each
Titanium	80074-Ti	80075-Ti	each
Vanadium	80074-V	80075-V	each
Tungsten	80074-W	80075-W	each
Yttrium	80074-Y	80075-Y	each
Zinc	80074-Zn	80075-Zn	each
Zirconium	80074-Zr	80075-Zr	each
Cast Iron	80074-BAS	80075-BAS	each
Highly Alloyed	80074-BAS	80075-BAS	each
High Carbon	80074-BAS	80075-BAS	each
Ferro-Chrome			
Austenitic	80074-BAS	80075-BAS	each
Cr 19%, Ni 12%, Mo 3%	80074-NBS		each
Cambridge Brass	80074-NBS		each
Soda-Lime-	80074-NBS		each
Silica Glass			
High Silicon Steel	80074-NBS		each
Stainless Steel	80074-NBS		each
SRM 160b		80075-NBS	each
SRM 478		80075-NBS	each
SRM 710		80075-NBS	each
SRM		80075-NBS	each
AISI 316		80075-NBS	each

All compound, BAS standards, Austenitic Steels, and NBS standards are available as single standards or grains.

➤ **MAC – Reference Standards for X-Ray Microanalysis (continued)**

➤ **Special Holders**

➤ **Type 1**

JSM 35 Standard Holder in brass, holds up to 21 standards of your choice.



80073-01 21 Standards for JSM 35 set

➤ **Type 2**

JEOL 100CX Standard Holder in brass for use in the STEM mode. Holds up to 7 standards of your choice.



80073-02 7 Standards for JEOL 100CX set

➤ **Type 3**

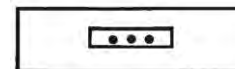
JXA 733 Standard Holder in brass; holds up to 12 standards of your choice.



80073-03 12 Standards for JXA 733 set

➤ **Type 4**

JEOL Temscan bulk Standard Holder made from plastic; holds 3-5 standards, fitted in a JEOL BR1 holder.



80073-04 3-5 Standard for JEOL Temscan set

➤ **MAC: X-Ray Microanalysis Reference Standards for Transmission Electron Microscopy**

We offer an extensive range of fully authenticated compounds and single element standards for the calibration of energy disperse X-ray detectors that are used in conjunction with transmission electron microscopes.

The standards available at present are:

- Any selection from Thin Film compound standards
- Universal Set of 25 compound standards
- Rare Earth Set
- Thin Foil Standards Set for S.T.E.M.

➤ **Thin Film Standards**

These standards are supplied as fine powders that are dispersed onto holey-carbon films and are selected from the range of certified natural and synthetic compounds already in use by us to prepare bulk analysis standards.

The holey-carbon films are supported by a 3.05mm copper grid (400 mesh). However, for analysis under critical conditions, we can supply alternative grid materials, such as beryllium or carbon composite. If requested, we can disperse the standards onto uncoated grids.

Universal Set of Thin Film Standards:

Ag ₂ Te	BaSO ₄	Be ₃ Al ₂ Si ₆ O ₁₈	Bi ₂ Se ₃	CaMoO ₄
CaWO ₄	CdTe	CeAl ₂	Cu ₂ S	FeCr ₂ O ₄
GaAs	Gd ₃ Ga ₅ O ₁₂	HgTe	InP	InSb
KAISi ₃ O ₈	LaB ₆	Li ₂ Ta ₂ O ₆	(Mg,Fe) ₂ SiO ₄	Na ₃ AlF ₆
Pb-Ge glass	SrTiO ₃	TlBr	ZnS	ZrSiO ₄

80080-25 Thin Film Universal Set 25/set

Thin Film Standards of your choice (from list) onto a 3.05mm diameter copper grid.

Cat #	Description	Pack
80080-01	1 Thin Film Standard	each
80080-05	5 Thin Film Standards	5/set
80080-10	10 Thin Film Standards	10/set
80080-15	15 Thin Film Standards	15/set
80080-20	20 Thin Film Standards	20/set
80080-30	30 Thin Film Standards	30/set
80080-40	40 Thin Film Standards	40/set
80080-50	50 Thin Film Standards	50/set

Note: For grid materials, other than copper, pricing is on request and delivery may be delayed.

➤ **Thin Foils for S.T.E.M.**

We have a selection of 25 high purity thin foils, 0.1mm thick, 3mm diameter to fit into TEM grid holders for use in the STEM mode. They are polished to a 3 micron diamond finish, and come in a variety of pure metals:

Thin Foils for S.T.E.M.:

Aluminum	Cadmium	Cobalt	Copper	Gold
Hafnium	Indium	Iron	Magnesium	Molybdenum
Nickel	Niobium	Palladium	Platinum	Rhodium
Silver	Tantalum	Tin	Titanium	Tungsten
Vanadium	Yttrium	Zinc	Zirconium	AISI 316 S/S

80082-25 Thin Foil Standards for S.T.E.M. 25/set

➤ **Rare Earth Set**

This set consists of 14 rare earth compounds dispersed onto holey carbon films (3.05mm, 400# copper grid).

Rare Earth Set:

LaF ₃	CeAl ₂	PrF ₃	NdF ₃	SmF ₃	EuF ₃	GdF ₃
TbF ₃	DyF ₃	HoF ₃	ErF ₃	TmF ₃	YbF ₃	LuF ₃

80086-14 Rare Earth Set 14/set

Special Ordering Information:

Please supply the following information when ordering:

- 1) Make and model of instrument in which standards are to be used.
- 2) Specify quantity and standard materials required.
- 3) Outer diameter of block or individual required.
- 4) Inner diameter where appropriate.
- 5) Thickness of block (5mm normally supplied).
- 6) Whether a Faraday Cup is required.
- 7) Any limitation of the x- and y- movements of the stage.
- 8) List of element Standards.

Delivery is normally 2-3 weeks.

Compound Standards

Formulae	Name	Formulae	Name	Formulae	Name	Formulae	Name
AgCl	Silver (I) Chloride	ErF ₃	Erbium Fluoride	Mg ₃ Sn	Magnesium Tin Alloy	TaN	Tantalum Nitride
Ag ₂ S	Silver Sulphide	Eu ₂ O ₃	Europium (III) Oxide	MgAl ₂ O ₄	Spinel	TaSi ₂	Tantalum Silicide
Ag ₂ Te ₃	Silver Telluride	EuF ₃	Europium Fluoride	MgF ₂	Magnesium Fluoride	TbF ₃	Terbium Fluoride
Al,Cu,Mg	Dural	Fe ₂ O ₃	Hematite	MgO	Periclase	TbSi ₂	Terbium Silicate
Al,Mg,Si		Fe ₂ P	Iron Phosphide	MnF ₂	Manganese Fluoride	TeO ₂	Tellurite
AlSb	Aluminium Antimonide	Fe ₃ C	Iron Carbide	MnTiO ₃	Manganese Titanate	Th	Thorium Ree-Glass
Al,Si		FeO	Ferrous Oxide	MoO ₃	Molybdenum (V1) Oxide	ThO ₂	Thorium Oxide
Al ₂ O ₃	Aluminium Oxide	FeS	Synthetic Troilite	MoS ₂	Molybdenum (IV) Sulfide	TiC (325 mesh) 98%	Titanium Carbide
AlF ₃	Aluminium Fluoride	FeSi ₂	Iron Silicide	Na ₃ AlF ₆	Cryolite	TiC (solid) 99.5%	Titanium Carbide
AlF ₃	Aluminium Fluoride anhydrous	Ga ₂ Se ₃	Gallium Selenide	NaCl	Sodium Chloride	TiN	Titanium Nitride 99.5%
AlN	Aluminium Nitride	GaAs	Gallium Arsenide	NaF	Sodium Fluoride	TiO	Titanium Monoxide
B ₂ O ₃	Boron Trioxide	GaN	Gallium (III) Nitride	Nb ₂ O ₅	Niobium Oxide	TiO ₂	Titanium (IV) Oxide
B ₄ C	Boron Carbide	GaP	Gallium Phosphide	Nd ₂ O ₃	Neodymium Oxide	TiSi ₂	Titanium (IV) Sulfide
Ba	Barium REE Glass	GaS	Gallium Sulphide	Nd	Neodymium 1.2mm pcs 99.9%	TlBr	Thallium Bromide
BaF ₂	Barium Fluoride	GaSb	Gallium Antimonide	NdF ₃	Neodymium Fluoride	TlI	Thallium Iodide
BaTiO ₃	Barium Titanate	Gd ₂ O ₃	Gadolinium (III) Oxide	NiAs	Nickel Arsenide	Tm	Thulium Ingot 99.9%
Bi ₂ Se ₃	Bismuth Selenide	Gd ₂ Ga ₃ O ₁₂	Gadolinium Gallium Garnet	NiO	Nickel Oxide	TmSi ₂	Thulium Silicide
Bi ₂ Te ₃	Bismuth Telluride	GdF ₃	Gadolinium Fluoride	Ni ₂ Si	Nickel Silicide	U	Uranium REE-Glass
BN	Boron Nitride	HfO ₂	Hafnium Oxide	NiSO ₄	Nickel Sulphate	UO ₂	Uranium Oxide
CaMoO ₄	Calcium Molybdate	HgS	Mercury Sulphide (black)	NiP	Nickel Phosphide	VC	Vanadium Carbide
CaWO ₄	Calcium Tungstate	HgS	Mercury Sulphide (Red)	PbF ₂	Lead Fluoride	V ₂ O ₅	Vanadium (V) Oxide
CdS	Cadmium Sulphide	HgTe	Mercury Telluride	PbO	Lead Oxide	WC	Tungsten Carbide
CdSe	Cadmium Selenide	HoF ₃	Holmium Fluoride	PbS	Lead Sulphide	WSi ₂	Tungsten Silicide
CdTe	Cadmium Telluride	In ₂ Se ₃	Indium Selenide	PbS	Galena	WTI	W 95%; Ti 5%;
CeAl ₃	Cerium Alumate	In ₂ Te ₃	Indium Telluride	PbSe	Lead Selenide	Y ₂ O ₃	Yttrium Oxide
CeF ₂	Cerium (III) Fluoride	InAs	Indium Arsenide	PbTe	Lead Telluride	Y ₃ Al ₅ O ₁₂	Yttrium Aluminium Garnet
CeO ₂	Cerium (IV) Oxide	InP	Indium Phosphide	Pr	Praseodymium REE Glass	YbF ₃	Ytterbium Fluoride
Co ₃ O ₄	Cobalt (II,III) Oxide	InS	Indium Sulphide	PrF ₃	Praseodymium Fluoride	ZnS	Zinc Sulphide
CoSi ₂	Cobalt Silicide	InSb	Indium Antimonide	Rb	Rubidium REE Glass	ZnSe	Zinc Selenide
Cr ₃ C	Chromium Carbide	K	Potassium REE Glass	RbBr	Rubidium Bromide	ZnTe	Zinc Telluride
CrN	Chromium (III) Nitride	KBr	Potassium Bromide	RbI	Rubidium Iodide	Zr ₂	Zirconium Boride
Cr ₂ O ₃	Chromium Oxide	KCl	Potassium Chloride	Sb ₂ S ₃	Antimony (III) Sulfide	ZrC	Zirconium Carbide (Powder)
Cs	Caesium REE Glass	La	Lanthanum REE Glass	Si ₃ N ₄	Silicon Nitride	ZrN	Zirconium Nitride
CsBr	Caesium Bromide	La ₂ O ₃	Lanthanum (III) Oxide	SiC	Silicon Carbide	ZrO ₂	Zirconium Oxide
CsI	Caesium Iodide	LaB ₃	Lanthanum Hexaboride	SiO ₂	Silicon Oxide	ZrO ₂	Zirconium Oxide Ytria Slab 99.5%
CsNO	Caesium.....	LaF ₃	Lanthanum Fluoride	Sm ₂ O ₃	Samarium Oxide	ZrO ₂	Zirconium Oxide Ytria Tablets 99.995%
CuI	Copper Iodide (Powder)	Li ₂ Nb ₂ O ₆	Lithium Niobate	SmF ₃	Samarium Fluoride	ZrO ₂	Zirconium Oxide REE Free Glass Blank
CuO	Copper Oxide	Li ₂ Ta ₂ O ₆	Lithium Tantalate	SnO ₂	Tin Oxide		
CuS	Copper Sulphide	LiF	Lithium Fluoride	Sr	Strontium REE Glass		
CuSO ₄	Copper Sulphate	LuF ₃	Lutetium Fluoride	SrF ₂	Strontium Fluoride		
DyF ₃	Dysprosium Fluoride	LuSi ₂	Lutetium Silicide	SrTiO ₃	Strontium Titanate		
Er	Erbium REE Glass	Mg,Al,Mn,Zn	Magnesium Alloy	Ta ₂ O ₅	Tantalum Oxide		

Pure Standards

Formulae	Name	Formulae	Name	Formulae	Name	Formulae	Name
Ag	Silver	Fe	Iron	Os	Osmium	Ta	Tantalum
Al	Aluminium	Gd	Gadolinium	Pb	Lead (very soft material)	Te	Tellurium
As	Arsenic	Ge	Germanium	Pd	Palladium	Ti	Titanium
Au	Gold	Hf	Hafnium	Pt	Platinum	Tl	Thallium (very soft material)
B	Boron	In	Indium (very soft material)	Re	Rhenium	Tm	Thulium
Be	Beryllium	Ir	Iridium	Rh	Rhodium	V	Vanadium
Bi	Bismuth	La	Lanthanum	Ru	Ruthenium	W	Tungsten
C	Carbon	Mg	Magnesium	Sb	Antimony	Y	Yttrium
Cd	Cadmium	Mn	Manganese	Sc	Scandium	Zn	Zinc
Co	Cobalt	Mo	Molybdenum	Se	Selenium	Zr	Zirconium
Cr	Chromium	Nb	Niobium	Si	Silicon		
Cu	Copper	Ni	Nickel	Sn	Tin		

Natural Mineral Standards

Formulae	Name	Formulae	Name	Formulae	Name	Formulae	Name
NaAlSi ₃ O ₈	Albite	BaTiS ₃ O ₉	Benitoite	Ca(Mg,Fe)Si ₂ O ₆	Diopside	(Mg,Fe) ₂ SiO ₄	Olivine
Fe ₃ Al ₂ Si ₆ O ₁₂	Almandine Garnet	Be ₂ Al ₂ Si ₆ O ₁₈	Beryl	CaMg(CO ₃) ₂	Dolomite	KAlSi ₃ O ₈	Orthoclase
Ca ₃ Fe ₂ (SiO ₄) ₃	Andradite	CaCO ₃	Calcite	CaF ₂	Fluorite	FeS ₂	Pyrite
CaSO ₄	Anhydrite	SrSO ₄	Celestine	Mg ₂ SiO ₄	Forsterite	MnSiO ₃	Rhodonite
Ca ₅ (PO ₄) ₃ (F,Cl,OH)	Apatite	BaAl ₂ Si ₂ O ₈	Celsian	Mn ₃ Al ₂ Si ₃ O ₁₂	Garnet Spessartine	CaTiSiO ₅	Sphene
(Ca,Mg,Fe) ₂ (SiAl) ₂ O ₆	Augite	FeCr ₂ O ₄	Chromite	NaAlSi ₂ O ₆	Jadeite	Zn ₂ SiO ₄	Willemite
Cu ₂ (CO ₃) ₂ (OH) ₂	Azurite	Cu ₂ S	Cuprite	Al ₂ SiO ₅	Kyanite	CaSiO ₃	Wollastonite
BaSO ₄	Baryte (Cumbria)	Cu ₂ S	Chalcocite	Fe ₃ O ₄	Magnetite	ZrSiO ₄	Zircon
BaSO ₄	Baryte (Shropshire)	CuFeS ₂	Chalcocopyrite	Cu ₂ CO ₃ (OH) ₂	Malachite		

Natural Minerals

Formulae	Name
CaAl ₂ Si ₂ O ₈	Anorthite Powder
K(Mg,Fe) ₃ AlSi ₃ O ₁₀ (OH) ₂	Biotite Powder
PbCrO ₄	Crocoite Powder
PbS	Galena
Ca ₂ (Mg,Fe,Al) ₅ (Al,Si) ₈ O ₂₂ (OH) ₂	Hornblende (Amphibole)
FeTiO ₃	Ilmenite Powder
SiTiAlFeMgCaNaKO	Kaersutite (KK1-15)
AlSi ₂ O ₆	Pollucite

Natural Minerals (No Certificate of Analysis)

Formulae	Name
CaAl ₂ Si ₂ O ₈	Anorthite
(Mn,Ca)SiO ₃	Bustamite
SnO ₂	Cassiterite (Tin Oxide)
SrSO ₄	Celestine
CuFeS ₂	Chalcopyrite
FeCr ₂ O ₄	Chromite
CoAsS	Cobaltite
	Chrome Diopside
FeTiO ₃	Ilmenite
KAlSi ₃ O ₈	Microcline
NiS	Millerite (Nickel Sulphide)
(Ce,La,Th NdY)PO ₄	Monazite
(Ce,La,Th)PO ₄	Monazite Powder
KAl ₂ (AlSi ₃ O ₁₀)	Muscovite
SiO ₂	Obsidian
ZnS	Sphalerite
LiAlSi ₂ O ₆	Spodumene (Lithium Aluminium Silicate)
Na ₃ AlBe(Si ₃ O ₁₂)Cl	Tugtupite
Sb ₂ O ₃	Valentinite (Antimony Oxide)

NIST/NBS Standards

Formulae	Name	Notes
SRM 101g	Cr 18%; Ni 10%	AISI 304L Stainless Steel
SRM C1287	High Alloy Steel	AISI 310 Mod. ACI HK
SRM 160b	Cr 19%; Ni 12%; Mo 3%	AISI 316 Stainless Steel
SRM 121d	Cr 17%; Ni 11%; Ti 0.3%	AISI 321 Stainless Steel
SRM 343a	Cr 16%; Ni 2%	AISI 431 Stainless Steel
SRM 361	-	AISI 4340 Steel
SRM 132b	-	AISI M-2 Tool Steel
SRM 478	Cu 73%; Zn 27%	Cartridge Brass
SRM 481	Au/Ag Set of 6	Gold-Silver wires
SRM 482	Au/Cu Set of 6	Gold-Copper wires
SRM 710	Soda-Lime-Silica glass	-
SRM 1872	Set of three glasses	K-453; K-491; K-968
SRM 1134	High Silicon Steel	-
SRM 1160	Ni-80% Mo-4% Fe-14%	Electronic & Magnetic alloy
SRM 1276a	Cu 67.5%; Ni 30.8%	CDA 715
SRM C2400	High Alloy Steel	ACI 17/4 PH
SRM 872	Phosphor Bronze B2	CDA 544
SRM 179	High Silicon Steel	-
SRM 480	W 78.5% Mo 21.5%	Tungsten 20% Molybdenum Alloy

BAS EURO Standards

Formulae	Name	Notes
481-1	Cast Iron	-
281-1	Cr 18.7%; Ni 9.3%	Highly alloyed steel
553-1	High Carbon Fe-Cr	B.C.S. No. 204/4

B.C.S. Stainless Steel Spectroscopic Standards

Formulae	Name	Notes
S.S. No. 62	Austenitic	B.S. 970 En 58D
S.S. No. 63	Austenitic	B.S. 970 En 58A & 58E
S.S. No. 72	Ferritic	-
S.S. No. 461	Austenitic	-
S.S. No. 464	Austenitic	-
S.S. No. 465	Austenitic	-
S.S. No. 466	Austenitic	-
S.S.-CRM No. 474	-	B.S. 970, type 317
S.S. No. 495/1	13% Manganese steel	Containing Ni & Cr
B.C.S. No. 204/4	High Carbon Ferro-Chromium	-
BCS No. 179/2	High-Tensile Brass	-
BCS/SS-CRM No 470	Ferritic Stainless Steel	-
BCS/SS-CRM No 355	Tin Ore Sn 31.42%	MBH#206A355

Assorted Standards

Formulae	Name	Notes
ISO 3585	Borosilicate 3.3 glass	Duran glass
AISI 316	Stainless Steel	EN58J Wire.
AISI 304L	Stainless Steel	From Advent (1mm wire)
Glass No 1360-3	-	-
B.S. 153	AISI Grade 430 F Stainless Steel	
B.S. 154	Stainless Steel 430FR (High Silicon)	

M.B.H. Standards

Formulae	Name	Notes
27X14386	Ni; Cr; Co; Mo Cast.	=
11X S/1-CR1	Corr.Resist Cast Iron	Chill cast.
210X11775	Ni; Co; Cr; Al; Ti Cast.	=
212NN50.01	Ni Rem; Cu 30%; Sn 10%; Fe 4%.	BNF.
31XWSB1	Silicon Brass Cast.	=
59XG77J1	Al; Zn; Mg; Cu Cast.	=
81XPA12.5	Sb 12.6%; Pb 87.4%	=
111X12670	Cr 19.31%; W 10.1%	Cobalt/Tungsten Cast.
204JC	Fluorspar	Swedish Inst for Metals Res.
206ABL5	Uranium Ore. U 7.09%	Canada Centre for Mineral and Energy Technology
206A355	Tin Ore. Sn 31.42%	BCS-CRM No. 355
13MBS89	Martensitic Stainless Steel	AISI 410
13MBS91E	Martensitic Stainless Steel	AISI 430
13MBS186A	High Alloy Stainless Steel	INVAR 36
14XHS1	High Speed Steel	Tool steel T-1
(37MBS314B)	Copper Alloy	CDA 314, CDA 360,
(37MBS360A)		CDA 630
(37MBS630)		
14HYT2/2	Steel	=
Ref 0683	Bronze (85c,5Sn,5Pb,5Zn)	=
C13X170020	Austenitic Stainless Steel	=
C55XG02D60	Aluminium/Silicon/Copper	Chippings
(55XG900J5)	Aluminium/Silicon/Copper	Cast
(55XG26H5)		
(55XG04H8)		
(55XG04H6)		
43XZ2	Zinc/Aluminium/Copper	Cast
55XG900JB	Aluminium/Silicon/Copper	Cast
58XG40H9	Aluminium/Zinc	Cast
FCR-3-1	=	=
14M B.S. 190	High Manganese Stainless Steel	
13X 18001	Austenitic Stainless Steel	Cast
(65XMGA5)	Manganese/Aluminium/	Cast
(65X MGA1)	Zinc	
(65XMGA3)		
54X G231 H4	=	=

► MAC – Reference Materials for Auger Electron Microscopy

MAC has developed multi-element blocks of reference materials suitable for the compilation of a reference library of Auger sensitivity factors when used with the Auger Electron Microscope (AES).

Auger Electron: one of the electrons ejected from an atom as a result of the internal conversion of its own X-ray in the auger effect. **Auger Effect:** a process in which an atom singly ionized by emitting one electron with energy in the X-ray range instead of emitting the usual X-ray photon on recovery undergoes a transition in which a second electron is emitted.

A carefully selected range of elements or compounds will enable the surface analyst to compile a valuable reference library of spectra for those materials of specific interest to his field of study. AES is of particular value in the investigation of the surface chemistry of electronic materials. A set of 33 relevant reference materials is designed for this purpose.

A Faraday Cup, for the accurate measurement of specimen current, is available as an option on all reference blocks.

Multi-element blocks containing up to 50 reference materials can be made to suit the configuration of the most instruments but, the actual number of materials and the shape and size of the reference block is determined by the physical limitations imposed by the specimen holder and chamber. The reference material each has an exposed area about 2 square mm.

Each block of reference material is made from AISI 304 grade austenitic stainless steel, set with elements and compounds of your choice and polished to a ¼ micron diamond finish. All blocks are supplied with certificates of analysis and a map showing the locations of the reference materials. The design of the reference blocks for AES is based upon that used for the production of our already established range of electron probes X-ray microanalysis (EPMA) standard blocks. For surface analysis in ultra-high vacuum (UHV) environments, the design of the AES blocks has three significant differences over the EPMA blocks:

- For EPMA, the reference standards are set into drilled brass blocks. However, for UHV, the brass would outgas, so non-magnetic stainless steel is used for the AES reference blocks.
- There is no coating of electrically conductive carbon on the AES blocks. For EPMA, this coating is needed to neutralize any electron beam induced charge.
- EPMA standards are mounted using epoxy resin, which would rapidly outgas under UHV conditions. The AES reference blocks are set with Wood's Fusible Metal. This is an alloy of bismuth, lead, tin, and cadmium.

Wood's Metal, being electrically conductive, also serves as an electrical connection between the reference material and the stainless steel block thereby dissipating any electrical charge. However, some of the reference materials are electrical insulators, so there must be charge neutralized using a high specimen tilt angle or a lower primary beam accelerating potential.

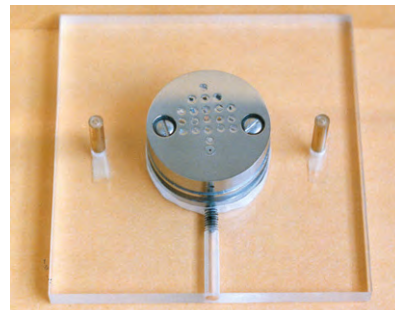
The results of using Wood's Fusible Metal as a mounting compound as follows:

Out Gassing

The chamber base pressure immediately prior to block admission was 6.4×10^{-10} bar. After 24 hours, the chamber pressure was 8.0×10^{-10} bar. This is the pressure that would be expected for a typical sample. Thus, the Wood's Metal is acceptable as a mounting compound for the blocks of reference materials.

Electron Beam Damage

No appreciable electron beam induced damage of the Wood's Metal was noted despite prolonged exposure to a beam of 10kV and 0.3 micro Amps.



Contamination

After the removal of Atmospheric contamination from the reference materials using a rastered argon ion gun, no evidence of cross-contamination by the Wood's Metal was found above a detection limit of 1 atomic weight %.

WARNING: The block of reference materials should not be baked prior to analysis. Wood's Metal melts at about 70°C and also, because of its high vapor pressure, cadmium vapor would be liberated into the specimen chamber.

A comprehensive library of spectra could be used to establish the relative contribution of various elements in an unknown sample by the application of a peak stripping routine.

For those AES instruments equipped with a solid state energy dispersive X-ray detector, a multi-element block of reference materials will enable the analyst to calibrate the E.D. system. (The problem associated with the charging of any electrically insulating materials must be taken into consideration before attempting this calibration). This ability to analyze an unknown sample using the E.D. system to gain prior knowledge of the elemental composition will ensure that the correct peak positions are set before depth profiling by AES.

Acknowledgment: The investigation was carried out on a JEOL-10S by Dr. M.D. Hill of British Telecom Research Laboratories, Martlesham Heath, Suffolk.

Ordering Information

Please supply the following information when ordering:

- 1) Make and model of instrument in which the reference materials are to be used.
- 2) Specify quantity and reference materials required.
- 3) Dimensions of the block (with drawing is preferred).
- 4) Whether a Faraday Cup is required.
- 5) Any limitation of the X and Y movements of the stage.

► A. Multi Element Block

Cat.#	Description	Pack
80095-05	5 Standards	Set
80095-10	10 Standards	Set
80095-15	15 Standards	Set
80095-20	20 Standards	Set
80095-25	25 Standards	Set
80095-30	30 Standards	Set
80095-35	35 Standards	Set
80095-40	40 Standards	Set
80095-45	45 Standards	Set
80095-50	50 Standards	Set
80062	Faraday Cup	Set
80095-481	SRM 481 Au/Ag Set of 6 Standards	Set
80095-482	SRM 482 Au/Cu Set of 6 Standards	Set
80095-483	SRM 483 Fe-Si	Set
80095-1872	SRM 1872 Set of 3 glasses	Set

► B. Electronics Materials Set:

The set is comprised of 33 materials:

Ag	GaP	Bi ₂ Te ₃	Si	Ag ₂ Te	Zn	GaAs	Ni	KBr
W	ZnS	InP	FeS ₂	Sn	B	Pt	PbTe	Cu
CaF ₂	LiF	BN	InSb	Mg ₂ Sn	SiO ₂	CdS	Al ₂ O ₃	Sb
C	MgO	Zr	NaCl	Pd	Cr			

80095-ELE Electronic Set of 33 Materials Set

► C. Mineral Block Set

The set is comprised of 27 minerals:

Beryl	Be ₃ Al ₂ Si ₆ O ₁₈	Anhydrite	CaSO ₄
Cryolite	Na ₃ AlF ₆	Titanium Monoxide	TiO
Albite	NaAlSi ₃ O ₈	Rhodonite	MnSiO ₃
Magnesium Oxide	MgO	Garnet Spessastine	Mn ₃ Al ₂ Si ₃ O ₁₂
Fosterite	Mg ₂ SiO ₄	Ferric Oxide	Fe ₂ O ₃
Olivine	(MgFe) ₂ SiO ₄	Almandine Garnet	Fe ₃ Al ₂ Si ₃ O ₁₂
Kyanite	Al ₂ O ₃ SiO ₂	Pyrite	FeS ₂
Orthoclase	KAlSi ₃ O ₈	Willemite	Zn ₂ SiO ₄
Calcite	CaCO ₃	Celestine	SrSO ₄
Fluorite	CaF ₂	Zircon	ZrSiO ₄
Diopside	Ca(Mg,Fe)Si ₂ O ₆	Baryte	BaSO ₄
Augite	(Ca,Mg,Fe) ₂ (Si,Al) ₂ O	Benitoite	BaTiSi ₃ O ₉
Wollastomite	CaSiO ₃	Apatite	Ca ₅ (PO ₄) ₃ (F,Cl,OH)
Gadolinium Gallium Garnet	Gd ₃ Ga ₅ O ₁₂	Faraday Cup	

80095-MINA Mineral Block, 25 mm Diameter Set

80095-MINB Mineral Block, 32 mm Diameter Set

► D. Rare Earth (REE-Glass) Block:

The set is comprised of 15 standards, 25mm diameter block:

Y	Pr	Dy	Er	Ce	Eu	Ho	Tm	La
Sm	Gd	Yb	Nd	Tb	Lu			

80095-REG 15 Rare Earth Ree-Glass Block Set

► E. Rare Earth Block:

The set is comprised of 18 standards:

LaB ₆	NdF ₃	TbF ₃	ErF ₃	LaF ₃	SmF ₃	TbSi ₂	Tm	CeAl ₂
EuF ₃	DyF ₃	TmSi ₂	PrF ₃	GdF ₃	HoF ₃	YbF ₃	LuF ₃	LuSi ₂

80095-RE25 18 Rare Earth, 25mm Dia. Block Set

80095-RE32 18 Rare Earth, 32mm Dia. Block Set

► F. Semi-Conductor Block:

The set is comprised of 21 materials:

B	Si	Cu ₂ S	Ge	InSb	C	CaF ₂	ZnS	Ag ₂ S
HgTe	Mg ₂ Sn	FeSi ₂	GaP	CdS	PbTe	Al ₂ SiO ₅	FeS ₂	GaAs
InP	Bi ₂ Se ₃	Bi ₂ Te ₃						

80095-SC25 21 Semi-Conductor Materials 25mm Dia. each

80095-SC32 21 Semi-Conductor Materials 32mm Dia. each

► G. Biological Block:

The set is comprised of 18 materials with Faraday cup:

BN	Al	CaCO ₃	FeS ₂	BaSO ₄	C	SiO ₂	CaSO ₄	Se
Bi	NaCl	KCl	Ti	InP	MgO	KBr	V	BaF ₂
Faraday Cup								

80095-BI025 18 Biological Materials, 25mm Dia. Set

80095-BI032 18 Biological Materials, 32mm Dia. Set

► H. 42 Standard Universal Block:

The block is comprised of 42 materials:

Jade	Fe	SeF ₂	InAs	Ir	MgO	FeS ₂	Y	Sn
Pt	Al ₂ O ₃	Co	Zr	Sb	Au	Ortho	Ni	Nb
BaF ₂	HgTe	Wollas	Cu	Mo	LaB ₆	PbTe	Ti	Zn
Rh	CeAl ₂	Bi	V	GaP	Pd	Hf	Cr	Ge
Ag	Ta	Mn	Se	Cd	W			

80095-U25 42 Standard Universal, 25mm Dia Block Set

80095-U32 42 Standard Universal, 32mm Dia Block Set

► I/ 45 Standard + Faraday Cup Universal Block

The block is comprised of 45 materials and Faraday Cup:

B	V	GaP	Pd	Hf	BN	Cr	Ge	Ag
Ta	C	Mn	Se	Cd	W	Jade	Fe	SrF ₂
InAs	Ir	MgO	FeS ₂	Y	Sn	Pt	Al ₂ O ₃	Co
Zr	Sb	Au	Ortho	Ni	Nb	BaF ₂	HgTe	Wollas
Cu	Mo	LaB ₆	PbTe	Ti	Zn	Rh	CeAl ₂	Bi
Faraday Cup								

80095-UF25 45 Standard + FC, 25mm Dia Block Set

80095-UF32 45 Standard + FC, 32mm Dia Block Set

► J. 37 Standard + Faraday Cup

The block is comprised of 37 materials and a faraday cup.

B	Cr	GaP	InAs	Au	C	Mn	SrF ₂	Sn
PbTe	MgO	Fe	Zr	Sb	Bi	Albite	FeS ₂	Nb
BaF ₂	C	Si	Co	Mo	Hf	Al ₂ O ₃	Ortho	Ni
Pd	Ta	Wollas	Cu	Ag	W	Ti	Zn	Cd
Pt	Faraday Cup							

80070-37 37 Standard and FC Dia Block Set 25mm each

80070-37A 37 Standard and FC Dia Block Set 32mm each

► K. 55 Standard+ Faraday Cup

The block is comprised of 55 standards and a faraday cup

BEI	Si ₃ N ₄	Cr	GaP	Pd	Hf	Bi	B	SiO ₂
Mn	Ge	Ag	Ta	BN	Ortho	Fe	Se	Cd
PbTe	C	KBr	Fe ₃ C	SrF ₂	InAs	W	Albite	CaF ₂
FeS ₂	Y	Sn	Re	NaCl	Woll	Co	Zr	Sb
Ir	MgO	Sc	Ni	Nb	BaF ₂	Pt	Al ₂ O ₃	Ti
Cu	Mo	LaB ₆	Au	Si	V	Zn	Rh	CeO ₂
HgTe	Faraday Cup							

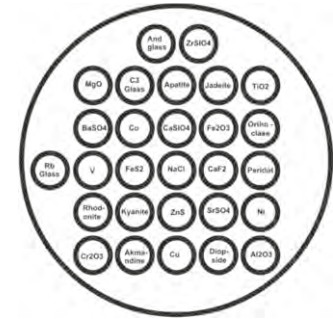
80070-55 55 Standard and FC Dia Block Set 32mm each

► Geological/Silicate Material Standards Block

Geological/Silicate Mineral Standards Block Layout

—	—	And Glass	ZrSiO ₄	—	—
—	Mg ₀	C ₃ Glass	Apatite	Jadeite	TiO ₂
—	BaSO ₄	Co	CaSiO ₄	Fe ₂ O ₃	Orthoclase
Rb Glass	V	FeS ₂	NaCl	CaF ₂	Peridot
—	Rhodonite	Kyanite	ZnS	SrSO ₄	Ni
—	Cr ₂ O ₃	Akmandine	Cu	Diopside	Al ₂ O ₃

80086-28 Geological/Silicate Material Block each

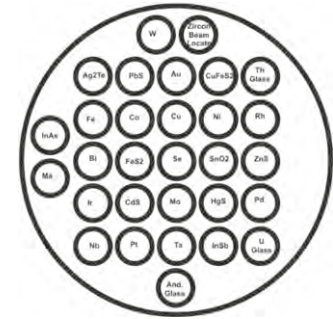


► Sulphide Minerals/Oxide Heavy Metals Standards Block

Sulphide Minerals/Oxide Heavy Metals Standards Block Layout

—	—	—	W	Zircon Beam Locate	—
—	Ag ₂ Te	PbS	Au	CuFeS ₂	Th Glass
InAs	Fe	Co	Cu	Ni	Rh
Ma	Bi	FeS ₂	Se	SnO ₂	ZnS
—	Ir	CdS	Mo	HgS	Pd
—	Nb	Pt	Ta	InSb	U Glass
—	—	And. Glass	-	-	-

80086-30 Sulphide Minerals/Oxide Heavy Metals Standards Block each



► Quality Control Testing Standards

A new product that allows the user of the Scanning Electron Microscope to check the performance of their instrument to make sure that it is working within the manufacturer's specification.

A useful tool to all Scanning Electron Microscope users such as Researchers, Technologists, Quality Assurance Departments, and SEM. users with Energy Dispersive or Wavelength Dispersive X-ray systems fitted, because it enables them to readily assess the state of their instrument.

- 1. STANDARDS** — Co (Cobalt) is compulsory for checking Energy Dispersive analyzers. The customer can choose any other five from our lists, with the exception of the SRM 481, SRM 482 and SRM 1872. (see pages 198-199) for complete list)
- 2. DUPLEX BRASS** — Used for checking the contrast efficiency of Back Scattered detectors and it is capable of detecting two major copper/zinc phases of 0.1 atomic number difference.
- 3. FARADAY CAGE** — A Faraday cage is used for measuring the current of the beam at the specimen plane. The beam of electrons is focused inside the hole by increasing the magnification so that when the hole fills the screen all the electrons are trapped and a true measure of current is achieved. The Hole size in FC aperture — 150 microns.
- 4. S168T** — Is a sample of gold crystals on a carbon background which is useful for checking the performance of the SEM under high-resolution conditions i.e. finer than a 10 micron probe.
- 5. S1930** — Silicon test specimen with squares of periodicity 9.9 micrometers lines about 1.9 micrometers wide which has formed by electron beam lithography - used for magnification calibration and assessing image distribution.

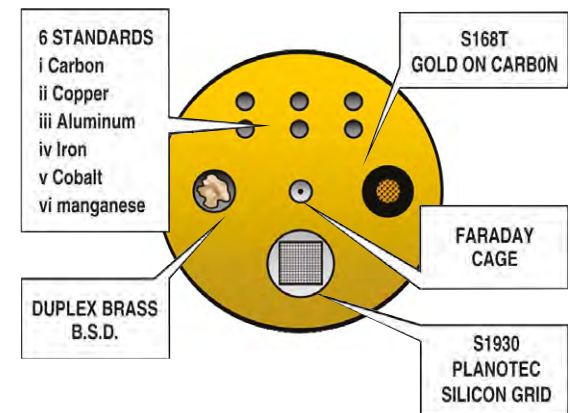
All items 1 through 5 above (QCT A) can be mounted on a block 25mm diameter x 5mm thick

A larger version of the above is available with the following additions:

- (a) S168U Gold on Carbon used for low KV resolution check.
- (b) 1000 mesh and a 2000 mesh grid for magnification calibration of Scanning Electron Microscope.

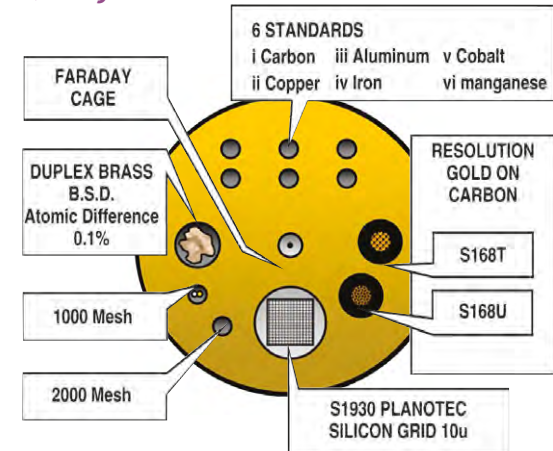
This larger (QCT B) version is mounted on a brass block 32mm diameter x 5mm thick.

Quality Control Test Set A



80150-25 Quality Control Test Set A set

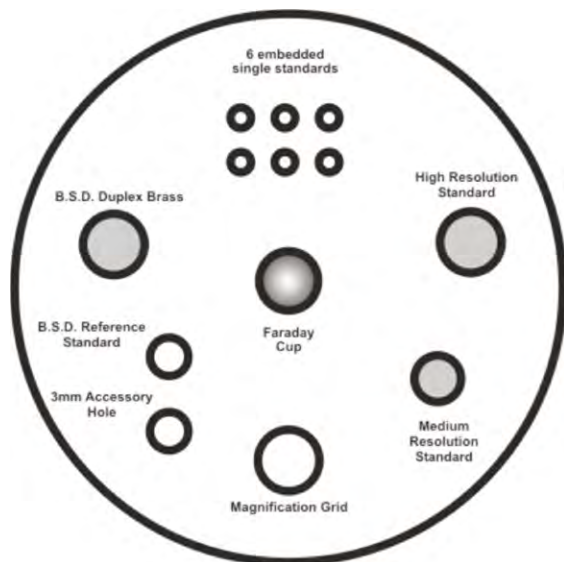
Quality Control Test Set B



80150-32 Quality Control Test Set B set

► Standard Test Specimen

The STANDARD TEST SPECIMEN keeps the Scanning Electron Microscope up to peak operating conditions. It is available in three models.



1. Three formats: *Metallurgical*
Biological
Geological

2. **32mm Diameter Brass Block** consisting of 6 standards. One being Cobalt the remainder is the customer's choice. (see pages 198-199 for list)

3. **Faraday cage.**

4. **B.S.D. Duplex Brass Reference Standard at No. Difference 0.1.**

5. **Resolution Grid** either High or Medium.

6. **Test Specimen for Magnification Calibration.**

7. **Certificate Booklet.**

80154-00 Standard Test Specimen set

► MAC – Repolishing Service

Every care has been taken with the production of your standards. Some materials (i.e. water soluble) can deteriorate rapidly if moisture is present. The materials used most readily can become contaminated over time. It is recommended that the standards are returned to us for repolishing and refurbishment every two years.

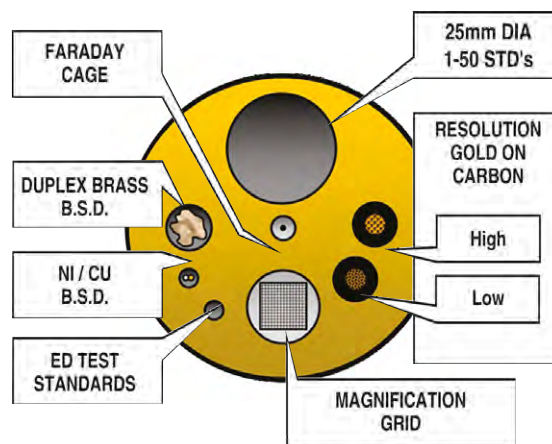
Please call for pricing on our refurbishment service.

► SEM Sample Holder

Custom Made to Your Choice!

The Sample Holder is perfect for keeping all important SEM test specimens together. All specimens can be individually and easily removed at any time for use.

The brass sample holder is 50mm diameter x 8mm thick and comes in MAC's standards presentation box.



It accommodates the following:

1. **A 25mm or 32mm Diameter x 5mm Thick Brass Block** containing your Analytical Standards, or other smaller sizes if required.

2. **Duplex Brass Single Standard**

Used for checking the contrast efficiency.

3. **Ni/Cu B.S.D. Single Standard.**

4. **Faraday Cage**

For measuring the current of the beam at the specimen plane.

5. **E.D. Test Standards**

Three standards of your choice for E.D. test set up of calibration center.

6. **Magnification Calibration Standard**

Used for magnification calibration and assessing image distortion.

7. **Resolution Standards**

High and Low resolution standards for checking the performance of the S.E.M. under high resolution conditions.

80155-00 SEM Custom Sample Holder

SECTION 10

Mailers and Shippers

Laboratory and Diagnostic Mailing Systems

Including:

Histopathology Mailers

Drug Test Kit Mailers

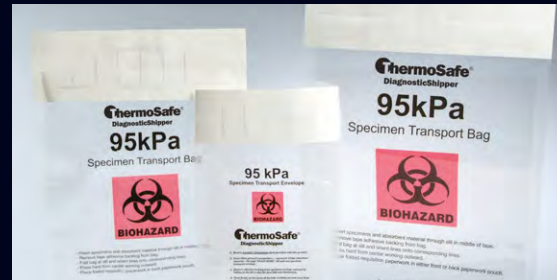
Mini Mailers

Vial Shippers

Insulated Shippers

Medical Transporters

and more...



**Electron
Microscopy
Sciences**

THERMOSAFE® MAILING SYSTEMS

© Tegrant Corporation, ThermoSafe Brands

► Diagnostic Specimen Mailing Systems

These ready-to-use combination/triple packaging kits, have been tested and certified for transport of diagnostic shipments as defined by the applicable regulations, in compliance with IATA Packaging Instruction 650, US, Postal Service and DOT regulations.

Each kit includes: approved 10 ml specimen tubes; leak-resistant foam shippers that secure and protect 95kPa-certified specimen tubes; absorbent material—sufficient to absorb complete contents of approved primary receptacles filed with blood; waterproof tape; leak-proof pressure-lock poly bag; corrugated shipping carton; UN3373 Biological Substance label and step-by-step instruction sheet.



Model 473

outer dimensions: 5½" x 4" x 2"



Model 472

outer dimensions: 10½" x 5½" x 3"

Cat. #	Model	Holds	Includes	Qty
61510-73	473	3 x 10 ml tubes	Tubes, EPS mailer & lid, absorbent material, water proof tape, Corrugated shipping carton, press-lock poly bag, UN3373 label & instruction sheet	3 set
61510-72	472	8 x10 ml tubes		5 set

► Replacement Parts for Model 473 & 472:

Cat. #	Description	Qty
61510-76	For Model 473: Model 476 EPS mailer – 3 tube specimen mailer foam	3/pk
61510-70	For Model 472: Model 470 EPS mailer – 8 tube specimen mailer foam	10/pk

► Accessories for Model 473 & 472:

Pack includes: tubes, absorbent material, waterproof tape, press-lock poly bag, 200-lb corrugated shipping carton, and instructions

Cat. #	Description	Qty
61510-74T	For model 473: Model 474T accessory pack	3 sets
61510-71T	For model 472: Model 471T accessory pack	5 sets

► Flexible Mailers (Without Tubes)

Complies fully with US Postal Service, DOT and IATA regulations for transport of clinical and diagnostic specimens (UN3373) by air or ground; Domestic Mail Manual Part 8.6; Title 49 CFR, Part 173, 199; and IATA Packing Instruction 650. Includes all required secondary and outer packaging components. Users provide only leak-proof specimen containers (primary receptacles), such as tubes, vials, cups, etc. Accommodates any size and quantity of specimen containers that fit inside the flexible secondary envelope with required absorbent material. Maximum capacity is 300 ml or less.



Cat. #	Model	Corrugated Carton I.D.	Plastic Envelope	Absorbent Sheets	Bottle Wrap 6" x 24"	Qty
61512-70	570	4" x 4" x 9½"	1 – printed with international biohazard 5¼" x 8¾" I.D., 6" x 9¾" O.D./95 pKa (14psi)	2 – 7½" x 4½" 240ml capacity	1	5/pk
61512-75	575*	N/A	95 kPa Plastic Bag, 25/case	4 Bay 6¾" x 4'8", 50/cs	25/case	Case

*Accessories kit for Model 570 & 571

CytoSep™ Family

The CytoSep™ Family is a series of Cytology Funnel sample chambers specially designed to concentrate cells into thin layer preparation.

These Cytology Funnels are disposable and manufactured to use with numerous major models, such as Shandon Cytospin™ 4 Cyto-centrifuge, the Sakura Cyto-Tek™ Cyto-centrifuge, the Hettich Cyto-System. They are safer than reusable sample chambers and lower your risk of contamination to pathologic samples.



For more information, see pages 548–549 >>>>

► **LabMailer – ThermoSafe®**

Maximum breakage protection for known non-hazardous blood, serum, tissue, and other specimens. Accommodates VacuTainer® Microtainer® and other collection/transport tubes. Available in multi-tube, slide, and tube/slide combinations Lightweight polystyrene foam construction saves postage. Reusable and recyclable. (® is trademark of Becton Dickinson).

► **Histopathology Mailer**

This versatile combination mailer carries 10 vials, 2 slides packets, or 5 vials and 1 slide packet. Suitable use with Model 365 mailing sleeve



Cat. #	Description	Qty
61513-94	Model 394 Histopathology Mailer	10/pk

► **Drug Test Kit Mailer**

All in one, easy to use drug test mailing system that meets postal and courier service regulations for non-hazardous clinical specimens.



Kit consists of:

- 90 ml Specimen Bottle, Screw Top Cap and Temperature Indication Label 1 1/4" dia. X3"
- Pad of Absorbent Material 4" x 2 1/4"
- Press-Lock Plastic Bag, 5 1/8" x 9 1/8"
- Model 601, I.D. 6" x 3" x 2 1/2"; O.D. 7" x 4" x 3 1/2", 1/2" Wall
- Model 602, I.D. 6" x 3" x 2 1/2"; O.D. 7" x 4" x 3 1/2", 1/2" Wall
- Security Seal: 7" long x 1" wide

Cat. #	Description	Qty
61514-00	Model 600 Drug Test Kit Mailer	10/pk

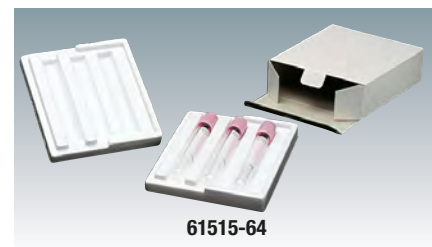
► **Other Mailers and Accessories**



61515-62



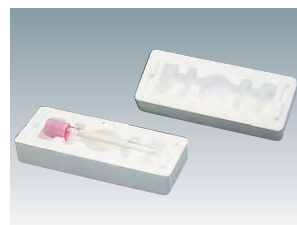
61515-39



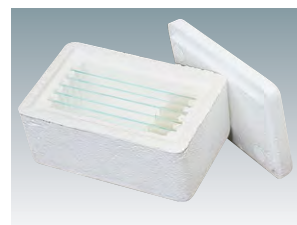
61515-64



61515-09



61515-56



61515-69



61515-07

Cat. #	Model	Holds Tube/Slide Specifications				Tube Capacity Dimensions	Mailing Sleeves	Qty/ Pk
		Tubes	Slides	Tube Volume	Tube Dimensions, mm			
61515-56	356	1	N/A	3, 5, 7, 10 ml	Dia:10.25 – 16; Length:75-103	110 x 16 mm	357	10/pk
61515-62	362	2	2	5, 7, 10 ml	Dia:10.25 – 16; Length:75-103	107 x 16 mm	363	10/pk
61515-64	364	3	N/A	3, 5, 7, 10 ml	Dia:10.25 – 16; Length:75-103	105 x 17 mm	365	10/pk
61515-07	407	4	8	7, 10 ml	Dia:16; Length:75-100	110 x 19 mm	408	10/pk
61515-39	339	5	N/A	3, 5 ml	Dia:10.25 – 13; Length:75-103	105 x 13 mm	365 & 340	10/pk
61515-09	409	5	N/A	7, 10, 15, 25 ml	Dia: 16; Length:75-150	170 x 16 mm	410	10/pk
61515-41	341	8	8	5, 7, 10 ml	Dia:10.25 – 16; Length:75-103	113 x 18 mm	342	10/pk
61515-69	369	N/A	10	N/A	N/A	N/A	370	10/pk

THERMOSAFE® MAILING SYSTEMS

® Tegrant Corporation, ThermoSafe Brands

► Mailing Sleeves

Sturdy 18-point white paperboard sleeves increase the cost-effectiveness of foam mailers. Reverse tuck closures enable foam mailers to withstand multiple trips.



61516-42

61516-40

Cat. #	Model	Fit Foam Mailer	Qty / Pk
61516-57	357	356	10/pk
61516-63	363	362	10/pk
61516-40	340	364, 339, 394	10/pk
61516-65	365	364, 339, 394	10/pk
61516-08	408	407	10/pk
61516-10	410	409	10/pk
61516-42	342	341	10/pk
61516-70	370	369	10/pk

► Vial Shippers

This unique array of shipping system protects frozen and refrigerated shipping vials. These ready-to-use kits include everything to keep temperature sensitive goods in top condition. Just load your product, add U-tec phase change material pack, and close the shipper.

- Shippers (Models 480-413 and 480-490) also include U-tec® and reusable polyethylene platform
- Shippers (Models 413-C24 & 490-C24) also include flexible polyurethane foam cushion



61519-24

Cat. #	Model	Holds	Includes	Dimensions		Qty / Pk
				Inner L x W x H	Outer L x W x H	
61519-13	480-413	12 of 28 mm Vials	EPS container & lid, 24oz, U-tec phase change material, reusable polyethylene platform & corrugated shipping carton	8" x 6" x 7"	11" x 9" x 10"	2/pk
61519-90	480-490	48 of 28 mm vials		12" x 10 1/4" x 5 1/2"	14 3/8" x 13 3/4" x 8 1/4"	2/pk
61519-24	413-C24	24 of 16 - 20mm vials	EPS container and lid, corrugated shipping carton and 24-hole flexible foam insert	8" x 6" x 7"	11" x 9" x 10"	2/pk
61519-48	490-C24	48 of 16 - 20mm vials		12" x 10 1/4" x 5 1/2"	14 3/8" x 13 3/4" x 8 1/4"	2/pk

► Aluminum Cans and Can Shippers

Accommodates the most widely used laboratory collection tubes, vials, and bottles. Helps to prevent breakage during handling and shipment. Seamless construction with lined screw-cap to prevent leakage. completely autoclavable. EPS foam mailers and mailing sleeves available.



61517-35

61517-36

Can Ordering:

Cat. #	Model	Can Dimensions	Recommended EPS Mailer	Qty/ Pk
61517-35	435	1 1/4" dia. X 4" H	373	12/pk
61517-36	436	2 1/2" dia. X 6" H	353	5/pk

EPS Foam Mailer Ordering:

Cat. #	Model	Cavity Measures	Outer Measures	Qty/ Pk
61518-73	373	2" dia. x 5 1/2"	6 1/4" x 3 1/4" x 3 1/16" -	10/pk
61518-53	353	2 3/4" dia. X 7"	4" x 4" x 8 1/2"	10/pk

Magnifying Lights: Green-Lite™

EMS is proud to introduce the next generation of Magnifying Lights

Equipped with next generation, surface mount LEDs, these innovative designs create the new standard for illuminated magnifiers. Your investment in new technology quickly pays for itself through energy savings.

Made in the USA.

For more information, see page 890 >>>>



► **Mini Mailers for Temperature Sensitive Shipment**

- Compact protection for temperature sensitive shipments, ideal for serums, tissues, and reagents
- Accommodate tubes, vials, ampoules, small bottles, and tissue flasks with space for refrigerants
- Insulating, thick wall polystyrene foam construction
- Walls on model 440 are 1" thick; walls on model 312 are 1½" thick.



Cat. #	Model	Dimensions		Wall Thickness	Qty / Pk
		Inner	Outer		
61520-40	440	5½" x 4¾" x 3"	8" x 6" x 5¼"	1"	12/pk
61520-12	312*	6½" dia x 4" High	9½" x 9½" x 6¾"	1½"	4/pk

*Model 312 is in corrugated carton.

► **Mini Mailer/U-tek® Economy Packs**

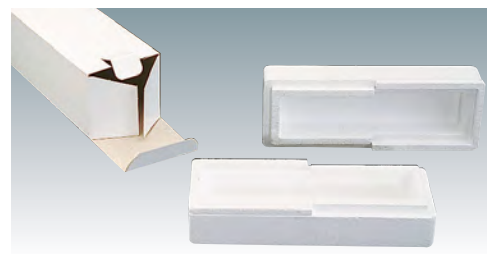
Cat. #	Model	Kit Includes	Qty.
61521-43	443	Model 440 Mini Mailer and Model 432 U-tek® refrigerant packs -23°C (-10°F)	6/pk
61521-44	444	Model 440 Mini Mailer and Model 429 U-tek® refrigerant packs -1°C (+30°F)	6/pk

► **More Mini Mailers and Accessories**

- Maximum breakage protection for non-hazardous laboratory specimens. Ideal for biological, environmental, research and development, public health, industries hygiene, and veterinary use
- Accommodate tubes, vials, bottles, petri dishes and cans
- Lightweight polystyrene foam construction saves postage
- Reusable and recyclable
- Standard mailing sleeves available



61522-05



61522-35



61522-34

Cat. #	Model	Holds	Cavity Dimensions	Mailing Sleeve	Qty.
61522-34	334	Cans, screw cap vials, tube, swabs, air filter cartridges	8" x 2¼" x 1½"	392	10/pk
61522-35	335	Specimen tubes, vials, swabs	5½" x 1½" x 1½"	336	10/pk
61522-02	402	Tubes, vials, cans, bottles. Can be used with Poly-Pad Foam cushion, to keep containers from shifting	4" x 3 ½" x 3 ¼"	372	10/pk
61522-00	400	1 or 2 standard petri dished	4" x 1½" x 4"	N/A	10/pk
61522-04	404	10 standard petri dishes	6¼" x 3¾" x 4"	403	12/pk
61522-01	601	Bottles, cans, vials, cups. Can be fitted with foam insert to hold small kit components	6" x 3" x 2 ½"	602	10/pk
61522-05	605	100 ml sample containers, 4oz urine cup	3¾" x 2¼" x 1½"	606	12/pk
61522-95	395	2 oz Boston round bottle	3¼" x 2" dia.	396	10/pk

Mailing Sleeves:

Cat. #	Model	Description	Qty	Cat. #	Model	Description	Qty.
61523-92	392	Mailing Sleeve for Model 334	10/pk	61523-06	606	Mailing Sleeve for Model 605	12/pk
61523-36	336	Mailing Sleeve for Model 335	10/pk	61523-42	442	Mailing Sleeve for Model 440	12/pk
61523-72	372	Mailing Sleeve for Model 402	10/pk	61523-41	441	Poly-Pad for Model 440	12/pk
61523-03	403	Mailing Sleeve for Model 404	12/pk	61523-96	396	Mailing Sleeve for Model 395	10/pk
61523-02	602	Corrugated Carton for Model 601	10/pk				

► **5-Bay Specimen Transport Bag**

5-bay 95kPa specimen transport bag includes absorbent material each pocket, enough to absorb 15ml of urine or 10ml of blood. This multi layer polyethylene 95 kPa bag is IATA certified, marked with biohazard symbol and detailed closing procedures.



Cat. #	Description	Qty
61525-50	Model VIAL650: 9 x 9¾" O.D. tubes; 8¾ x 1½" I.D. each pocket	20/pk

THERMOSAFE® MAILING SYSTEMS

® Tegrant Corporation, ThermoSafe Brands



► 95 kPa Transport Bag

Specimen transport bags are liquid tight and tamper evident. The patented adhesive closure and continuous seal meet or exceed standards of all major air carriers and DOT. Polyethylene construction and adhesive closure provides added security during handling by personnel.

Cat. #	Model	Description	Qty
61525-51	951	Inside dimensions 6 x 9 $\frac{1}{2}$ "	25/pk
61525-52	952	Inside dimensions 9 x 12"	25/pk
61525-53	953	Inside dimensions 9 x 16"	25/pk
61525-54	954	Inside dimensions 13 $\frac{1}{4}$ " x 17 $\frac{1}{2}$ "	10/pk

► Nylon Carrier – ThermoSafe®

Rugged lightweight totes ideal for transport of diagnostic and clinical specimens, even for field works. Washable, weather resistant nylon shell with thick-walled polystyrene foam insulation. Adjustable nylon carrying straps; for hand or shoulder carrying. Exterior may be printed with your facility name or company logo (by your own). Five models with capacities from 0.17 to 1.6 cu.ft.



Cat. #	Model	Volume Cu. ft.	Wall Thick	Dimensions L x W x H	Closure	Empty Weight	Interior	Exterior Color	Qty	
61528-78	478	0.17	2 $\frac{1}{4}$ "	6 $\frac{1}{2}$ x 5 $\frac{3}{4}$ x 7 $\frac{3}{4}$ "	11 $\frac{1}{2}$ " x 10 $\frac{1}{2}$ " x 12 $\frac{1}{2}$ "	Zipper	2.0 lb	Polys-tyrene	Blue	each
61528-54	454	0.82	1 $\frac{1}{2}$ "	17 $\frac{1}{4}$ x 10 $\frac{1}{4}$ x 8"	20" x 13 $\frac{3}{4}$ x 11"	Velcro®	3.0 lb	Nylon	Red	each
61528-55	455	0.96	2"	12 x 12 x 11 $\frac{1}{2}$ "	16 x 16 x 15 $\frac{1}{2}$ "	Bayonet Style Clip	3.5 lb	Nylon	Red	each
61528-58	458	1.0	1 $\frac{1}{2}$ "	17 $\frac{1}{2}$ " x 10 $\frac{1}{8}$ " x 10 $\frac{1}{8}$ "	20 $\frac{1}{4}$ " x 13 $\frac{1}{4}$ " x 13 $\frac{3}{4}$ "	Velcro®	3.0 lb	Nylon	Red	each
61528-59	459	1.6	1 $\frac{1}{2}$ "	17 x 9 $\frac{1}{8}$ " x 16 $\frac{1}{2}$ "	20 $\frac{1}{2}$ " x 13 $\frac{1}{4}$ " x 19 $\frac{1}{2}$ "	Bayonet Style Clip	4.5 lb	Nylon	Red	each

► Infectious Shippers – ThermoSafe®

■ Meet US Dept of Transportation (DOT) and IATA requirement for transporting infectious substances (UN2814 and UN 2900)

■ 4 Models – Accommodate shipments from 4-60 6 tubes/vials

■ Pre-assembled packaging includes everything needed for shipping infectious agents in accordance with DOT Regulation 49CFR Parts 171 to 178 and IATA Packaging Instructions 602.

Note: Compliance with UN/DOT regulations governing shipments of infectious substances in these approved shippers is contingent on the use of all supplied components. The shipper is ultimately responsible for determining the suitability of packaging for use with contents. Consult appropriate regulations.

"infecon" is a Trademark of Com-Pac International, Inc.

► Infectious Shipper – Model 630

ThermoSafe shippers include EPS foam container, flexible foam insert, clear plastic press-lock bag, secondary packaging and absorbent material for full capacity of blood, corrugated carton, and packaging instructions.

► Dry Ice Overpack – Model 670

Substance Shippers protect frozen samples for over four days. The EPS foam container and lid accommodates either Model 630 or Model 660B shipper plus 25 pounds of dry ice. Foam insert holds in place while dry ice sublimates. Includes one Class 9 Miscellaneous Dangerous Goods label (for dry ice) and shipping carton (Dry ice NOT included)



61535-30



61535-10

► Infectious Shipper – Model INF3000

Infectious shippers include pressure vessel with stop-lock lid, compartmentalized bubble pouch, 50 ml absorbent sheet, corrugate outer carton with required markings, shipper's declarations and easy-to-follow instructions.



61535-70

Cat. #	Model	Vessel Dimensions	Internal Cushioning	Capacity	Outer Measures L x W x H	Additional Features	Qty
61535-30	630	Aluminum can, 3 x 6"	Foam insert	Four 16 x 100 mm tubes	5 $\frac{1}{2}$ " x 5 $\frac{1}{2}$ " x 11 $\frac{1}{4}$ "	Includes 4 x 10ml blood collection tubes	2/pk
61535-60B	660B	Aluminum can, 3 x 6"	Absorbent material, flexible pressure vessel & bubble wrap	Six 16 x 100 mm tubes max. volume 60ml	5 $\frac{1}{2}$ " x 5 $\frac{1}{2}$ " x 11 $\frac{1}{4}$ "	Flexible pressure vessel accepts various size tubes	2/pk
61535-70	670	N/A	EPS Insulated Shipper	Overpack for Models 630 & 660B	14"x14"x14 $\frac{1}{2}$ "	Foam insert holds up to 25 lbs of dry ice in place	2/pk
61535-05	INF2000	0.5 L transparent container	Compartmentalized bubble pouch	Six tubes	4" x 4" x 6 $\frac{3}{4}$ "	Liquid-tight container withstands up to 95kPa pressure	2/pk
61535-10	INF 3000	1.0L transparent container	Compartmentalized bubble pouch	Up to 50 MI	6 $\frac{1}{4}$ " x 6 $\frac{1}{4}$ " x 7 $\frac{1}{2}$ "	Liquid tight container withstands up to 95kPa pressure; vessel is autoclavable for re-use	2/pk

► **U-tek® - Ice-Packets**

Cushion fragile shipments, won't dilute ice baths or damage samples. They remain frozen longer than regular ice without the melting mess.

- May be refrozen and reuse, withstands pressure of 60 lb per square inch for 5 minutes or longer
- Refrigerant contains neutral pH distilled deionized water and proprietary materials certified by the US Food and Drug Administration as food grade chemicals; -1°C / +30°F-



61533-06



61533-05

Cat. #	Model	Style	Description	Qty
61533-05	405	Mat	1 -16" x 2 ft sheet	1/pk
61533-06	406J	Single	Individual Packet	100/pk

► **U-tek® -Blue-Ice**

Superior protection for shipping temperature sensitive materials. Maintains critical temperatures of serums, test samples, live or frozen tissues, organs and pharmaceutical for extended periods. Laminated, metalized film exterior provides radiant heat barrier and resists punctures. U-Tek® -50°C / -58°F ultra low, high-tech phase change formula is ideal for products which require extreme cold but may not tolerance dry ice or CO₂. Eliminate dry ice hazmat hassles.



Cat. #	Model	Formula	Weight	Dimension	
				L x W x H	Qty
61530-29	429	-1°C (+30°F)	8 oz	6" x 8" x ¾"	6/pk
61530-12	412	-1°C (+30°F)	12 oz	6½" x 4" x 1"	6/pk
61530-96	596	-1°C (+30°F)	16 oz	6½" x 6½" x ¾"	4/pk
61530-14	414	-1°C (+30°F)	24 oz	7½" x 6½" x 1"	4/pk
61531-32	432	-23°C (-10°F)	8 oz	6" x 4" x ¾"	6/pk
61531-18	418	-23°C (-10°F)	12 oz	6¾" x 4" x 1"	6/pk
61531-97	597	-23°C (-10°F)	16 oz	6½" x 6½" x ¾"	4/pk
61531-20	420	-23°C (-10°F)	24oz	7½" x 6½" x 1"	4/pk
61532-60	760	-50°C (-58°F)	24 oz	6½" x 6½" x 1"	4/pk
61532-61	761	-50°C (-58°F)	32 oz	9½" x 7¼" x 1"	4/pk

► **Insulated Shipper – ThermoSafe®**

© Tegant Corporation, ThermoSafe Brands

These shippers and containers offer the ideal solution for the safe storage and delivery of most refrigerated or frozen materials, including pharmaceuticals, laboratory specimens, serum and vaccines, human organs, culture packs, and nuclear and isotope materials.

When shipping dry ice or utilizing dry ice as a refrigerant, these shippers provide excellent dry ice sublimation – average dry ice usage in 1½" thick wall units is 5 lbs for the first 24 hours; 3 – 4 lbs thereafter.



61536-41

Cat. #	Model #	Construction	Dimensions L x W x H		Wall Thickness	Qty/pk
			Inner	Outer		
61536-11	411	Foam Box only	8" x 5½" x 7"	11" x 9" x 10"	1½"	2/pk
61536-41	413*	Foam & Carton	8" x 5½" x 7"	11" x 9" x 10"	1½"	2/pk
61536-19	319	Foam Box only	8" x 5½" x 8½"	11" x 9" x 11½"	1½"	2/pk
61536-21	321*	Foam & Carton	8" x 5½" x 8½"	11" x 9" x 11½"	1½"	2/pk
61536-16	316	Foam Box only	8" x 6" x 4¼"	11" x 9" x 7¼"	1½"	2/pk
61536-18	318*	Foam & Carton	8" x 6" x 4¼"	11" x 9" x 7¼"	1½"	2/pk
61536-46	446	Foam Box only	10" x 10" x 7"	14" x 14" x 10"	1¾"	1/pk
61536-48	448*	Foam & Carton	10" x 10" x 7"	14" x 14" x 10"	1¾"	1/pk
61536-89	489	Foam Box only	11¼" x 10" x 5"	15" x 13¼" x 9 x 16"	1½"	1/pk
61536-90	490*	Foam & Carton	11¼" x 10" x 5"	15" x 13¼" x 9 x 16"	1½"	1/pk
61536-12	612	Foam Box only	12½" x 12½" x 9"	15½" x 15½" x 12"	1½"	1/pk
61536-13	613*	Foam & Carton	12½" x 12½" x 9"	15½" x 15½" x 12"	1½"	1/pk
61536-14	614	Foam Box only	12½" x 12½" x 12"	15½" x 15½" x 15"	1½"	1/pk
61536-15	615*	Foam & Carton	12½" x 12½" x 12"	15½" x 15½" x 15"	1½"	1/pk
61536-31	313*	Foam & Carton	4½" Dia x 7½"H	7¼" x 7¼" x 9"	1½"	2/pk

*These foam box sets suit for shipping by UPS or other carriers.

THERMOSAFE® MAILING SYSTEMS

® Tegrant Corporation, ThermoSafe Brands

► Medical Transporters – ThermoSafe®

Insulated expanded polypropylene medical transporter is ideal for on-site collection, storage, and transport of temperature sensitive specimens, medications, medical devices and organs.

- Durable nylon clad transporter
- Stain and impact resistant expanded polyethylene container
- Lightweight – ergonomic design
- Extra space for crushed ice and refrigerant gel pack
- Washable, weather-resistant.

Model 931, 932

Includes removable, rigid, thermoformed tray—ideal for washing and reusing; prevents leaking inside and out of transport unit, reinforced durability. Adjustable, durable carrying strap for shoulder transport.



61537-31

Model 932: also features a comfortable sturdy hand strap.

Model 931: 0.3 cu. ft volume and 3/8" wall thickness

Model 932: 0.53 cu. ft. volume and 3/8" wall thickness

Model 960

For mobile blood collection, cools and stores whole blood units and other temperature sensitive materials



61537-60

- Qualified by ISC labs for temporary storage and transport of both platelet (20°C – 24°C for up to 8 hours) and non-platelet production (1°C – 10°C for up to 24 hours) whole blood with crushed wet ice.

■ Includes operating instructions and test data for cooling platelet and non-platelet production blood.

■ Volume: 1.60 cu. ft. and 1" wall thickness



61537-30

Model 930

For operating rooms storage and blood bank transport, provides temperature control for packed red blood cells and other temperature sensitive specimens

- Qualified by ISC labs for temporary storage and transport of packed red blood cells with three 32oz Polar Pack Rigid Bottle refrigerant and two 16oz Polar Pack refrigerant.

■ Maintains up to 8 packed red blood cell units at 1°C – 6°C while in storage for 6 hours or more and between 1°C – 10°C while in transit for up to 24 hours.

■ Including operating instruction and test data for storage of packed cells.

■ Volume: 0.95 cu.ft. and 1" wall thickness



Model 640, 641

Inner partition divides unit and separates specimens. Features built-in lid compartments for U-tec refrigerant packs. Adjustable nylon carrying strap for hand or shoulder. Model 641 includes a vial foam insert that holds twenty four 5–15ml vials and one model 418 U-tec®

Volume is 0.30 cu. ft. with 1/4" wall thickness.



61537-40



61537-41

Cat. #	Model #	Blood Unit Capacity	Dimensions L x W x H		Empty Weight	Qty
			Inside	Outside		
61537-31	931	N/A	6" x 9" x 9 1/2"	6 1/2" x 9 1/4" x 10 1/4"	2 lbs	1/pk
61537-40	640	N/A	10 1/4" x 7 1/4" x 8"	10 3/4" x 7 3/4" x 8 1/2"	1 lb	1/pk
61537-41	641	N/A	10 1/4" x 7 1/4" x 8"	10 3/4" x 7 3/4" x 8 1/2"	1 lb	1/pk
61537-32	932	N/A	8 3/4" x 11 x 9 1/2"	9 3/4" x 12 1/4" x 10 1/4"	2 lbs	1/pk
61537-30	930	8	15 3/4" x 10 3/4" x 12 3/4"	17 3/4" x 12 3/4" x 13 3/4"	7.1 lbs	1/pk
61537-LN	930LINER	Replacement liner for Model 930			—	1/pk
61537-60	960	16	15 3/4" x 10 3/4" x 22 3/4"	17 3/4" x 12 3/4" x 24 3/4"	12.2 lbs	1/pk
61538	960Dolly	—	—	—	4 lbs	1/pk

SECTION 11

Specimen Preparation and Embedding Supplies

General Supplies

Beakers and Bottles

Vials, Racks, Holders, and Lyophilization Containers

Plastic, Pasteboard, and Cocoon Boxes

Sample Storage Sets, Membrane Boxes, and Gel-Pak®

Embedding Capsules and Holders

Biopsy Pads, Cloth, Lens Tissues, Towels

Scribers, Slide Coating, and Release Agents

Molds, Chucks, and Holders

Weighing Boats, Canoes, Dishes, and Paper

Glass Knife Making Supplies

Laboratory Gloves

Ultramicrotomy Aid Tools

Cell Culture, Petri, Permanox Dishes, and Seals

Tissue Grinders

Lab-Tek® Chamber Slide Products

Wells, Plates, Covers, Tissue Culture Inserts

Mica Sheets and Disks

ACLAR®—Fluoropolymer Films

Pipettes and Pipette Fillers

Razor Blades, Scapels, and Saws

Tissue Matrices and Sampling Tools

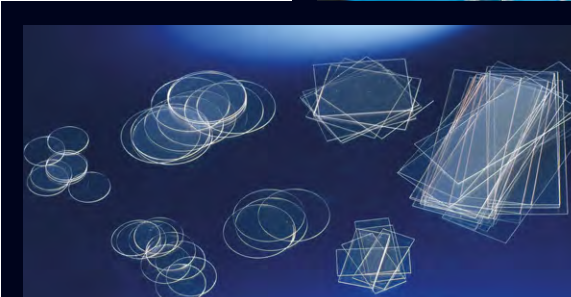
Microscope Slides, Cover Glasses, and Coverslips, Accessories

Microscope Slide Storage Boxes, Trays, Holders, and Mailers

Microarrays and Hybridization

Filtration, Filters, Syringes, and Hypodermic Needles, Swabs

Gel Electrophoresis and X-ray Autography



**Electron
Microscopy
Sciences**

GENERAL SUPPLIES

Handle Your Ampoules Safely...**► Break-Safe™ Ampoule Opener**

EMS Introduces Break-Safe™ allowing you to safely open up to 3 ampoules at one time

Box style design allows one handed opening of up to 3 ampoules at a time. Gently pressing down on the lid snaps ampoule necks clean while keeping them contained within the device and away from fingers. After removing ampoule contents, simply turn the device upside down over a trash receptacle to safely discard ampoules and tops.

Features:

- 4 inserts allow opening of 1ml, 2ml, 5ml and 10 ml ampoules
- Open ampoules easily and safely
- Transparency allows unobstructed viewing of ampoule contents at all times
- Copolyester plastic construction has broad chemical resistance



60607 Break-Safe™ Ampoule Opener each

► Ampoule Breaker; Soft Silicone

EMS EXCLUSIVE Reusable – Made from soft silicone. It offers a simple way to break pre-scored glass ampoules safely. Accommodates 5, 7, and 10 ml size ampoules. Reduces injury and spillage.



60600 Ampoule Breaker; Soft Silicone each

► Ampoule Cracker™

The Ampoule Cracker™ is a disposable plastic fracture and safety collar, which is specially designed to aid in the breaking open of pre-scored glass ampoules. Simply slip the Ampoule Cracker™ over the top at the pre-scored portion, snap it, and discard both the ampoule top and the safety collar to prevent cross contamination.



Cat #	Description	Pack
60605-04	Ampoule Cracker for Ampoule Size 1 – 4 ml	500/pk
60605-10	Ampoule Cracker for Ampoule Size 5 – 10 ml	500/pk
60605-20	Ampoule Cracker for Ampoule Size 10 – 20 ml	500/pk

► Aluminum Foil

Heavy duty foil, packed in a convenient box. Can be self cut to any length you desire. Comes 12" width, 500 ft. long each roll.



60400 Aluminum Foil each

► Apron; Disposable

A plastic, full length, bib-type apron. Handy protection in a compact envelope. Smooth finish, size 28" x 46". (71cm x 117cm; 1½ mil thick)



60900 Apron 100/bx

► Atomizer Rubber Bulb

A natural rubber bulb with 4" tubing on one end. Used for dusting surfaces which should not be wiped. A



two-way valve is inserted into one end to prevent suck back and a rubber nozzle prevents scratches on the surface that have to be cleaned. This device also reduces the need for freon dusters.

	TYPE A	TYPE B
Capacity	75cc	45cc
Center Diameter	53mm	52mm
Length without valve and tube	105mm	62mm
Base Diameter	–	35mm

60804 Atomizer Type A each
60806 Atomizer Type B each

► Easy Duster

EMS is pleased to release this small hand held device which easily blows clean air when the Duster is squeezed eliminating the need for dusting rags, brushes and even Duster compressed gas cans.



60805 Easy Duster each

► Cutemol Cream; Protective Hand Cream

Contains five skin softening compounds, plus allantoin to relieve dry, fissuring, peeling, chapped, or irritated skin.

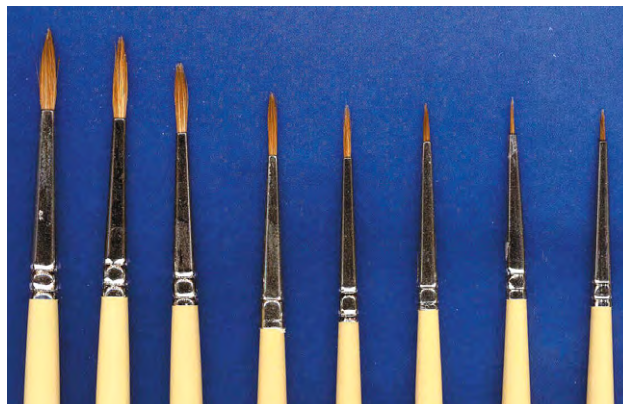
EMS EXCLUSIVE

70550 Cutemol Cream 50g

GENERAL SUPPLIES

► **Brush; Red Sable**

Extremely soft and pliable. Perfect for the manipulation of pre-viously fixed, dehy-drated specimens into embedding capsules or molds.



Cat #	Description	Pack
66100-50	Brush, Red Sable, Size #5/0	each
66100-30	Brush, Red Sable, Size #3/0	each
66100-20	Brush, Red Sable, Size #2/0	each
66100-00	Brush, Red Sable, Size #0	each
66100-01	Brush, Red Sable, Size #1	each
66100-02	Brush, Red Sable, Size #2	each
66100-03	Brush, Red Sable, Size #3	each
66105*	Brush, Red Sable, Set of 3	set

*Set of 3 sizes: #2/0 (fine point), #1 (small), and #3 (medium)

► **Stirring Rods**

Available in two versions: pure PTFE solid rod with tapered end and pure PTFE with bendable steel core. The version with steel core can be bent into a permanent shape. Rods are inert and will not scratch, use up to 280°C.



Cat #	Rod Length	Rod OD, mm	Qty
PTFE with Steel Core Rods			
66200-10	100 mm (4")	6	each
66200-15	150 mm (6")	6	each
66200-20	200 mm (8")	6	each
66200-25	250 mm (10")	6	each
66200-30	300 mm (12")	6	each
66200-35	350 mm (14")	6	each
66200-40	400 mm (16")	6	each
Solid PTFE Rods			
66201-10	100 mm (4")	8	each
66201-15	150 mm (6")	8	each
66201-20	200 mm (8")	8	each
66201-25	250 mm (10")	8	each
66201-30	300 mm (12")	8	each

► **Camel Hair Brushes**

Useful for dusting and cleaning embedding center, balances, and sensitive instruments. Camel hair is mounted on wooden handle with metal ferrule. Available with three styles:

- Round, camel hair portion has full body and slightly pointed tip. Brush size 3/4" diameter x 1 1/2" long. Overall length is 9".
- Paint brush style 1, camel hair portion is 1" long x 1" wide. Overall 6" long.
- Paint brush style 2, camel hair portion is 1 1/4" long x 2" wide. Overall 8 1/4" long.



Cat. #	Description	Pack
65575-01	Camel Hair Round Brush	each
65576-01	Camel Hair Paint Brush, Style 1	each
65577-01	Camel Hair Paint Brush, Style 2	each

► **Scratch Brushes with Metal Ferrules**



These pen shaped handles are available in four different types. They are offered with metal ferrules for improved durability. Used for fine deburring, polishing, as well as rust removal and the cleaning and removal of deposited wax.

The overall length is 4 1/4" long, and the brush is 1/8" wide. Refills are available and are packaged 12/box.

Brush Material	Cat.# Complete Brush	Pack	Refill	Cat.# for Pack
Steel Ferrules Brush	65582-01	each	65582-R1	12/pk
Nylon Ferrules Brush	65582-03	each	65582-R3	12/pk
Fiberglass Brush	65582-05	each	65582-R5	12/pk
Brass Brush	65582-07	each	65582-R7	12/pk

GENERAL SUPPLIES

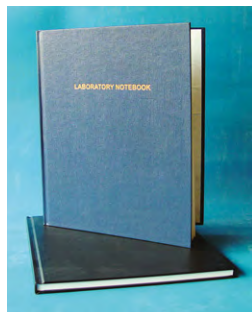
► Notebooks, PolyPaper®

PolyPaper® is a Trademark of Nalgene® for a special spunbonded polyethylene "paper" designed for exceptional strength and resistance to moisture and chemicals. Records written or printed on PolyPaper® are virtually indestructible. PolyPaper® outperforms conventional papers, even with special coatings. It is unaffected by fresh or salt water. The non-absorbent, lint-free material resists mildew, tearing, fraying, curling, aging and discoloration. Chemical spills rinse off easily. PolyPaper® accepts any writing device. You can even write on it with No. 2 pencil under water.

► Laboratory Notebooks

Valuable notes and data are permanently secured in these hand cover, case-bound books – important for documenting research.

- Thick polyethylene cover, uncoated PolyPaper® pages
- Waterproof, and extremely chemical resistant
- 50 sheets are numbered and printed with a fine green ¼", grid or horizontal 3 lines per inch
- Pages include spaces for dates and signatures of workers and witnesses, for securing patent protection, measures: 9¼" x 11¼" (235 x 286mm)
- Other pages include instructions for keeping research records, table of contents, and the page for issuing the notebook



Cat. #	Mfr. #	Cover Color	Qty
38020-10	6300-1000	Lab Notebook, Black	each
38020-20	6300-2000	Lab Notebook, Blue	each

► Spiral Field Notebook

Coated PolyPaper® pages – Blue polyethylene cover

- Flexible yet durable cover, with sheets permanently bound with spiral binding
- Chemical and moisture resistance ideal for fieldwork
- Pages are printed on both sides with a fine green ¼" grid and numbered 1 through 96
- Title and table of contents pages. Each page has space for date and signatures of workers and witnesses to research records
- Page measures 9" x 11¼" (229 x 286 mm)



Cat. #	Mfr. #	Description	Qty
38021-10	6303-1000	Field Notebook	each

► Laboratory Paper Notebooks

Paper pages – Water Resistant Cover

- These notebooks feature permanently bound pages with grid lines
- Acid free pages with spaces for dates, title, project number, book number, and witness signatures
- Each Notebook contains periodic and conversion tables in the back
- Admissible as court evidence when used as prescribed by law
- Page measures: 8½" x 11" (216 x 279 mm)



Cat. #	Description	Qty
38025-10	Laboratory Notebook, 100 pages	each
38025-20	Laboratory Notebook, 200 pages	each

► Tissue Adhesive

Permabond 910.

Contains cyanoacrylate ester. Immediate bonding of biological specimens. It is not water soluble. Used for mounting specimens for Vibratome sectioning.



RT	72590	Tissue Adhesive	10z
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► Quick Bond

An ultra fast, room temperature curing adhesive; a cyanoacrylate monomer. It bonds with virtually no shrinkage to almost any non porous surface except fluorocarbons. Comes in a convenient dispensing tube, 2g each.



RT	72588	Quick Bond	5/pk
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► Mascot® Instant Adhesive



A gel type, no-drip formula that fills the gaps and is ideal for use on vertical surfaces. A high performance, extended range cyanoacrylate adhesive that bonds metals, most plastics, rubber, ceramics, and glass, in seconds. It is optically transparent and sets in about 30 seconds depending upon the objects being joints. Pack 0.1 oz (3g) per dispensing tube.

RT	72587-01	Mascot® Instant Adhesive	3g
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For all other Adhesives and Mountants, See Chemicals Section, pages 9-21 >>>>

► Tri-Corn Beakers; *Plastic, Disposable*

Three dripless pouring spouts. Resistant to most chemicals. Autoclavable —The beakers can withstand temperatures up to 121°C. Metric graduations.

Cat.#	Size ml	Graduations ml	Height mm	Diameter mm	Pack
60968	50ml	5ml	55mm	44mm	100/pk
60970	100ml	10ml	73mm	53mm	100/pk
60972	250ml	10ml	90mm	72mm	100/pk
60974	400ml	20ml	110mm	80mm	100/pk
60976	800ml	50ml	134mm	107mm	100/pk
60978	1000ml	50ml	147mm	112mm	100/pk



► Beakers Staccup; *Plastic, Disposable*

- Resistant to most chemicals.
- Anti-drip ridge.
- Frosted marking area.
- Heavy gauge polypropylene.
- Customary and metric graduations.
- Suitable for parafilm cover.

60950	Staccup 120cc	25/pk
60952	Staccup 120cc	100/pk
60960	Staccup 500cc	25/pk
60962	Staccup 500cc	100/pk



► Tri-Corn Beaker Caps

The caps are available for all Tri-Corn beakers. The caps are wax impregnated, have lift-tabs, and may be written on for sample identification.

60969	Cap for 50ml Beaker	500/pk
60971	Cap for 100ml Beaker	500/pk
60973	Cap for 250ml Beaker	500/pk
60975	Cap for 400ml Beaker	500/pk
60977	Cap for 800ml Beaker	250/pk
60979	Cap for 1000ml Beaker	250/pk



► Discups™; Disposable Paper Beakers

With environmental awareness in mind these disposable paper beakers create less waste and is as economical as plastic.

- Graduated in English and Metric units (1/2 oz. or 10cc increments).
- Very economical.
- Made from unwaxed, plain finished paper.
- Most popular size: 4 oz. (120 ml)

60954-10	Discups™, 120cc	100/pk
60954-20	Polystyrene Lids	100/pk



► Beakers PTFE®

Is statically molded from virgin PTFE and machine finished to give a smooth surface for ease of cleaning and to eliminate contamination. Supplied with a pouring spout and they are virtually immune to chemical attack. Working temperature range is from cryogenic to 260°C (500°F). Ideal for use in wafer etching.

Beaker	Catalog #	Capacity ml	Inside Measures mm	Height	Diameter
60936	60936-C	1	18	10	
60938	60938-C	5	26	17	
60940	60940-C	10	33	21	
60941	60941-C	25	47	28	
60942	60942-C	50	58	38	
60944	60944-C	100	70	48	
60946	60946-C	250	95	60	
60947	60947-C	400	106	73	
60948	60948-C	500	125	73	
60949-06	60949-06C	600	127	80	
60949-10	60949-10C	1000	155	92	
60949-20	60949-20C	2000	200	114	



► Thermotech™ PTFE Beakers

This product features a unique combination of a pure PTFE Body with a specially formulated stabilized PTFE-Carbon base as a single molding to give the following:

- A totally inert pure PTFE inner surface
- Heatable to 270°C without distortion
- Improved heat transfer

All PTFE Beaker caps can be used for same-sized Thermotech™ PTFE Beakers.



EMS #	Description	Qty
60930-10	Thermotech, 100ml, 74mm H x 56mmOD	each
60930-25	Thermotech, 250ml, 94mm H x 75mmOD	each
60930-40	Thermotech, 400ml, 112mm H x 85mmOD	each

► Beaker-Store; Instrument Store

For the first time EMS introduces a unique beaker with a silicone bottom that allows you to store all of your tweezers and tools in cleaning solution and never damage the tips.

Instruments may be placed in the beaker with the tips only immersed in distilled water and or cleaning solution. This allows the instruments to be kept clean and safe and ready to use. The Silicone bottom prevents the tips of the instruments from being damaged and the top of the beaker is compartmentalized and segmented allowing for each tool to be kept separate.

The beaker measures 10 cm in diameter and it is 8 cm in height.

Cat. #	Description	Qty.
68113-05	Beaker Store	each



► Bio-Pure™ Sure-Footed Beakers

100% Biodegradable

- Sure-Footed - Innovative outer beaker base ensures stability with small volumes of liquid.
- Biodegradable - Made from the same environmentally conscious Bio-PET as our Bio-Pure reservoirs.
- Thermally Insulating - Air void allows beakers to hold liquid temperatures 30% longer than standard polypropylene beakers
- Unique Pipet Rest - Diametrically opposed grooves act as a pipet rest when not in use



Alternate Uses:

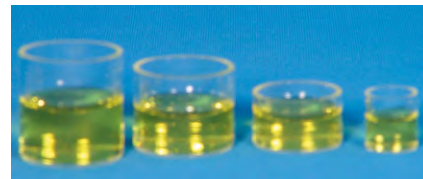
- The thermal retentive characteristics of the Sure-Footed Beaker allow it to be used as a small bucket for ice/dry ice.
- Allow beaker to sink in a water bath by piercing or melting a ventilation hole in the beaker rim.
- Beakers may be covered or piggybacked to increase thermal insulation.



Cat #	Description	Size ml	Qty
68553	Sure-Footed Beaker	250 ml	50/pk

► Glass Microbeakers

For the processing of micro-samples and for visual or microscopic examination, staining, fixation, infiltration, liquid evaporation, bacterial growth, weighing, etc...



Cat.#	Size (ml)	Dia x Hgt (mm)	Pack
60980	1ml	12mm x 13mm	100/bx
60982	2.5ml	21mm x 13mm	100/bx
60984	5ml	25mm x 19mm	100/bx
60986	7.5ml	25mm x 25mm	100/bx

► Microbeaker Holder

Brushed aluminum rack holds six 12mm O.D. microbeakers in unique, stepped "see-through" holes for illuminated and microscopic observation of samples.



Cat #	Description	Qty
72645	For 12mm OD. Beakers	each
72645-10	For 22mm & 25mm OD. Beakers	each

Safety Bulb, See page 292 >>>>

Bulbs; Rubber, See page 292 >>>>

► Glass Sample Bottles With Plastic Snap Cap

For collecting and exhibiting a wide variety of specimens in the lab or field. Caps snap over a special sealing ring to form an effective barrier to moisture, making these bottles especially suitable for hydroscopic materials.

Note: The following sizes are also available: 30, 40, 48, 60, 90, 120, and 180 ml. Please call for prices and availability.



Cat.#	ml	Dia. x Ht, mm	Cap Size	Pack
64250	4	23 x 27	22 mm	144/pk
64252	8	22 x 39	22 mm	144/pk
64254	12	22 x 51	22 mm	144/pk
64256	16	30 x 40	30 mm	144/pk
64258	24	30 x 52	30 mm	144/pk
64260	32	30 x 63	30 mm	144/pk

► Replacement Snap Caps for the above bottles:

Cat.#	Description	Pack
64251-22	Natural Polyethylene Snap Cap Size 22 mm	200/pk
64257-30	Natural Polyethylene Snap Cap Size 30 mm	200/pk

► Sample Bottles, PVC Transparent

These lightweight transparent PVC sample bottles come with snap-on tight-fitting caps and they offer excellent clarity, durability, and good chemical resistance.

Maximum temperature -20°C (-4°F) to 80°C (176°F).



Cat.#	Capacity (ml)	Neck Opening, (mm)	Height (mm)	Pack
64264-03	30	25	48	50/pk
64264-05	50	36	60	50/pk
64264-10	100	34	75	50/pk

► Fluid Dispenser Bottles

These ESD safe polyethylene solvent dispensers are available in three standard sizes. These dispensers have neither a stopper nor a cap to remove. Just touch the dispensing dish with a brush

cloth or applicator and solvent is brought to the surface instantly as needed. Stainless steel valves seal contents in bottle until used. The fluid pumps into the dish and it does not drip back into the bottle, keeping stored liquids uncontaminated. Surface resistivity of 10E⁷ to 10E⁹



Catalog #	Description	Qty/Box
64299-01	Fluid Dispenser, 120 ml	each
64299-02	Fluid Dispenser, 180 ml	each
64299-03	Fluid Dispenser, 240 ml	each



► Volume Labeled Narrow Mouth Wash Bottles

The volume (in millimeter) of each polyethylene wash bottle is silk screened in highly visible and chemical resistant ink. All have one piece polypropylene cap and nozzle assemblies. 4/pack.

64172	500 ml (16oz)	28mm Cap	4/pk
64173	1000 ml (32oz)	38mm Cap	4/pk

► Wash Bottles; Permanently Labeled

Permanently Labeled/Color-Coded Wash Bottles. These safe wash bottles, which are permanently labeled and color-coded, eliminate the risk of dispensing the wrong liquid by mistake. All of these wide-mouth (easy transfer liquid) polyethylene bottles have polyalomer caps and a fine-tip-nozzle that may be cut back for heavier flow.

Capacity is 16 oz (500ml), low density polyethylene.



64150	Acetone Wash Bottle	each
64151	Acetonitrile Wash Bottle	each
64153	Dichloromethane* Wash Bottle	each
64154	Ethanol Wash Bottle	each
64155	Ethyl Acetate Wash Bottle	each
64157	Isopropyl Alcohol Wash Bottle	each
64158	Methanol Wash Bottle	each
64159	MEK Wash Bottle	each
64161	Soap Wash Bottle	each
64162	Toluene* Wash Bottle	each
64165	Water Wash Bottle	each

Group of Six - Variety includes: Acetone, Methanol, Water, Iso-propyl Alcohol, Ethanol and Toluene*

64167	Group of Six - Variety	6/pk
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*Short term storage only

► Dispensing Bottles

Made from low-density polyethylene with a dropper closure and captive cap. The tip has a 0.003" (0.76mm) opening. The bottles are supplied capped in shrink-wrapped packs of ten.



Cat.#	ml	Dia. X Ht, mm	Pack
64290	30	31 x 115	10/pk
64292	60	39 x 128	10/pk
64294	150	50 x 144	10/pk
64295	250	59 x 176	10/pk
64296	500	74 x 196	10/pk

► Measure-Matic™ Dispenser

Makes repeated measuring and pouring easy!

- Adjustable for volumes from 5ml to 25ml
- Just squeeze and check the fluid level
- Dust cover included

To use:

Adjust the dispensing cup to the desired volume, then squeeze the 500ml (16 oz) reservoir bottle.

The desired volume of liquid will flow through the tube and into the cup.

Excess liquid will flow back into the reservoir bottle.



Cup and closure are made of rugged polypropylene

Reservoir bottle is made of squeezable low-density polyethylene

Cat. #	Description	Qty.
64299-08	Measure-Matic™ Dispenser	each

► Acid Pump/Reagent Dispenser

Dispense dangerous liquids safely and easily — no pouring!

Fits many different containers, including: 2.5 liter, 4 liter, 5 pint (80 fl. oz), 1/2-gallon, 1-gallon

- Reduces spills and potential for breakage and injury
- Two adapters included for short neck bottles.

Large bottle (pictured) not included.

Includes:

Dispenser Body:

Threads directly to bottles with GPS No. 38-430 or 38-400 threads

Outlet Tube:

A short length of 3/8" diameter polyethylene tube is supplied for the outlet.

Polyethylene Tubing:

1/4" O.D. included. Cut to required length and insert into the underside of the dispenser body.



Light pressure on the relief valve button on top of the dispenser quickly stops the flow of liquid.

Rapid but light finger tip squeezes on the small bottle will start fluid dispensing from the short tube.

Cat. #	Description	Qty.
64299-12	Acid Pump/Reagent Dispenser	each

► Autoclavable Carboys

Ideal for storing and dispensing large batches of double-distilled water, buffers and salts

- Excellent chemical resistance
- Large handles assist in transport
- Molded-in bung accepts easy-to-use polypropylene spigot
- 83mm polypropylene buttress screw cap includes a built-in silicone gasket for positive seal
- Steam autoclavable 121° C (250° F)
- Rugged polypropylene construction
- Spigot can be operated with one hand

FDA grade polypropylene compliant with 21CFR177.1520 for direct contact with food and beverages

USP Class VI Certified

Note: When autoclaving, do not engage cap threads.

Cat. #	Description	Qty.
64299-13	10 liters (2.5 gallons) with spigot	each
64299-14	20 liters (5.0 gallons) with spigot	each
64299-15	10 liters (2.5 gallons) without spigot	each
64299-16	20 liters (5.0 gallons) without spigot	each
64299-17	Replacement spigot for 64299-13 and 64299-14	each



► Carboy with Handle and Screw Cap

Gasketed closure for leakproof shipping and storage

- Smooth interior surfaces facilitate complete drainage
- Knurled cap creates a positive grip for secure tightening
- Smooth exterior accepts adhesive labels and can be marked with most indelible markers
- Rugged polyethylene resists acids and alkalis

Capacity:20 liters (5 US gal)
 Diameter:28cm (10.90")
 Height:49.8cm (19.6")
 Cap:83mm

Cat. #	Description	Qty.
64299-26	Carboy with Handle and Screw Cap	each



► Bellows Dropping Bottle (LDPE)

A low density polyethylene (LDPE) bottle supplied with a removable bellow-type dropping pipette. The pipettes are graduated for nominal indication of amount of liquid being drawn. Bellows-shaped bulb makes for easy use and provides excellent drop formation.

Cat.#	ml	Dia. X Ht, mm	Cap Size	Pack
64298-02	60	38 x 86	18 mm	10/pk
64298-04	125	48 x 108	24 mm	10/pk
64298-08	250	60 x 136	24 mm	10/pk

► Narrow Mouth Ground Glass Stoppered Bottles

New designed Ground Glass Stoppered Bottles feature a no-drip pour lip for clean pouring of contents. The most preferred container for storage of prepared chemicals, and stock solutions. Octagon-shaped ground glass stopper is included. The borosilicate '400' glass offers a high degree of protection from leaching and the amber '500' glass gives extra protection to light-sensitive contents.

Capacity ml	Dia.xHgt. (mm) (w/stopper on)	Stopper Size	Clear Glass Cat#	Amber Glass Cat#	Pack
250	72 x 145	19/26	64202-C	64202-A	4/pk
500	88 x 175	24/29	64204-C	64204-A	4/pk
1000	110 x 215	29/32	64206-C	-	2/pk
2000	135 x 265	29/32	64207-C	-	each
5000	175 x 320	45/40	64209-C	-	each



► Mounting Media/Canada Balsam Bottles

Ideal for applying mounting media. The bottle comes with a glass applicator rod and glass cap. Cap is ground to the shoulder of the bottle to form a seal. Made from soda lime glass. 100 ml capacity.

Cat.#	Description	Pack
64211-01	Balsam Bottle, 100 ml	each
64211-06	Balsam Bottle, 100 ml	6/pk



► Barnes Dropping Bottles

The lower portion of the rubber bulb forms a tightly fitted stopper. Wheaton "400" borosilicate glass (meets USP Type I standards).

Average drop size is 46µl.

Bottle measures: 35 mm dia. x 103 mm high; 30 ml capacity.

The bottles can be autoclaved with either dry heat or chemicals.

The bulb and the pipette can be autoclaved in gas only.

Cat.#	Description	Pack
64215-01	Barnes Dropping Bottle	6/pk
64215-50	Replacement Bulb Only	10/pk
64215-55	Replacement Bulb and Pipette	10/pk



► All Glass Dropping Bottles

These bottles deliver stains and indicator solutions drop by drop from a projecting drip tip on the side of the stopper. A partial turn of the ground glass stopper will seal the bottle.

Cat.#	Type	Size (ml)	Measurements Dia. x Hgt. (mm)	Pack
64220-05	Clear	50	45 x 95	4/pk
64220-10	Clear	100	56 x 120	4/pk

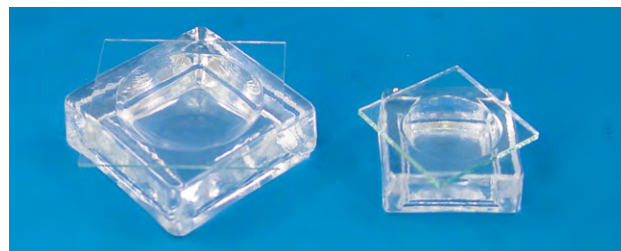


► Alcohol Burner with Ground Glass Cap

This burner offers a low heat flame, which is well suited for microscopy purposes. For use with isopropyl and denatured ethyl alcohol. The unit is supplied with a ground glass stopper. Made from soda lime glass. Size: 100 ml; measures: 75 mm dia. x 100 mm high.



Cat.#	Description	Pack
64213-01	Alcohol Burner, 100 ml	each
64213-25	Replacement Wick, 6" long	25/pk
64213-10	Replacement Cork Stopper	10/pk



► Embryo Dishes

These dishes are molded from clear glass and come with a glass lid for the viewing or staining of free-floating specimens.

Cat.#	Description	Pack
70543-30	Embryo Dish, 30 mm Dia. x 12 mm Deep	each
70543-45	Embryo Dish, 45 mm Dia. x 12 mm Deep	each

► Media/Lab Bottles

Graduated bottles have a large opening, no-drip pour lip and sloping shoulders to facilitate pouring and cleaning. These bottles are widely used for mixing and storage of culture media, fixation and dehydrating materials. Bottles show approximate volume graduations, and have large frosted writing area.

► Clear Glass

Clear bottles are Wheaton '400' borosilicate glass. Low alkali content helps to prevent changes in pH and maintain purity of contents. Comes with Ptfе-lined cap. Autoclavable.

► Amber Glass

Amber bottles are manufactured from Wheaton '500' borosilicate glass to protect light-sensitive samples.

Cat.#		Dia. x Hgt. (mm)			Screw	
Clear	Amber	Capacity	Cap on	Cap off	Cap Size	Pack
64210-C	64210-A	125ml	55x123	55x119	33-430	6/pk
64212-C	64212-A	250ml	67x152	67x148	33-430	6/pk
64214-C	-----	500ml	88x192	88x188	33-430	6/pk
64216-C*	-----	1000ml	103x235	103x231	38-430	4/pk



► Square, Wide Mouth Bottles

These bottles are made from high density polyethylene. They are supplied with push-in seals and easy-to-grip screw caps which have a toggle for tamper evident wire attachment. They are leak-proof for both solids and liquids and are very space efficient. They are supplied pre-capped in shrink-wrap.

Cat.#	Capacity		Measurements (mm)			Pack
	(oz.)	(ml)	Hgt	Width	Neck	
64246-10	0.8	25	50	30	20	10/pk
64246-15	1.6	50	71	36	24	10/pk
64246-20	3.3	100	87	49	36	10/pk
64246-25	8.0	250	111	59	36	10/pk
64246-30	16.0	500	135	76	50	6/pk
64246-35	32.0	1000	176	99	60	6/pk
64246-40	64.0	2000	211	135	60	6/pk



► Square Bottles - Polypropylene

Square polypropylene bottles with screw polypropylene closures. Repeatedly autoclavable and resistant to acids, alcohols and bases. Mouths are wider than conventional narrow mouth bottles. The square shape saves shelf space and the translucent color provides visual liquid level. Useful temperature is between 0°C and 135°C (32° and 275°F). Molded-in graduations and drip-proof spout for easier measuring and dispensing.

NOTE: remove closure or completely disengage threads before autoclaving. Ideal for buffers, cell culture solutions storage.

Cat. #	Capacity	Cap Size	Pack	Cat. #	Capacity	Cap Size	Pack
64245-01	1oz (30ml)	20mm	12/pk	64245-08	8oz (250ml)	38mm-430	12/pk
64245-02	2oz (60ml)	20mm	12/pk	64245-16	15oz (500ml)	38mm-430	12/pk
64245-04	4oz (125ml)	38mm-430	12/pk	64245-32	32oz (1000ml)	38mm-430	6/pk



► Polystyrene Containers; Poly-Containers

Lightweight, air-tight containers with snap-on polyethylene caps. They have less resistance to breakage than polyethylene but they are transparent and are ideal when used as a specimen container, storage vessel, or a block holder. Maximum temperature: 70°C.

Cat. #	Capacity	ID x Ht, mm	Pack	Cat. #	Capacity	ID x Ht, mm	Pack
64248-10	3 dram (11 ml)	19 x 48	10/pk	64248-35	15 dram (55.5 ml)	32 x 64	10/pk
64248-15	5 dram (18.5 ml)	22 x 48	10/pk	64248-40	20 dram (74 ml)	38 x 64	10/pk
64248-20	7 dram (25.9 ml)	26 x 51	10/pk	64248-45	30 dram (111 ml)	45 x 76	10/pk
64248-25	10 dram (37 ml)	27 x 50	10/pk	64248-50	40 dram (148 ml)	45 x 102	10/pk
64248-30	13 dram (48 ml)	30 x 56	10/pk				



► Chemical Containers

Relied on to transport dust samples from the moon

- Ideal for small quantities of liquids or solids
- Screw caps feature a leakproof inner seal
- Made of injection-molded polyethylene
- Easy to clean

Cat. #	Capacity (cc)	Height (mm)	O.D. (mm)	Pack
64299-40	5	22	33	6/pk
64299-41	10	22	54	6/pk
64299-42	30	32	65	6/pk
64299-43	90	52	69	6/pk
64299-44	120	52	84	6/pk
64299-45	180	52	114	6/pk

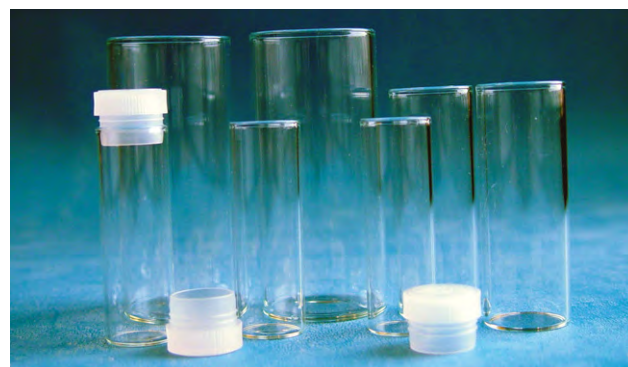


► Polyethylene Vials; Poly-Vials

Sample vials with a captive snap closure; flat bottom cylindrical vials with a friction-fit, flip-top closure which can not be lost. These vials are unbreakable and can withstand temperatures up to 90°C. The wall thickness is approx. 1mm and these vials are ideal for use as a specimen container for the storage of small samples, or as embedding capsules.



Cat.#	Vial Capacity	Dia x Hgt.	Pack
72621-10	Poly-Vial, 1ml	9x32mm	10/pk
72621-12	Poly-Vial, 1ml	9x32mm	100/pk
72621-20	Poly-Vial, 2.5ml	12x32mm	10/pk
72621-22	Poly-Vial, 2.5ml	12x32mm	100/pk
72621-30	Poly-Vial, 5ml	15x50mm	10/pk
72621-32	Poly-Vial, 5ml	15x50mm	100/pk
72621-36	Poly-Vial, 8ml	17x56mm	10/pk
72621-38	Poly-Vial, 8ml	17x56mm	100/pk
72621-40	Poly-Vial, 10ml	22x32mm	10/pk
72621-42	Poly-Vial, 10ml	22x32mm	100/pk
72621-60	Poly-Vial, 25ml	24x72mm	10/pk
72621-62	Poly-Vial, 25ml	24x72mm	100/pk
72621-90	Poly-Vial, 50ml	30x74mm	10/pk
72621-92	Poly-Vial, 50ml	30x74mm	100/pk



► Shell Vials, Glass

► 1. Clear Glass, Plain Top

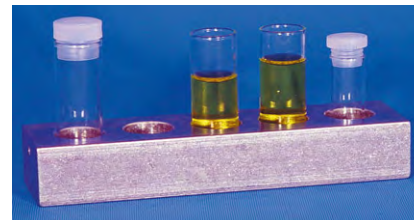
These vials are optically clear with straight-sides. Made from Type1, N-51A borosilicate glass. Fixation, dehydration, and infiltration procedures can be done in the same vial. The larger size vials can be used as an embedding media mixture container or for sample storage. The vials come with polyethylene open bottom snap-caps, Titeseal®, which are packed separately. Except the 4- dram size vial which comes without a closure. We recommend the use of our cork stoppers.

Catalog #	Capacity	O.D. x Hgt	Pack
72630-05	½ dr. (1.8ml)	12 x 35mm	144/pk
72631-10	1 dr. (3.7ml)	15 x 45mm	144/pk
72631-20	2 dr. (7.4ml)	19 x 51mm	144/pk
72631-30	3 dr. (11.1ml)	19 x 65mm	144/pk
72631-40*	4 dr. (14.8ml)	21 x 70mm	144/pk
72631-70	7 dr. (25.9ml)	29 x 65mm	144/pk
72628-50	Cork to fit 4 dram Vial (1¼"H x 5/8"Dia.)		144/pk

* Cap is not available Use cork stopper (#72628-50, 100/pk)

► Vial Holder

Machined from solid aluminum, holds 5 shell vials. It is ideal for handling cold or hot samples for prolonged periods of time out of the refrigerator or oven. Comes complete with a handle. Measurements: 4¾" x 1¼" x ¾"



72640 Shell Vial Holder each

► 2. Amber 203 (Borosilicate) Glass

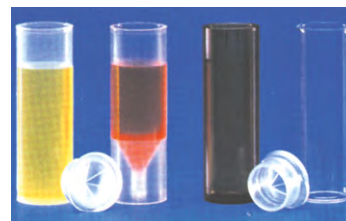
These amber glass vials offer protection from light sensitive materials. Vials come with polyethylene plug style needle closure (not attached), Titeseal®.

Cat.#	Capacity	O.D. x Hgt	Pack
72629-02	2 ml	8 x 43mm	200/pk
72629-04	4 ml	15 x 44mm	200/pk



► 3. Wheaton 15x45mm Shell Vials

These vials are for use with auto-samplers that require 15x45mm vials. The vials are available in either clear or amber glass or in natural polypropylene, without 15mm snap plug cap.



Cat.#	Volume, Material	Cap Size	Dia x Hgt	Pack
72627-4C	4.0mL, Clear Glass	15mm	15x45mm	100/pk
72627-4A	4.0mL, Amber Glass	15mm	15x45mm	100/pk
72627-4P	4.0mL, Polypropylene	15mm	15x45mm	100/pk
72627-3P*	3.0mL, Polypropylene	15mm	15x45mm	100/pk
72627-50	LDPE Conical Snap Plug Cap, Natural	15mm		100/pk

*Conical interior for maximum sample recovery

► Vial Rack



This rugged polypropylene rack holds 48 vials, size 1 dram (15x45mm); or 4 ml tissue culture vials; or 2ml serum vials in 4x12 configuration with alpha-numeric indexing. The rack is constructed from chemically resistant, autoclavable (121°C for 20 minutes) polypropylene and features corner posts to assure stability when stacking empty.

Dimensions: 3¾" x 10½" x 1½" (94x266x28mm)

72641-01	Rack for 1 dram Shell Vial	each
72641-05	Rack for 1 dram Shell Vial	5/cs

► Liquid Scintillation Vials

► 1. Glass Vials

Wheaton "180"® low potassium borosilicate glass (meets ASTM Type I Class A and USP Type I standards). Vials are packed in individual cells in trays of 100. Vials are in trays are shrunk-wrapped in plastic, 5 trays to a case. Screw caps size 22-400 is made from Urea with Poly-seal cone liner. Caps are packed separately in polyethylene bags of 100. Vial measures 28mm diameter x 57mm height (with cap off), and 61mm height (with cap on). Size 20 ml.



► 2. High Density Polyethylene (HDPE) Vials

Opaque, high-density polyethylene vials are economically priced. They are 20ml in capacity and they measure 27mm diameter x 61mm height (with cap). The screw caps are 22-400 and they are made from polypropylene with a foam- polyethylene liner. The vials and caps are packaged the same way as glass vials.



► 3. Polyethylene Terephthalate (PET)

For optimal performance in the laboratory, PET plastic vials provide a combination of features previously unavailable in a counting vial. Safe disposal is accomplished by incineration. No harmful gas is generated (only CO₂ and H₂O are created). These vials are lightweight, virtually unbreakable and they have the clarity of glass. PET vials also offer low permeability to solvents and minimal background count. These vials hold 20 mls of fluid and they measure 27mm diameter, 61mm height (with cap on). The screw caps are 22-400 and are made from polypropylene with a foamed polyethylene liner. The vials and the caps are packaged separately.



Ordering:

Cat. #	Description	Pack
72632	20 ml Glass Scintillation Vial	100/pk
72632-PE	20 ml HDPE Scintillation Vial	100/pk
72632-PT	20 ml PET Scintillation Vial	100/pk
72634	20 ml Glass Scintillation Vial	500/pk
72634-PE	20 ml HDPE Scintillation Vial	500/pk
72634-PT	20 ml PET Scintillation Vial	500/pk

Cryo-Lok Vials, See page 680-681 >>>>

► Scintillation Vial Racks



► (1) White Polypropylene Rack

The rack measures: 12 $\frac{1}{2}$ " x 6 $\frac{3}{4}$ " x 1 $\frac{3}{8}$ " High (32 x 17 x 3.5cm), and it has 50 cavities, 1.1" (28mm) diameter x .75" (20mm) deep. The cavities have a center drain hole 1/2" (13mm) in diameter. The racks are stackable when not in use and are steam autoclavable at 250°F (121°C).



► (2) Rack with Handle

Rugged and stackable. They hold 24 scintillation vials (30mm diameter). There is a handle on both ends for carrying. Autoclavable.

Measures: 11 $\frac{1}{4}$ " x 5" x 3 $\frac{3}{4}$ " High (298 x 127 x 95mm).



► (3) 100-Place Scintillation Vial Rack

Welded polypropylene rack holds 100 standard 20 ml scintillation vials. The rack is autoclavable and resists both nitric and hydrochloric acids. The hole measures 1 $\frac{1}{8}$ " diameter. Dimensions: 14 $\frac{1}{2}$ "(L) x 15"(W) x 2 $\frac{1}{2}$ "(H)

Ordering: welded

Cat.#	Description	Pack
72635	50-Place Scintillation Vial Rack, White	each
72636	50-Place Scintillation Vial Rack, White	5/pk
72637	24-Place Scintillation Vial Rack w/Handle	each
72638	24-Place Scintillation Vial Rack w/Handle	5/pk
72639	100-Place Scintillation Vial Rack, welded	each

► Peti-Vial – Scintillation Vial

Peti-Vials are made from a special grade of polypropylene, which produces a product of optimum clarity. It's unique design offers users a leak-proof fit with only one-half of a turn of the cap.

FEATURES:

- Compatible with all major liquid scintillation counting system
- Dimple bottoms to facilitate filter paper counting
- Nominal Volume of 7ml
- Ideal for Sample storage
- Vials are autoclavable

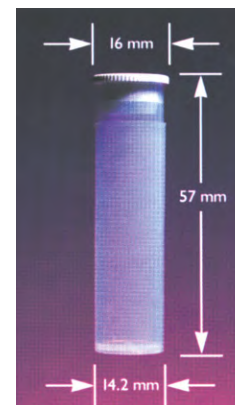


► Multi-Vials – Scintillation Vials

Multi-vials are excellent multipurpose containers. They are primarily used for liquid scintillation counting, beta-gamma counting, and sample storage. They are made from a new type of polypropylene, which assures superior visibility. They come with white polyethylene caps and are perfect and convenient for easy marking.

FEATURES INCLUDE:

- Nominal volume of 5ml
- High density white polyethylene snap cap
- Alternate white plug cap



Ordering:

Cat.#	Description	Pack
72657	Peti-Vial and Caps	250/Tray
72656	Peti-Vial and Caps, Bulk	1000/cs
72656-50	Caps for Peti-Vials	1000/cs
72659	Multi-Vials and Snap Caps	200/Tray
72658	Multi-Vials and Snap Caps	1000/cs
72658-50	Snap Cap for Multi-Vials	1000/cs

► Tooled Neck Vials

These vials are made from Type 1, Class B borosilicate glass. Their tooled necks ensure accurate fit with "snap-in" closures. They are ideal for storage of specimens and sample blocks. The 1 and 2 dram sizes come with an open-bottom closure and all of the other sizes come with a closed bottom, two-piece closure. Closures are packed separately.

Cat.#	Capacity	Dia.xHgt. (mm)	Package
72646-01	1 dr (3.7ml)	15 x 45	144/pk
72646-02	2 dr (7.4ml)	19 x 48	144/pk
72646-03	3 dr (11.1ml)	21 x 50	144/pk
72646-04	4 dr (14.8ml)	25 x 52	144/pk
72646-05	5 dr (18.5ml)	27 x 55	144/pk
72646-07	7 dr (25.9ml)	29 x 65	144/pk



► V-Vials®; Clear With Screw Cap

These vials are made from Wheaton-33 low extractable borosilicate glass and they safeguard against any change of product pH caused by alkali, which can be extracted from ordinary glass. Wheaton V-Vials are exceptionally sturdy vials with a conical interior bottom. Their special features insure maximum security and economy in handling, storing and shipping of costly micro and semi-micro samples.

V-Vials are ideal for: Micro Mixing, Homogenization, Centrifugation, Concentration, Extraction, Derivatization, Radiosynthesis, Hybridization, Anaerobic Reactions, and Catalytic Hydrogenation.

All components can be autoclaved. They come packed 12 vials in a hinged lid storage box. Graduated; clear; screw cap has solid top and Ptfе-faced white (styrene butadiene) rubber liner.

Cat.#	Size ml	Dia x Hgt mm (with cap off)	Screw Cap Size	Pack
72647-01	0.3	13 x 32	13-425	12/pk
72647-02	1.0	13 x 41	13-425	12/pk
72647-05	2.0	20 x 41	20-400	12/pk
72647-07	3.0	20 x 47	20-400	12/pk
72647-08	5.0	20 x 62	20-400	12/pk



► Lyophilization Containers – Serum Vials/Bottles

These are the choice containers for Lyophilization.

There are three major factors for successful Lyophilization:

Heat Transfer, Sealability, and Water Vapor Transmission Barrier.

- **Heat Transfer** – a Wheaton Glass serum vial, as opposed to glass serum bottles, plastic serum bottles, and other containers has a very consistent thin wall and bottom. This attribute of a Wheaton glass serum vials allow the heating phase of the lyophilization process to take place rapidly and effectively
- **Sealability** – Wheaton glass serum vials feature a “blowback” feature in neck and bottom. This allows for a 2 or 3 legged lyophilization stopper to be securely and evenly seated in the mouth of the vial during the lyophilization process. An uneven stopper may result in water vapor entering back into the vial once stored. Additionally, these serum vials come in standard crimp finish sizes, for compatibility with various standard aluminum seals and crimping tools.
- **Water vapor Transmission Barrier** – Wheaton glass serum vials are made from premium, low extractable, borosilicate glass, which offers a superior barrier to water vapors. The vials are available in either clear and amber for UV light transmission applications.
- **Autoclavable** – These vials can be autoclaved, by dry heat, by chemical, by gas, or by radiation.

► Serum Tubing Vials – Clear

Manufactured from Wheaton “200” low extractable borosilicate glass tubing to hold uniform wall thickness. Glass meets ASTM Type I, Class A and USP Type I standards.



EMS #	Size ml	Mouth ID x OD mm	Dia x Hgt mm	Qty/case
60300-02	2	7 x 13	15 x 32	144/pk
60300-03	3	7 x 13	17 x 38	144/pk
60300-05	5	13 x 20	22 x 40	144/pk
60300-10	10	13 x 20	24 x 50	144/pk
60300-20	20	13 x 20	30.5 x 58	120/pk

► Serum Tubing Vials – Amber

Manufactured from Wheaton “320” borosilicate glass (meets ASTM Type I, Class B and USP Type I Standards)



EMS #	Size ml	Mouth ID x OD mm	Dia x Hgt mm	Qty/case
60302-02	2	7 x 13	15 x 32	144/pk
60302-05	5	13 x 20	22 x 40	144/pk
60302-10	10	13 x 20	24 x 50	144/pk

► Threaded Tubing Vials – Vacule®

Heavy wall construction, designed for lyophilization and freeze-drying. Manufactured from Wheaton 33® low extractable borosilicate glass (meets ASTM Type I Class and USP Type I Standards).



EMS #	Size ml	Thread Size	Mouth ID x OD mm	Dia x Hgt mm	Qty/case
60304-04	4	15-425	9 x 13	17 x 43	200/pk
60304-05	5	22-350	13 x 20	22 x 45	200/pk
60304-10	10	22-350	13 x 20	22 x 60	200/pk

► Cap and Stopper for use with Vacule®



EMS #	Description	Qty/case
Accessories for 4 ml Vacule® Vials		
60304-40	Red Stoppers	100/pk
60304-41	Lyophilization Stoppers, Two Prong	100/pk
60304-42	Caps, Solid Top, Rubber Liner, 15-425	200/pk
60304-43	Caps, Open Top, No Liner, 15-425	200/pk
Accessories for 5 and 10 ml Vacule® Vials		
60304-50	Red stoppers	100/pk
60304-51	Lyophilization Stoppers, Two Prong	100/pk
60304-55	Caps, Solid Top, No Liner, 22-350	500/pk

► Serum Bottles - Clear

Manufactured from Wheaton “400” borosilicate molded glass (meets USP Type I standards)



EMS #	Size ml	Mouth ID x OD mm	Dia x Hgt mm	Qty/case
60306-02	2	7 x 13	17.5 x 34	288/pk
60306-05	5	13 x 20	23 x 47	288/pk
60306-10	10	13 x 20	25 x 54	288/pk
60306-20	20	13 x 20	32 x 58	288/pk
60306-30	30	13 x 20	37 x 63	288/pk
60306-50	50	13 x 20	43 x 73	288/pk
60306-100	100	13 x 20	52 x 95	144/pk

► Serum Bottles - Amber

Manufactured from Wheaton “500” borosilicate molded glass (meets USP Type I standards)



EMS #	Size ml	Mouth ID x OD mm	Dia x Hgt mm	Qty/case
60308-05	5	13 x 20	23 x 47	288/pk
60308-10	10	13 x 20	25 x 54	288/pk
60308-20	20	13 x 20	32 x 58	288/pk
60308-30	30	13 x 20	37 x 63	288/pk
60308-50	50	13 x 20	43 x 73	288/pk
60308-100	100	13 x 20	52 x 95	144/pk

► Lyophilization Seals and Stoppers

Unlined Aluminum Seals

■ Center Disc Tear Out

The center disc tears out, exposing the top of the stopper to the syringe. Natural in color.

EMS #	Fit Mouth ID x OD, mm	Qty
60320-07	7 x 13	100/pk
60320-13	13 x 20	100/pk



■ Flip-Cap, Center Tear

Easy-to-use. Push upward on plastic button to access stopper or septum. No sharp metal edges. Removal of the Flip Cap Button can be accomplished with one hand, freeing the other for the syringe.

EMS #	Fit Mouth ID x OD, mm	Qty
60321-07	7 x 13	100/pk
60321-13	13 x 20	100/pk



■ Complete Tear Off

Seal can be completely removed and contents poured from the bottle.

EMS #	Fit Mouth ID x OD, mm	Qty
60322-07	7 x 13	100/pk
60322-13	13 x 20	100/pk



► Lyophilization Stoppers

Manufactured from the highest quality raw materials

► Two Leg Lyophilization Stoppers

EMS #	Fit Mouth ID x OD, mm	Qty
60326-07	7 x 13, Gray chlorobutyl/50	100/pk
60326-13	13 x 20, Gray holobutyl/50	100/pk
60326-14	13 x 20, Gray chlorobutyl/50	100/pk



► Three Leg Lyophilization Stoppers

EMS #	Fit Mouth ID x OD, mm	Qty
60327-13	13 x 20 Gray chlorobutyl/50	100/pk
60327-14	13 x 20 Gray chlorobutyl/50 Thin Flange	100/pk



► Lined Aluminum Seals

These seals are ideal for filling or retrieving contents with a syringe and as closures for many instrumentation applications. These seals have a center disc tear-out, seal lined with PTFE – Faced natural red rubber.

EMS #	Fit Mouth OD mm / Color	Qty
60330-13N	13, Natural	100/pk
60330-20N	20, Natural	100/pk



► EZ Crimper™

An adjustable stopper allows the user to determine the tightness of the seal while ensuring consistent crimping. The jaws are tapered to allow for the crimping of the vials in the racks. Ergonomic, PVC grip and spring assembly reduces hand fatigue.

EMS #	Description	Qty
For Standard Seals		
60334-13	Attaches 13mm Seals	each
60334-20	Attaches 20 mm Seals	each



For Flip Cap Seals

60335-13	Attaches 13mm Flip Top Seals	each
60335-20	Attaches 20mm Flip Top Seals	each



► De-Crimper Pliers

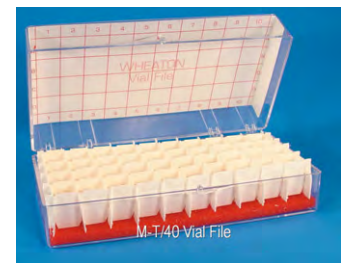
Made from stainless steel offers one tool for both sizes: 13mm and 20mm serum vial de-crimper. An inexpensive and easy way to remove the seal from the serum vial, simply secure the seal between the jaws, squeeze the handle and twist the seal. Plastic coated handle offers comfort and ease of use.



EMS #	Description	Qty
62180-01	De-Crimper for Sizes 8 & 13 mm	each
62180-02	De-Crimper for Sizes 8 & 30 mm	each
62180-03	De-Crimper for Sizes 11 & 20 mm	each
62180-04	De-Crimper for Sizes 13 & 20 mm	each

► Wheaton M-T Vial File®

This filing system offers a clean, compact, and convenient alternative for the storage of biological samples. A clear polystyrene case, with hinged lid, alpha-numerical index, and individual partitions. Foam inserts are provided as well and they offer extra protection for the vials.



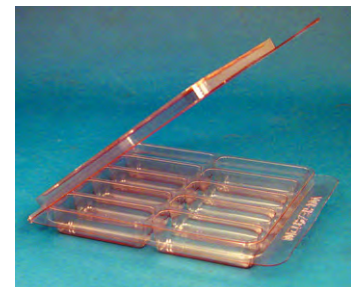
- M-T/40: stores up to 40 vials of 16mm diameter x 50mm height
- M-T/60: stores up to 60 vials of 13mm diameter x 50mm height

Dimensions: 6¾"(L)x3¾"(W)x2½"(H) (190x95x62mm).

60990-40	M-T/40 Vial File	each
60990-46	M-T/40 Vial File	6/cs
60990-60	M-T/60 Vial File	each
60990-66	M-T/60 Vial File	6/cs

► Mini-File®

This mini filing system offers the convenience for transporting, displaying and storing sample vials. This reusable, clear plastic storage tray has ten 16mm x 16mm x 50mm cells for storage sample vials and V-Vials. The file comes with a hinged lid that seals securely with a snap-lock fit offering protection against spills while also allowing easy access. They can be stacked in a horizontal position and they require minimal space. Files are supplied empty.



Cat.#	Description	Pack
60998-05	Mini-File®, Clear Plastic	5/pk

► Sample Vials; Clear and Amber

Multi purpose glass sample vials. Specifically suited for research studies. These sample vials are economically priced and conveniently packaged in two shrink-wrapped packs of 100 vials.

These vials come with ptf lined caps and are packaged separately. The vials can be sterilized and stored at low temperatures.



Clear: Manufactured from Wheaton-33R a low extractable borosilicate glass which protects against changes in the pH and maintains sample integrity.

Cat.#	Size ml	Dia. x Hgt. (mm) (with cap off)	Screw Cap Size	Pack
60992-01*	1.8	12x35	8-425	200/pk
60992-02*	2	12x38	8-425	200/pk
60992-04**	4	15x48	13-425	200/pk
60992-08	8	17x63	15-425	200/pk
60992-12	12	19x68	15-425	200/pk
60992-16	16	21x73	18-400	200/pk
60992-24	24	23x88	20-144	200/pk

Amber: Manufactured from Wheaton "320" borosilicate glass and protects light-sensitive samples.

Cat.#	Size ml	Dia. x Hgt. (mm) (with cap off)	Screw Cap Size	Pack
60993-01*	1.8	12x35	8-425	200/pk
60993-02*	2	12x38	8-425	200/pk
60993-04**	4	15x48	13-425	200/pk
60993-08	8	17x63	15-425	200/pk

* Fits M-T/60 Vial File ** Fits M-T/40 Vial File

► Vial Caddy – 23mm

Heavy-duty vial caddy protects up to 48 of the popular 23mm diameter glass vials. Machined from a solid block of 1.25" HDPE sheet offering complete protection during storage and transport. The caddy is supplied with a snug fitting cover and non-skid feet. It is white in color.



Cat.#	Description	Pack
72642	48-Place Scintillation Vial Caddy with Cover	each

► Sample Vials In Mini-File®; Clear

Comes ten vials packed in a clean plastic thermoformed Mini-File and offers convenience in transporting, displaying and storing. The vials are made from Wheaton-



33R a low extractable borosilicate glass. The vials are supplied with a white (styrene-butadiene) rubber lined cap and both the vials and the caps can be autoclaved.

Cat.#	Size ml	Dia. x Hgt. (mm) (with cap on)	Screw Cap Size	Pack
60996-02	2	12x37	8-425	10/pk
60996-04	4	15x48	13-425	10/pk

► EZFlip™ Conical Centrifuge Tubes (Patented*)

- Leak-proof — Hinged, flip-cap design.
- One handed opening and closing.
- Good chemical resistance — low protein binding.
- 15 ml and 50 ml — Sterile.
- Freezer/Refrigerator capability.
- Clarified polypropylene — good visibility of contents.
- Easily maintain aseptic conditions.
- Compatible with all major centrifuges and rotors.

EzFlip™ Conical Centrifuge tubes offers a safer alternative to screw cap tubes. A patented closure system improves ergonomics and versatility. An improved tube and cap design increases mechanical strength to withstand aggressive centrifugal forces. The 15 ml tube's maximum relative centrifugal force (RCF) is 8,500 x g, and the 50ml tube's maximum RCF is 9,500 x g.

Tubes are graduated and feature a writing area. All EZFlip™ tubes are available in rack or bag of 50, case of 500.



Ordering:

EMS #	NUNC #	Description	Size, mm Dia x L	Qty / Pack	Qty / Case
63030-25	362695	PP, 15 ml EZFlip™ Conical Centrifuge Tube, Rack	17 x120	50	-----
63030-5C	362695	PP, 15 ml EZFlip™ Conical Centrifuge Tube, Rack	17 x120	-----	500
63031-25	362697	PP, 50 ml EZFlip™ Conical Centrifuge Tube, Rack	30 x115	25	-----
63031-5C	362697	PP, 50 ml EZFlip™ Conical Centrifuge Tube, Rack	17 x120	-----	500

► Transport /Sample Collection Vials and Tubes

► 1. Transport Vials

Transport Vials are ideal for sample collection and storage. Made from virgin polypropylene, they are available in three sizes and sterile as well as non-sterile. Graduations provide convenient and accurate references. 5 ml and 10 ml sizes are supplied with white screw cap, 50 ml are supplied with blue cap, that has a molded-in sealing ring for a leak-proof fit.

FEATURES INCLUDE:

- Conical tubes with freestanding skirts
- Tubes are autoclavable
- Write-on area on side

► 2. Transport Tubes

Transport Tubes and ideal for rapid sample collection when a plug cap is needed. Made from virgin polypropylene (PP) or polystyrene (PS). The tubes work well in Olympus automated testing equipment. The tube volume is 12 ml and the plug caps are available in yellow with either a hollow top (HT) or hollow bottom (HB)

Ordering:

Cat. #	Description	Pack
63034-05	5 ml Transport Vials with white caps	4x250/pk
63035-05	5 ml Transport Vials with white caps, sterile	20x25/pk
63034-10	10 ml Transport Vials with white caps	4x250/pk
63035-10	10 ml Transport Vials with white caps, sterile	20x25/pk
63034-50	50 ml Transport Vials with blue caps	500/pk
63035-50	50 ml Transport Vials with white caps, sterile	20x25/pk
63036-PS	12 ml PS Conical Bottom w/skirt Tube, no cap	1000/pk
63036-PP	12 ml PP Conical Bottom w/skirt Tube, no cap	1000/pk
63037-PS	12 ml PS Flat Bottom Tube, no cap	1000/pk
63037-PP	12 ml PP Conical Bottom Tube, no cap	1000/pk
63040-HT	Hollow Top Plug Cap, yellow	1000/pk
63040-HB	Hollow Bottom Plug Cap, yellow	1000/pk

► Sticky Stand

Sticky Stand is a unique adhesive platform for temporarily securing micro-tubes, vials, cuvettes, and many other kinds of laboratory vessels. To use, simply press down on the vial(s) and contact between the bottom of a tube or vial and the adhesive bed is sufficient for establishing support. A twist or pull releases the vessel from the adhesive bed, without leaving any adhesive residue.

The adhesive bed is fabricated in a heat-resistant plastic tray and it can be rejuvenated by placing it in a conventional oven for one hour (Preheated to approx. 190°C or 375°F). For safety, always place the Sticky Stand in a containment tray during reheating.

The polyolefin adhesive and polyester tray are resistant to most organic solvents and caustic agents. Sticky Stand can be used under either low or high humidity conditions as well as in cold or warm environments (from 4 to 40°C).

Once adhesion is established, it is maintained even at much lower temperatures, -20°C.

The adhesive bed is approximately 0.5" thick, and it is available in either regular or high adhesive strength. Regular strength is often preferred for room temperature uses. High strength is preferred for low temperature uses.

► Smooth Rack™

SmoothRack™ is an improvement over the old fashioned 3-tier-wire-racks:

■ When using SmoothRack, tubes will never slip into an adjacent position

The SmoothRack is versatile and it accommodates a wide range of tubes: 10 to 16 mm diameter.

■ A drainage hole right on each tube position

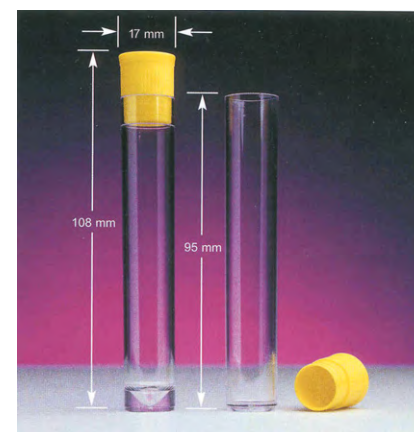
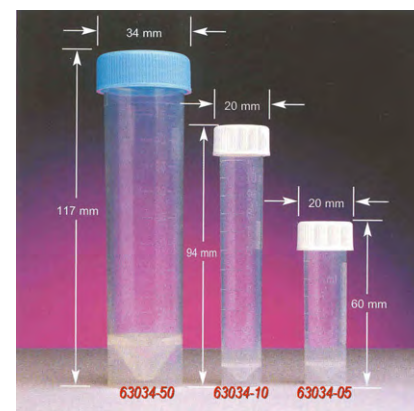
■ Holds 72 tubes, available in Blue or White

■ Made from autoclavable polypropylene

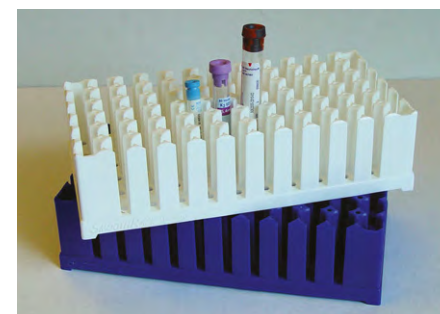
■ Made in USA – Patent pending

■ Dimensions: 9.5" (L) x 5" (W) x 2.6" (H)

64640-W	SmoothRack™, color White	each
64640-B	SmoothRack™, color Blue	each



72644-5R Sticky Stand(Regular, 5"x7") each
72644-5S Sticky Stand (Super Sticky, 5"x7") each



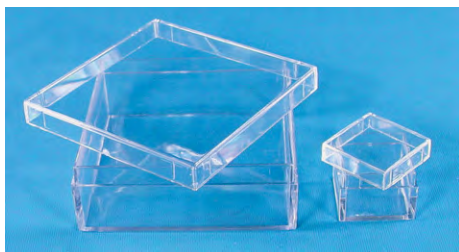
► Plastic Boxes - Multi-Use

EMS Plastic Boxes are in demand!

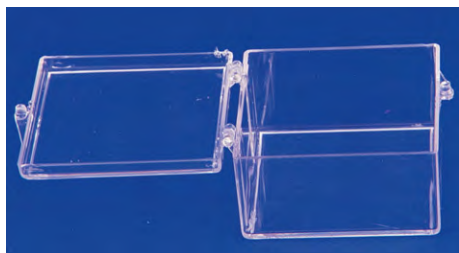
Whatever your storage needs, there's an EMS Plastic Box that's perfect for you. Molded from polystyrene for optimum clarity and rigidity. They come in a variety of shapes, styles, and sizes.

► 1. Square Boxes:

They have two equal dimensions for length and width. The "squares" are available in a variety of sizes in both friction-fitting lids and hinged-lids with snap locks.



64306

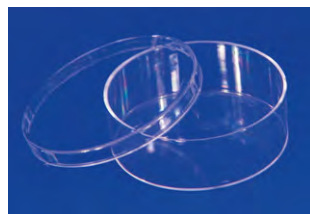


64310

Catalog Number	Inside Dimensions (inches, 1"=25.4mm)			Lid (H)	Base (H)	Pack
	L	W	H			
Style: Friction - Fitting Lids						
64306	$\frac{25}{32}$	$\frac{25}{32}$	$\frac{5}{8}$	-	-	50
64307	$1\frac{1}{16}$	$1\frac{1}{16}$	$\frac{3}{16}$	-	-	10
64308	$2\frac{1}{2}$	$2\frac{1}{2}$	$\frac{7}{8}$	-	-	10
64309	2	2	$\frac{3}{4}$	-	-	10
Style: Hinged-Lid, Snap-Lock						
64310	1	1	$\frac{5}{8}$	$\frac{1}{8}$	$\frac{1}{2}$	10
64312	2	2	$1\frac{1}{8}$	$\frac{1}{8}$	1	10
64313	$2\frac{3}{16}$	$2\frac{3}{16}$	$2\frac{3}{16}$	$\frac{1}{4}$	$1\frac{1}{16}$	10
64314	$3\frac{3}{16}$	$3\frac{3}{16}$	1	$\frac{1}{4}$	$\frac{3}{4}$	10
64315	$4\frac{1}{16}$	$4\frac{1}{16}$	$1\frac{1}{4}$	$\frac{1}{4}$	1	10

► 3. Round Boxes:

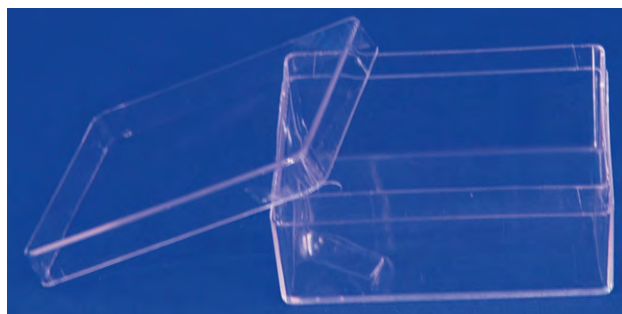
Super for storing many items that just don't seem to fit in square or rectangular boxes. Supplied with friction-fitting lids.



Catalog Number	Inside Dimensions (inches, 1"=25.4mm)			Lid (H)	Base (H)	Pack
	L	Dia.	H			
Style: Friction-Fitting Lids						
64330	-	$1\frac{1}{8}$	$\frac{3}{8}$	-	-	25
64331	-	$1\frac{1}{4}$	$\frac{1}{2}$	-	-	10
64332	-	$2\frac{1}{2}$	$\frac{7}{8}$	-	-	10

► 2. Rectangular Boxes:

Finally – the right shape for all those long and narrow items. Friction-fitting lids or hinged-lids with snap locks available on a wide selection of boxes depths and sizes.

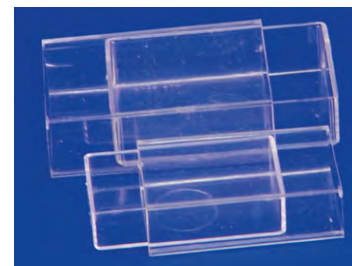


64318-05

Catalog Number	Inside Dimensions (inches, 1"=25.4mm)			Lid (H)	Base (H)	Pack
	L	W	H			
Style: Friction-Fitting Lids						
64318-05	$1\frac{1}{16}$	$\frac{3}{4}$	$\frac{5}{8}$	-	-	25
64318-07	$2\frac{3}{16}$	$\frac{3}{4}$	$\frac{3}{4}$	-	-	25
64318-09	$3\frac{3}{16}$	$2\frac{3}{16}$	$1\frac{1}{4}$	-	-	25
64318-12	$3\frac{3}{16}$	$6\frac{1}{16}$	$1\frac{1}{8}$	-	-	10
64318-14	$4\frac{1}{4}$	$1\frac{1}{2}$	1	-	-	10
64318-16	5	$5\frac{1}{4}$	$1\frac{1}{16}$	-	-	10
64318-18	$5\frac{1}{2}$	2	1	-	-	10
Style: Hinged - Snap-lock Lids						
64319	$2\frac{1}{8}$	1	$\frac{5}{8}$	$\frac{1}{8}$	$\frac{1}{2}$	25
64320	$2\frac{1}{8}$	2	$\frac{3}{16}$	$\frac{1}{16}$	$\frac{1}{2}$	10
64321	$3\frac{1}{2}$	$2\frac{3}{16}$	1	$\frac{1}{2}$	$\frac{1}{2}$	10
64322	6	4	$1\frac{1}{4}$	$\frac{1}{4}$	1	1
64323	$7\frac{7}{8}$	$4\frac{29}{32}$	$1\frac{1}{2}$	$\frac{1}{4}$	$1\frac{1}{4}$	1
64324	$8\frac{1}{8}$	$6\frac{1}{4}$	$1\frac{1}{16}$	$\frac{1}{4}$	$1\frac{15}{16}$	1

► 4. Plastic Matchboxes:

Especially designed for storing little pieces that constantly are misplaced. Ideal for specimen blocks, apertures etc.



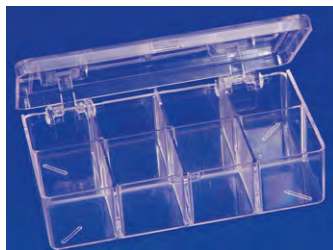
Catalog Number	Inside Dimensions (inches) 1"=25.4mm			Pack
	L	W	H	
64334	2	$1\frac{1}{4}$	$\frac{1}{2}$	10
64335	$1\frac{1}{8}$	$\frac{7}{8}$	$\frac{3}{8}$	10

► 5. Partitioned Boxes:

Available Hinged Snap Lock Lids or Sliding Lids

Organizing singular or groups of items in individual compartments. Stored items stay separately and are readily visible at all times.

Extra-thick wall construction permits containment of heavy objects; protects delicate items.



64337 - Plastic Box with Slide Cover

Catalog Number	O.D., inch			No. Compartment	Compartment Size, inch			Pack
	L	W	H		L	W	H	

Style: Hinged – Lid, Snap – Lock

64339-08	4%	3	1%	8	1%	1%	1	each
64339-06	4%	3	1%	6	1%	1%	1	each
64339-04	4%	3	1%	4	1%	2%	1	each
64340	5%	3%	1%	5	1%	3	1%	each
64341	7	3%	1%	12	1%	1%	1%	each
64342	8%	4%	1%	18	1%	1%	1%	each
64343	11	6%	1%	18	1%	1%	1%	each
64344	10	7	1%	36	1%	1%	1%	each
64345	13%	9	2%	12	2	4%	2%	each
64346	13%	9	2%	24	2	2	2%	each

Style: Slide – Cover

64337	10%	8%	1%	24	1%	2	1%	each
64338-07	3%	3	½	7	1%	2%	¾	each
64338-18	7%	3%	¾	18	1%	1%	1%	each

Note: 1" = 25.4mm



64338-18



64350-06 - Plastic Box Tray Set

► 6. Tray Box and Tray Sets:

A compact, solid fiberboard Tray Box makes instituting a plastic box/sample storage system more convenient and efficient. To form a Tray Set, use plastic boxes for specimen storage, and then organize boxes within the fiberboard Tray Box. These sets eliminates misplacement or inadvertent sample loss, and allows for rapid retrieval of specimens. The tray boxes are available with or without accompanying plastic boxes.

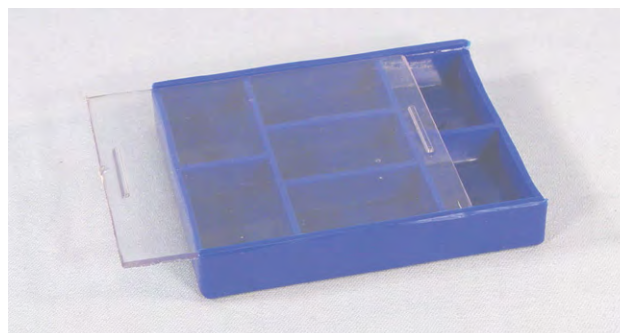
Ordering Tray Box only

Catalog #	L (in.)	W (in)	H (in)	Pack
64348-05	9½	9½	¾	5
64348-10	9½	9½	¾	10

Ordering Tray Set, (Tray Box and Plastic Boxes):

Catalog Number	Includes Plastic Box (Cat. #)*	Boxes/ Set	Arrangement
64350-01	64306	100	10 x 10
64350-02	64318-05	50	5 x 10
64350-03	64318-07	30	3 x 10
64350-04	64307	25	5 x 5
64350-05	64309	16	4 x 4
64350-06	64310	56	8 x 7
64350-07	64319	20	4 x 5
64350-08	64320	12	3 x 4
64350-09	64334	24	4 x 6
64350-10	64335	40	5 x 8

* See previous page for these plastic boxes.



64338-07

Electron Microscopy Sciences is proud to announce the introduction of the highest quality line of

Microscopes

in the market place today.

With all of our research and comparing all of the Microscope manufacturers in the market place we found these to offer the best quality and price and they are 100% made AMERICAN!!!!

Our Microscopes incorporate advanced technology into a durable, cost effective solution for your microscope. All of the Microscopes that we are offering have:

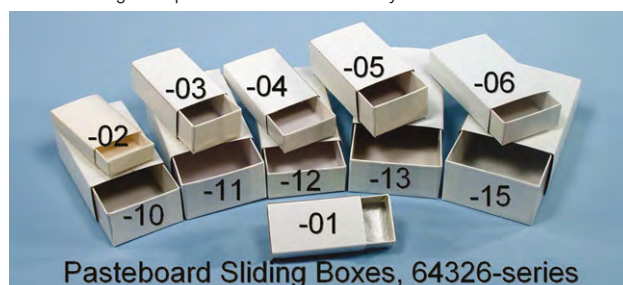
- A Modern frame with enhanced stability for image documentation
- An Ergonomic single hand stage/focus control to minimize fatigue
- A Robust stainless steel/brass focus mechanism endures high use
- Brilliant images resolved with superb optics
- A Versatile performance - multiple techniques available, including polarization with First Order (Full Wave/Red) Retardation Plate, phase contrast, dark field and more



For more information, see pages 854-869 >>>>

► Pastebord Sliding-Boxes

Constructed from white pastebord; match box style and rectangular in shape. Available in different sizes to meet all of your needs. It is ideal for the storage of specimen blocks and many small items.



Pastebord Sliding Boxes, 64326-series

Cat #	Tray Interior	Box Exterior	Qty
64326-01	2 1/8 x 1 1/8 x 5/8" (54 x 28 x 16mm)	2 1/4" x 1 1/4" x 3/4" (77 x 32 x 19 mm)	72/pk
64326-02	2 x 1 1/4 x 7/16" (51 x 32 x 11mm)	2 1/8" x 1 1/8" x 1/2" (53 x 37 x 15)	72/pk
64326-03	2 5/16 x 1 1/16 x 1 1/16" (59 x 34 x 22mm)	2 1/2" x 1 1/2" x 1" (63 x 38 x 25mm)	72/pk
64326-04	2 1/2" x 1 1/2" x 3/8" (63 x 38 x 15mm)	2 3/4" x 1 1/8" x 3/4" (66 x 44 x 18mm)	72/pk
64326-05	2 5/16" x 1 1/16" x 1" (65 x 40 x 25mm)	2 3/4" x 1 3/4" x 1 1/8" (70 x 45 x 28mm)	72/pk
64326-06	3 x 1 1/4" x 3/4" (76 x 43 x 18mm)	3 1/8" x 1 7/8" x 7/8" (78 x 48 x 20mm)	72/pk
64326-10	2 1/8 x 1 7/8 x 1/8" (72x47x28mm)	3" x 2" x 1 1/4" (75x51x30mm)	72/pk
64326-11	3 1/8 x 2 1/8" x 1 1/4" (80 x 53 x 31mm)	3 3/4" x 2 1/4" x 1 1/4" (82 x 57 x 34mm)	72/pk
64326-12	3 1/4" x 2 x 7/8" (82 x 51 x 22mm)	3 3/8" x 2 1/2" x 1" (85 x 54 x 25mm)	72/pk
64326-13	3 1/16" x 2 1/16" x 1 1/16" (87 x 58 x 28mm)	3 1/2" x 2 1/2" x 1 1/4" (90 x 63 x 30mm)	72/pk
64326-15	3 1/2" x 2 1/2" x 1 1/8" (88 x 60 x 34mm)	3 1/2" x 2 1/2" x 1 1/2" (90 x 65 x 38mm)	72/pk

► Micro-Partition Boxes

Made from white recyclable board. Has a partition insert and removable lid. Ideal for filing small samples



Micro Partition Boxes, 64328-series

Cat. #	Inside Dimensions	No. of Compartmtns and size	Qty
64328-06	1 1/16 x 1 1/8 x 1 1/16"	6, (13 x 13mm)	36/pk
64328-12	2 1/4 x 1 1/16 x 1 1/16"	12, (13 x 13 mm)	36/pk
64328-24	3 3/8 x 2 1/4 x 1 1/16"	24, (13 x 13 mm)	36/pk

► Tin Can – Specimen Tin Boxes

A round seamless tin with a friction fit lid. Low form, flat bottoms. White label on lid. These boxes are ideal for specimen or small item storage.



EMS #	Dia x H, in. (mm)	Capacity	Qty
61020-01	1 1/2 x 1/2 (38 x 13)	1/2 oz (15 ml)	144/pk
61020-02	2 x 3/8 (51 x 16)	1 oz (30 ml)	72/pk
61020-03	2 1/2 x 3/4 (60 x 19)	2 oz (60 ml)	72/pk
61020-04	3 3/8 x 1 1/16 (79 x 24)	4oz (120 ml)	36/pk

► Cocoon Box — A Smart Box *THE REVOLUTIONARY WAY FOR MAILING AND STORING SAMPLES*

Boxes - Made from polypropylene, envelope shape, available with or without an inner frame. These boxes are the safest way for mailing or storing fragile samples. They are impact and shock resistant. With a living-hinge, opaque-clear, reusable and recyclable. The boxes are available in many sizes and styles to fit your needs. Closing Clips and Security Seals are also available as an option.



Vials — are made from polystyrene and they are tough and crystal clear and come with a friction lid. Cocoon Boxes are also available to accept these vials for safe storing and/or mailing valuable samples.

Ordering:

1. BE3, BE3A, BE3B, and BE3D

Box BE3 comes with inner frame to form a cocoon; BE3A is without an inner frame offering more room inside of the box; BE3B comes with 8 round cavities, each 0.94"x0.62"H (24x16mm) for storing Vials DB20; BE3D comes with 6 round cavities each 1.29ix0.62ixH (33x16mm) for storing vials DDB30

Catalog Number	Outside Dimensions inch (mm)	Inside dimensions inch (mm)	Quantity
64300-3	5.31x3.89x0.70 (135x99x18)	4.01x2.55x0.59 (102x65x15)	10/pk
64300-3A	5.31x3.89x0.70 (135x99x18)	4.33x2.79x0.59 (110x71x15)	10/pk
64300-3B	5.31x3.89x0.70 (135x99x18)	4.33x2.79x0.59 (110x71x15)	10/pk
64300-3D	5.31x3.89x0.70 (135x99x18)	4.33x2.79x0.59 (110x71x15)	10/pk

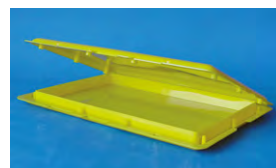
2. BE4, BE4A and BE4B

Box BE4 comes with an inner frame to form a cocoon; BE4A is without an inner frame for more room inside of the box; BE4B comes with 6 round cavities, each 0.94"x0.47"H (24x12mm) for storing vials DB10

Catalog Number	Outside Dimensions inch (mm)	Inside dimensions inch (mm)	Quantity
64300-4	4.49x3.70x0.55 (114x94x14)	3.26x2.36x0.35 (83x60x9)	10/pk
64300-4A	4.49x3.70x0.55 (114x94x14)	3.50x2.91x0.35 (89x74x10)	10/pk
64300-4B	4.49x3.70x0.55 (114x94x14)	3.50x2.91x0.35 (89x74x10)	10/pk

3. BE6

Large size with an inner frame. The yellow box (BE6Y) is accepted by the US Postal service AS-IS. No need for envelopes or other containers. This box is also available in clear (BE6C).



Catalog Number	Outside Dimensions inch (mm)	Inside dimensions inch (mm)	Quantity
64300-6Y	9.64x6.69x0.70 (245x170x18)	8.26x5.31x0.59 (210x135x15)	10/pk
64300-6C	9.64x6.69x0.70 (245x170x18)	8.26x5.31x0.59 (210x135x15)	10/pk

4. BE8 and BE8A

BE8 comes with an inner frame.

BE8A - The-Envelope-Mailer - comes without the inner frame.



Catalog Number	Outside Dimensions inch (mm)	Inside dimensions inch (mm)	Quantity
64300-8	3.70x2.56x0.55 (94x65x14)	2.44x1.22x0.39 (62x31x10)	10/pk
64300-8A	3.70x2.56x0.55 (94x65x14)	2.48x1.22x0.39 (64x31x10)	10/pk

5. BE9, BE9A, and BE9B

BE9 comes with single inner frame. BE9A comes with two compartments and BE9B comes with 4 compartments.



Catalog Number	Outside Dimensions inch (mm)	Inside dimensions inch (mm)	Quantity
64300-9	8.26x3.93x0.70 (210x100x18)	2x 7.80x1.26x0.59 (180x32x15)	10/pk
64300-9A	8.26x3.93x0.70 (210x100x18)	2x 7.80x1.26x0.59 (180x32x15)	10/pk
64300-9B	8.26x3.93x0.70 (210x100x18)	4x 3.42x1.26x0.59 (87x32x15)	10/pk

6. Vials DB10, DB20, and DB30:

Vial DB10 is designed for the Cocoon Box BE4B (64300-4B); Vial DB20 is designed for the cocoon Box BE3B (64300-3B); and Vial DB30 is designed for the Cocoon Box BE3D (64300-3D).



Catalog Number	Outside Dimensions inch (mm)	Inside dimensions inch (mm)	Quantity
64302-10	0.94 x 0.47 (24x12)	0.748 x 0.295 (19x7.5)	12/pk
64302-20	0.94 x 0.62 (24x16)	.708 x 0.511 (18x13)	12/pk
64302-30	1.29 x 0.62 (33x16)	1.102 x 0.62 (28x13)	12/pk

7. Locking Clips

Used to secure the cocoon boxes. Clips snap together to keep cocoon boxes securely lock.

100 clips per box.



Catalog	Description	Quantity
64301-10	Locking Clips	100/pk



► Vautainer® Storage Boxes

We now have two Sample Storage Boxes to accommodate our VACUTAINER® Tubes. Made from durable cardboard, medical laboratories, forensic laboratories, and hospitals will find these boxes extremely convenient for storing filled vials. These boxes are suitable for incubators, refrigerators, deep-freeze, and controlled atmosphere applications.

VACUTAINER® is a Registered Trademark of Becton Dickinson & Co.

Model 68-16-112 holds tubes from 10.25 to 16mm O.D. x 63 to 112mmL

Model 200-19-117 holds 200 tubes up to 19mm O.D. x up to 117mmL

Cat. #	Description	Pack	Cat. #	Description	Pack
64286	Vautainer® Storage Box, 68 Tubes	each	64287	Vautainer® Storage Box, 200 Tubes	each

► Sample Storage Sets

Compact space savers offered in a variety of sizes. Ideal for the storage of liquids, powders, small specimens, etc.... Each set includes a partitioned box, vials with caps, labels, reference chart, and an exterior card holder and card. Alpha-numerical indexing system allows quick identification and location of stored items.



► 1. Screw Cap Vial Series

Threaded glass vials with plastic lined caps.



■ Vial size 1 dram (3.8ml), 15mmx45mm, arrangement: 5x20;
Tray size 13"(L)x 3½"(W) x 2¼"(H)

64265 Sample Storage Set SCV1 100 vials/set

■ Vial size 2 dram (7.6ml), 17mmx60mm, arrangement; 5x20
Tray size 11¼"(L)x4¼"(W)x2¼"(H)

64266 Sample Storage Set SCV2 75 vials/set

► 2. Poly-Seal Screw Cap Series

The same as our screw cap series, but with Poly-seal caps and a cone shaped polyethylene liner.



■ Vial size 4 dram (15.2ml), 21mm x 70mm;
Tray size 9¼"(L) x 4¼"(W) x 3¼"(H), arrangement 5 x 10

64270 Sample Storage Set PSSC4 50 vials/set

■ Vial size 8 dram (26.6ml), 25mm x 95mm;
Tray size 10½"(L) x 5½"(W) x 4½"(H); arrangement 5 x 10

64271 Sample Storage Set PSSC8 50 vials/set

► 3. Snap Cap Shell Vial Series

Poly-plug, Knurled snap-caps are friction fitted with glass shell vial, straight sided, and a flat bottom.



■ Shell vial size 3 dram (10.4ml), 12mm x 114mm;
Tray size 13"(L) x 3½"(W) x 5"(H), arrangement 5 x 20

64276 Sample Storage Set SCSV3 100 vials/set

■ Shell vial size 4 dram (15.20ml), 25mm x 52mm;
Tray size 10½"(L) x 5½"(W) x 2½"(H), arrangement 5 x 10

64277 Sample Storage Set SCSV4 50 vials/set

■ Shell vial size 7 dram (36.6ml), 29mm x 65mm;
Tray size 13"(L) x 6¾"(L) x 3"(H), arrangement 5 x 10

64278 Sample Storage Set SCSV7 50 vials/set

For vial sizes of 10 and 12 dram please call us for prices and availability.

► 4. Square Bottle Series

A large size storage set. It comes with square clear glass bottles (1-ounce capacity) and black screw caps with plastic linings.



■ Bottle size 1 oz (29 ml), arrangement 5 x 10;
Tray size 12¼"(L) x 6½"(W) x 3¼"(H)

64281 Sample Storage Set SB1 50 bottles/set

■ Bottle size 2 oz (78 ml), arrangement 4 x 8;
Tray size 12"(L) x 6"(W) x 3½"(H)

64282 Sample Storage Set SB2 32 bottles/set

■ Bottle size 4 oz (116 ml), arrangement 3 x 7;
Tray size 12¼"(L) x 5½"(W) x 4½"(H)

64283 Sample Storage Set SB4 21 bottles/set

■ Bottle size ¼oz (7.5ml), 23 x 23 x 55mm, arrangement 5 x 10;
Tray size 9½" x 5" x 3½" (241.3x127x63.5mm)

64280 Sample Storage Set SB 0.25 50 bottles/set

► 5. Cork Stopper Vial Set

Most economical, straight-sided, flat bottom, glass shell vial with high quality cork closures. Ideally suited for storing small parts, geological specimens, soil and many other types of samples.



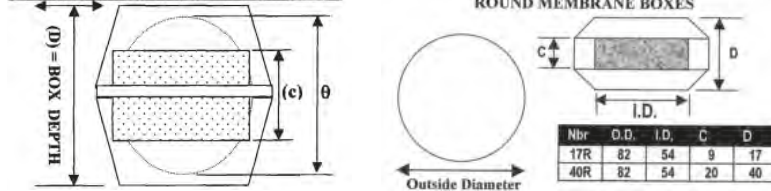
■ Vial size 3 dr (10.4ml), 12 mm dia x 114 mm H, arrangement 5x20.
Tray size 11½" x 3" x 5" (292.1x76.2x127mm)

64269 Sample Storage Set SK-3 100 vials/set

► Membrane Boxes

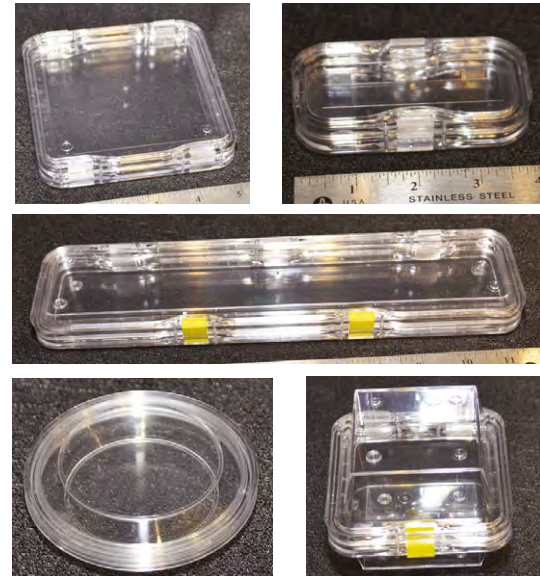
Our unique membrane storage boxes for the transfer, storage and shipping of many delicate items. Available in 5 different shapes and sizes these plastic containers, with a double elastic membrane on the top and bottom, offer security for all of your sensitive items. Once your item is placed in the box the elastic membrane conforms around the enclosed object and protects it from any movement.

ALL MEASUREMENTS ARE IN MILLIMETERS (mm)



Round Membrane Boxes

Cat. #	O.D, mm	I.D, mm	C	D	Qty
64304-20	82	54	20	40	each
64304-30	82	54	9	17	each



Cat. #	Overall Dimensions			Maximum Useful Area Dimensions			Capacity Weight	Qty
	L, mm	W, mm	D, mm	L, mm	W, mm	D, mm		
Rectangular Boxes								
64304-27	250	200	212	162	18	—	—	each
64304-28	250	200	204	154	40	—	—	each
64304-29	100	50	67	20	20	—	—	each
64304-36	100	50	16	67	17	9	8g	each
64304-38	100	75	16	67	42	9	19g	each
64304-39	100	75	25	62	37	18	31g	each
64304-40	125	75	25	87	37	18	44g	each
64304-41	150	75	25	112	37	18	56g	each
64304-42	150	125	25	112	87	18	132g	each
64304-43	150	125	50	112	79	20	246g	each
64304-44	250	200	100	188	138	60	1557g	each
64304-45	250	200	200	157	—	—	3371g	each
64304-46	300	150	16	267	117	9	211g	each
64304-51	100	50	50	54	17	12	—	each
<i>This box has no stackable feet.</i>								
64304-52	150	100	25	92	92	9	—	each
64304-53	300	75	25	262	37	18	—	each
64304-54	150	100	75	104	54	59	—	each
64304-55	300	150	25	267	117	19	—	each
64304-56	300	150	75	246	96	60	—	each
64304-57	175	100	25	137	62	18	—	each
64304-58	175	100	50	129	54	40	—	each
64304-59	200	150	50	154	104	40	—	each
Square Boxes								
64304-10	38	38	18	31	31	9	10g	12/pk
64304-11	100	100	16	67	67	9	30g	each
64304-12	100	100	25	62	62	18	52g	each
64304-13	100	100	50	54	54	40	88g	each
64304-14	125	125	16	92	92	9	57g	each
64304-15	125	125	25	87	87	18	102g	each
64304-16	125	125	50	79	79	40	187g	each
64304-17	150	150	100	88	88	80	465g	each
64304-18	125	125	75	92	92	60	—	each
64304-19	150	150	25	112	112	18	—	each
64304-21	150	150	75	104	104	60	—	each
64304-22	100	100	75	—	—	—	—	each
64304-23	175	175	25	137	137	18	—	each
64304-24	175	175	50	129	129	40	—	each
64304-25	200	200	25	162	162	18	—	each
64304-26	200	200	50	154	154	40	—	each
64304-50	150	150	50	104	104	40	324g	each

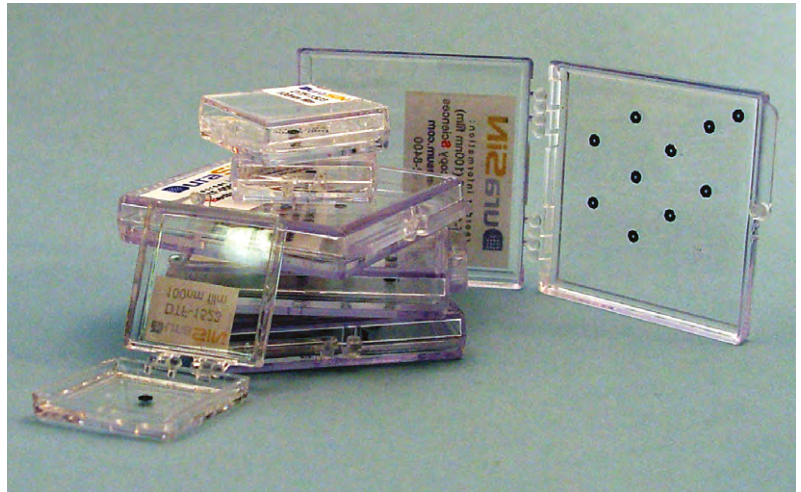
► Gel-Pak® Storage/Carrier Box

Patented gel technology – the innovative solutions for storage and carrying delicate materials

The traditional Gel-Box, Gel-Tray® and Gel-Slide Carriers are perfect for applications where devices are manually offloaded by tweezers or by hand.

- **Gel-Box (AD Series)** - Hinged plastic boxes coated with Gel in the bottom.
- **Gel-Tray® (BD Series)** - A removable 2" plastic tray coated with Gel and contained inside a hinged plastic box.
- **Gel-Slide (CD series)** - A removable 2" glass slide coated with Gel and contained inside a hinged plastic box.

(Gel-Pak® is A Division of Delphon Industries)



► GEL-BOX (AD Carrier Boxes)

Gel-Box AD Series Carriers owe their unique device-holding capabilities to a proprietary GEL coating applied directly to the bottom of a hinged box. Devices are held once contact is made with the GEL surface and will stay in place, even if the carrier is tilted or jarred. The carriers are designed for manual off-loading with tweezers or by hand. GEL-PAK AD series are ideal for handling devices where no direct contact with the top of the device is important.

The GEL-BOX Carriers may also be used for bare die handling, such as GaAs, PETs, laser diodes, and beam-lead devices where the die size is small (less than 1mm) and tweezers or other specialized techniques are used for off-handling.

FEATURES:

- No need for custom-molded containers for each device size.
- Ideal for handling subassemblies, hybrid models and packaged devices.
- Available in Transparent, Conductive and Anti-Static carriers in multiple sizes.
- Retention Level available: x0, x1, x2, x3, x4, x5, and x8 (the higher the number the more retention capability)

We offer standard retention level X4. Other retention levels are available with the order of 100 or more, and at least two weeks for delivery.

► GEL-TRAY® (BD Series) And GEL-SLIDE (CD Series)

Same as the Gel-Box, the Gel-Tray and Gel-Slide products are intended for manual applications in which the devices are loaded and unloaded using tweezers or by fingers. The Gel-Pak BD and CD series of pocketless trays are both configured as a 2" carrier stored in a protective plastic hinged box. The Gel coating is applied directly to the surface of the plastic tray (BD Series) or glass slide (CD Series).

These products offer the same functionality as the Gel-Box, however the plastic tray or glass slide can be easily removed from the box allowing for convenient handling when loading or unloading fixtures are being used.

The Gel-Slide (coated glass slides) is designed for higher temperature applications such as bonding and reflow where a plastic tray will not work. The CD slide has a temperature capability up to 220°C. The CD glass slides are also ideal for backside inspection due to their optical clarity.

Both the Gel-Tray and Gel-Slide products are available in the standard retention levels (X0, X4, X5, and X8) to accommodate variations in device size, weight, and surface roughness.

The protective 2" hinged boxes are available in transparent styrene (T), conductive black (C) and antistatic (AS) materials. The boxes, trays, and slides may be customized with a print pattern (grid) or company logo. Standard available Prints can be viewed at Gel-Tray/Gel-Slide Print options

Cat #	Description - Overall Box size	Qty
64900-x4	1"x1"x 1/4" Transparent Hinged Box	50/pk
64901-x3	2" x 2" x 0.25" Antistatic Gel-Box	50/pk
64901-x4	2"x2"x1/4" Conductive Hinged Box	50/pk
64902-x4	2"x2"x1/4" Anti-Static Top & Conductive Hinged Box	50/pk
64903-x4	2"x2"x1/4" Anti-Static Hinged Box	50/pk
64904-x4	2"x3"x3/8" Conductive Hinged Box	50/pk
64905-x4	2"x3"x3/8" Anti-Static & Conductive Hinged Box	50/pk
64906-x4	3.5"x4.5"x0.5" Conductive Hinged Box	50/pk
64908-X3	4.5" x 3.5" x 0.875" Conductive Base/Antistatic Lid Gel-Box	50/pk
64907-x4	3.5"x4.5"x7/8" Transparent Hinged Box	50/pk
64908-x4	3.5"x4.5"x7/8" Conductive Hinged Box	50/pk
64909-x4	2.5"x3.5"x0.5" Anti Static Top & Conductive Hinged Box	50/pk
64910-x3	6" x 4" x 0.5" Conductive Gel-Box	50/pk
64911-x3	6" x 4" x 0.5" Transparent Gel-Box	50/pk
64912-x3	7" x 5" x 1" Conductive Base/Antistatic Lid Gel-Box	50/pk
64913-x3	7" x 5" x 1" Conductive Gel-Box	50/pk
64914-x3	7.75" x 3.5" x 1" Conductive Gel-Box	50/pk
64915-x3	9.937" x 3.5" x 0.625" Transparent Gel-Box	50/pk

Cat #	Description	Qty
64900-10	2" x 2" Conductive BD Tray in Antistatic Hinged Box	50/pk
64900-11	2" x 2" Conductive BD Tray in Conductive Base/Antistatic Lid Hinged Box	50/pk
64900-12	2" x 2" Conductive BD Tray in Conductive Base/Transparent Lid Hinged Box	50/pk
64900-13	2" x 2" Conductive BD Tray in Conductive Hinged Box	50/pk
64900-14	2" x 2" Conductive BD Tray in Transparent Hinged Box	50/pk
64900-15	2" x 2" Conductive BD Tray in "High Clearance" Antistatic Hinged Box	50/pk
64900-16	2" x 2" Transparent BD Tray in Antistatic Hinged Box	50/pk
64900-17	2" x 2" Transparent BD Tray in Conductive Base/Antistatic Lid Hinged Box	50/pk
64900-18	2" x 2" Transparent BD Tray in Conductive Hinged Box	50/pk
64900-19	2" x 2" Transparent BD Tray in Transparent Hinged Box	50/pk
64900-20	2" x 2" Glass Slide in Transparent Hinged Box	50/pk
64900-21	2" x 2" Glass Slide in Conductive Hinged Box	50/pk
64900-22	2" x 2" Glass Slide in Antistatic Hinged Box	50/pk
64900-23	2" x 2" Glass Slide in MAG-40 Cassette	50/pk

► The EMS Single and Multi Wafer Containers

EMS is proud to introduce our complete line of carriers for either storage and or shipping of a variety of sizes of wafers (Any material) from 1"-6" in diameter.

The Containers are made from polypropylene and they prevent all types of damage and contamination to the wafer during shipping and even storage. Each of the containers are packed in 1000 class clean room and bag. The set includes the Container, the cover and the spring

There is as well a single container that will accommodate a variety of sizes from 4-6" by simply adjusting the silicone supports in the box. These boxes are transparent in color and are made from Anti- Electrostatic Polycarbonate.

For the Multi Wafer containers they have a storage capacity of 25 wafers maximum and they come complete with the Base and the cover.

► Tissue Mounting Stub



Tissue Mounting Stubs

Machined from aluminum rods with one end tapered to 4.8mm in diameter. The specimen can be oriented and mounted to the tip with glue and it is ready for sectioning. The body size is "00" and it measures 11mm long.

70145-05	Aluminum Tissue Mounting Stub	50/pk
70145-10	Aluminum Tissue Mounting Stub	100/pk

► BEEM® Capsules; Embedding, Size 00, 8mm I.D.

Polyethylene embedding capsules with 1x1mm face at the tip of a truncated pyramid, each with a hinged cap.



Size '00' Embedding Capsules

70000	BEEM® Embedding Capsule	100/pk
70010	BEEM® Embedding Capsule	500/pk
70020	BEEM® Embedding Capsule	1000/pk

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► BEEM® Embedding Capsules Size 3 (small)

These capsules, made from polyethylene, produce blocks with a 5.6mm O.D. and a pyramid tip. Comes complete with a hinged cap.



Size 3 Embedding Capsules

69911-01	BEEM® Capsule Size 3	100/pk
69911-05	BEEM® Capsule Size 3	500/pk
69911-10	BEEM® Capsule Size 3	1000/pk

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► BEEM® Dial-A-Grid-Grid Holder

► BEEM® Dial-A-Grid and Block Holder

See Grid Section, page 144 >>>>



64917-46



64917-1



64918-3

Cat. #	Description	Measurements	Qty.
64917-1	Single Wafer Container 1" (25mm)	33mm x 10mm	6/pack
64917-2	Single Wafer Container 2" (50mm)	60mm x 11mm	6/pack
64917-25	Single Wafer Container 2.5" (63mm)	75mm x 11mm	6/pack
64917-3	Single Wafer Container 3" (75mm)	84mm x 11mm	6/pack
64917-4	Single Wafer Container 4" (100mm)	110mm x 11mm	6/pack
64917-6	Single Wafer Container 6" (150mm)	160mm x 11mm	6/pack
64917-46	Single Wafer Container 4-6" (100-150mm),	170mm x 170mm x 20mm	6/pack
64918-2	Multi Wafer Container 2" (50mm)	-	3/pack
64918-3	Multi Wafer Container 3" (75mm)	-	3/pack
64918-4	Multi Wafer Container 4" (100mm)	-	3/pack

► BEEM® Embedding Capsules; Special Shapes



Bottle Neck Embedding Capsules



BEEM Conical Tip Embedding Capsules

Available in two specially shaped capsules which are designed to overcome commonly encountered embedding problems; such as, small or thin elongated specimens and powder samples. These capsules are also good for centrifuging precipitated matters and allows for less trimming.

- The bottle neck capsule produces a 7.9mm OD block with a hemihyperpoloid (rather than faced) tip.
- The conical capsule produces a 7.9mm OD block with a conical (rather than faced) tip.

69912-01	BEEM® Capsule Bottle Neck Tip	100/pk
69912-05	BEEM® Capsule Bottle Neck Tip	500/pk
69912-10	BEEM® Capsule Bottle Neck Tip	1000/pk
69913-01	BEEM® Capsule Conical Tip	100/pk
69913-05	BEEM® Capsule Conical Tip	500/pk
69913-10	BEEM® Capsule Conical Tip	1000/pk

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► Embedding Capsules; Flat

Added to our extensive line of embedding capsules is our flat bottomed capsules, which are made from polyethylene, and are 8mm (just like the standard 00 capsules) in diameter.

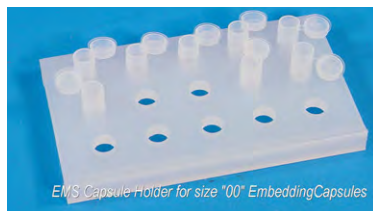


Flat Bottom Embedding Capsules

70021	Flat Bottom Embedding Capsules	500/pk
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► Embedding Capsule Holder

Fabricated from polyethylene. It accommodates 15 embedding capsules size "00". The



EMS Capsule Holder for size "00" Embedding Capsules

whole capsule is exposed to allow for even heat and/or UV light distribution during polymerization. Sturdy, long lasting, and stackable. Measures: 5"(L)x3"(W) (127mmx76mm).

70022-01	EMS Capsule Holder	each
70022-04	EMS Capsule Holder	4/pk
70022-06	EMS Capsule Holder	6/pk
70022-12	EMS Capsule Holder	1 doz.

► Multi Task BEEM Capsule Holder:

This Multi-Task BEEM Capsule Holder is an innovative holder designed to hold size "00" BEEM capsule during resin polymerization.

This holder is also a perfect tool when embedding and polymerizing resin by microwave, especially when the embedment needs to be performed under water. The direct contact of the microwave energy to the

resin inside the microwave is usually causes the resin to heat to quick and that leads to micro bubbles forming inside the resin block and this causes unknown damage to the tissues. To help eliminate this problem, the resin capsule should be immersed in the water bath during microwave irradiation of the resin. This 'indirect contact' of microwave energy to the resin will help the embedding block polymerize nicely and homogeneously and also avoids the overheating of the tissue.

Mold is machined from polyethylene block, comes in two parts: bottom part which holds the BEEM capsule, and the second part which is placed on top and is secured by two plastic screws to ensure the BEEM capsules are in place and capsule lid will not pop out during under water polymerization or microwave irradiation.

Accompanies is microwave transparent tray, which holds water and capsule holder for microwave processing.

Measures: 1-1/8" (L) x 3" (W) x 2" (H), accommodates 24 capsules.

You can order either the Multi-Task Capsule Holder only, or the set which includes one Capsule Holder and one Tray.



70023-01	Multi Task BEEM Capsule Holder,	each
70023-10	Multi Task BEEM Capsule Holder Set	each
97082	Microwave Transparent Tray, 10/pack	each

Beem Flat Embedding Molds, See page 252 >>>

EMS
EXCLUSIVE

► BEEM® Capsule Holders

These holders are used to hold capsules upright during the resin embedding stage. The cavities (22) allow for illumination from the bottom of the holder for specimen orientation. Available in two sizes: one holds size "00", conical, and bottle neck capsules; the other holds size #3 capsules.

Measures 5-1/2" (L) x 4" (W) x 7/8" (H) 138 x 100 x 12mm

69916-01	BEEM® Capsule Holder size "00"	each
69916-06	BEEM® Capsule Holder size "00"	6/pk
69916-12	BEEM® Capsule Holder size "00"	12/pk
69917-01-3	BEEM® Capsule Holder size 3	each
69917-06-3	BEEM® Capsule Holder size 3	6/pak
69917-12-3	BEEM® Capsule Holder size 3	12/pk

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► The Opaque BEEM® Capsule Holder

If microwaving or UV polymerizing of your embedding media these opaque Beem capsule holders are perfect. Made from Polypropylene. All embedding capsules size 00 and 3 fit it.

69915-01	BEEM® Capsule "00" Holder, Clear	each
69915-06	BEEM® Capsule "00" Holder, Clear	6/pk
69915-12	BEEM® Capsule "00" Holder, Clear	12/pk
69915-03-3	BEEM® Capsule "3" Holder, Clear	each
69915-06-3	BEEM® Capsule "3" Holder, Clear	6/pk
69915-12-3	BEEM® Capsule "3" Holder, Clear	12/pk

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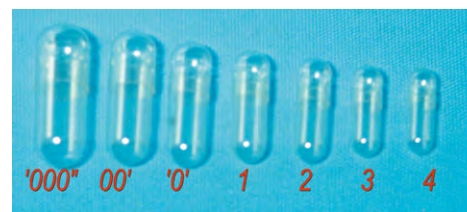


The Opaque BEEM Capsule Holder

► Capsules; Gelatin

Natural, hard gelatin capsules. To be used as an embedding mold for water miscible resins, or resins which need to be cured by transmitted light. Gelatin capsules dissolve or disintegrate within 5 minutes when immersed in a 0.5% HCl solution at 36-38°C, within 2 minutes in water at 37°C or in artificial gastric juice.

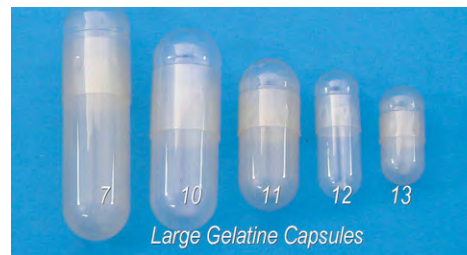
Cat.#	Size	Overall Inches	Length (mm)	Body Inches	Diameter (mm)	Volume (ml)	Pack
70101	000	1.029	26.14	0.376	9.55	1.37	1000
70100	00	.917	23.30	0.322	8.18	0.95	1000
70110	0	.835	21.20	0.289	7.34	0.68	1000
70103	2	.688	17.50	0.239	6.07	0.37	1000
70104	3	.610	15.50	0.219	5.56	0.30	1000
70105	4	.547	13.90	0.199	5.05	0.21	1000



► Large Gelatin Capsules

Our large size gelatin capsules are ideal for storing either delicate or small items. It is also suitable for use as an embedding mold for paraffin or paraplast. The capsules come complete with a locking ring. A variety of sizes are available.

Cat.#	Size	Length (mm)	Diameter (mm)	Volume (oz.)	Pack
70114	13	24	13	¼	50
70115	12	33	13	¼	50
70116	11	38	19	½	50
70117	10	52	22	1	50
70118	07	66	22	1½	50



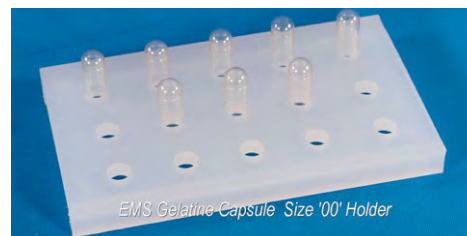
Large Gelatine Capsules

► Gelatin Capsule Holder

Made from durable polyethylene. It accommodates 15 gelatin capsules size "00". The whole capsule is exposed to allow for even heat and/or UV light distribution during polymerization. Measures: 5"(L) x 3"(W) (127mm x 76mm).

**EMS
EXCLUSIVE**

70120-01	Gelatin Capsule Holder	each
70120-04	Gelatin Capsule Holder	4/pk
70120-06	Gelatin Capsule Holder	6/pk



EMS Gelatine Capsule Size '00' Holder

► BEEM® Capsule Press

Designed to facilitate the removal of blocks from the capsule without any damage to the block tip.

PLEASE NOTE: FOR BEEM capsule size #3, an adapter is included.



Cat. #	Description	Qty.
69920-00	BEEM® Capsule Press	each

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► BEEM® Block Storage

A two tone color coded plastic box with insert, which allows for the storage of up to 10 blocks in the numbered cavities.

Measures: 2½"(L)x1¼"(W)x½"(H) 57x45x12.5mm



Cat. #	Description	Qty.
69922-01	BEEM® Block Storage	each
69922-05	BEEM® Block Storage	50/pk
69922-10	BEEM® Block Storage	100/pk

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► Capsule Block Storage

Stores 15 capsule blocks in numbered cavities.



Cat. #	Description	Qty.
69923-01	Capsule Block Storage Box	ea
69923-05	Capsule Block Storage Box	50/pk
69923-10	Capsule Block Storage Box	100/pk

► EMS EM5 Embedding Molds

Introducing the EM5 - an innovative new design based on the widely used Ø8 mm size embedding mold. The unique two part design allows for easy removal of resin blocks, as well as incorporating many other advantages over currently available embedding products.

- Separate base and tube sections that clip together to form the familiar capsule shape.

- Care should be taken that each component is free of debris before attaching together, to ensure a proper seal.

- Easy removal of resin blocks achieved by simply pulling the mold apart by hand.

- The mold can produce blocks up to 20mm in length, however shorter blocks (~14mm) allow for easier removal. No razor blades or capsule presses are required.

- The detachable cap section allows for easier access and manipulation of a specimen.

- For more accurate specimen alignment a small amount of resin can be cured or partially cured before clipping to the body and completing the resin block. When fully cured they form strong homogeneous blocks.

- Each mold can be clipped to other molds, allowing for the creation of trays of desired size. For volatile resins, another cap section can be clipped on to the top of the mold, creating an air tight seal.

- Each cavity is numbered 1 < 5, whilst the end support stands have designated areas for writing indexing numbers or comments.



2 part - Ø8mm body with 2mm cylindrical cone cap



EM5-8B/PP 5 Block Ø8mm body.
Material: Polypropylene



EM5-8C-C/PP 5 Block 2mm cylindrical cone cap.
Material: Polypropylene



Multiple array

Cat. #	Description	Qty.
69934-10	EM5-8B-PE 5 Block Embedding Mold-8mm Body	25/Pack
69934-20	EM5-8C-C/PE 5 Block Embedding Mold-2mm Cylindrical Cone Cap	10/Pack
69934-30	5 Block Embedding Mold-2 Part- 8mm Body with 2mm Cylindrical Cap	10/PACK

► Plastic Flat Embedding Mold

- Injected molded polyethylene.

- Resistant to most embedding materials.

- Easy peeled-off the blocks.

Mold fits perfectly inside the cocoon box BE8 (64300-8); See Cocoon Box section.

When the mold and the box BE8 are used together, the set allows for the use of oxygen-prohibited embedding materials (I.e: LR White) to be polymerized in a flat orientation.

These molds are reusable. Each cavity measures 12mm(L) x 5mm(W) x 3.5mm Deep.

Overall mold measures: 94 x 56 x 14mm.

Cat. #	Description	Qty.
70905-01	EMS Molded Flat Embedding Mold	ea
70905-12	EMS Molded Flat Embedding Mold	12/pk



► Easy-Molds™

Made from polyethylene, designed for convenience of use and offers better embedment. This tray-and-mold in one unit offers a unique specimen block that no other mold can.

FEATURES: (SEE ILLUSTRATIONS AT THE RIGHT)

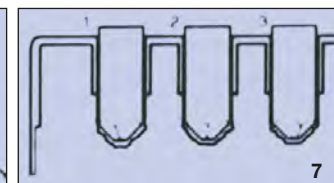
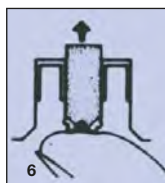
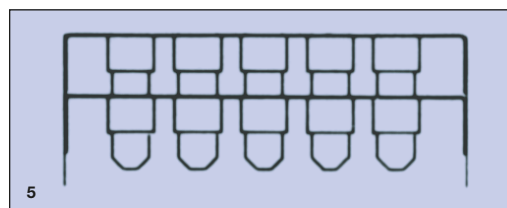
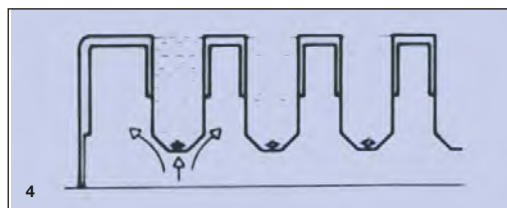
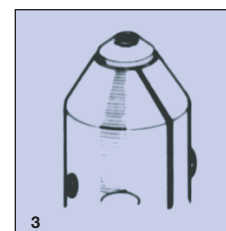
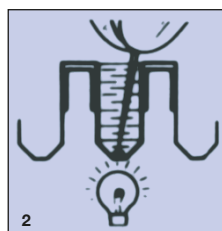
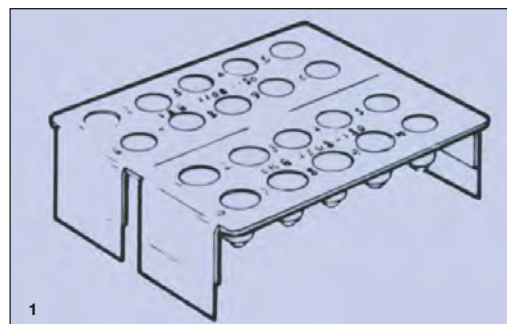
1. **Trays-and-molds are self standing** — There is no need for a holding tray.
2. **Easy Orientation of Specimens** — The tip of each mold is only 0.3mm thick and is designed to be transparent. This facilitates the orientation of your specimen prior to polymerization.
3. **They form a Universal Block** — Many microscopists have to embed large specimens. The Easy Mold tip forms a flat block face which is wide enough for large specimens. This wide surface helps to prevent air bubbles being trapped around the specimen during polymerization. In addition, a positive guide form on the block offers an accurate position for clamping.
4. **Free Airflow for Even Polymerization** — Easy Mold trays raise the molds away from the surface of the oven, allowing air of a constant temperature to circulate freely and evenly around the specimen tip during the hardening process.
5. **Sealing of Capsules** — If you are using Acrylate or other volatile embedding mediums (LR White, GMA, HPMA), the molds can be sealed by placing another Easy Mold on the top, and by applying a little pressure you can seal the capsule completely.
6. **Easy to Remove the Polymerized Block** — Due to the softness of the bottom of the mold, to release the block simply push the bottom of the mold with your thumb and your block will just pop out. There is no need for razor blades or a Capsule Press!
7. **Convenient Storage and Identification of Sectioned Blocks** — Each cavity on the Easy Mold is numbered, and data can be written on the trays. Used Easy Molds can be used for the storage of blocks which have already been sectioned, and filed away by stacking one tray on top of another. There is no need for block storage boxes.

TECHNICAL SPECIFICATIONS:

Each tray contains 2x10 block molds and measures 87x66mm. They are available in two sizes:

- Size 5.6mm diameter, which corresponds to gelatin and BEEM* capsules size 3, and forms a block face of 1.6mm.
- Size 8mm diameter, which corresponds to gelatin and BEEM* capsule size "00" and forms a block face of 3mm.

69930-05	Easy Mold, Size 3	5 Trays
69930-25	Easy Mold, Size 3	25 Trays
69930-50	Easy Mold, Size 3	50 Trays
69931-05	Easy Mold, Size "00"	5 Trays
69931-25	Easy Mold, Size "00"	25 Trays
69931-50	Easy Mold, Size "00"	50 Trays



Tough-Tags® on a Roll

Perfectly sized to fit microcentrifuge tubes and other containers in the laboratory

Compatible – Tough-Tags are pre-cut, peel-off labels that accept any marking instrument.

Convenient – Dispensing box assists in labeling individual tubes used in small experiments.



For more information, see page 1133 ▶▶▶▶

► BEEM® Specimen Block Storage System 2000®

- Are your bench-tops and drawers crowded with petri dishes and pillboxes full of various sized specimen blocks?
- Have you been spent hours to look for a block for re-sectioning?
- Do you wish you could neatly catalog, file and store all of those blocks in one convenient place?

If you answer yes to any of those questions, now you can organize and safely store all of your specimen blocks with the newly introduced BEEM® Specimen Storage System 2000®

The system consists of four newly designed Blocklock® storage modules (#69956, #69957, #69958, #69959) and a Covered Mounting Panel (#69950) that fits in a standard "D-Type" 3-ring binder (optional) – A 1-inch binder will accommodate two Covered Mounting Panels, and 1.5-inch binder accommodates three Panels.

Each Blocklock module has an adhesive backing which when exposed permits it to be permanently mounted on any grease-free surface.

All Blocklocks can be inserted in a Plastic Protective Box (EMS #69956-B & 69958-B, #69957-B, and 69959-B) or, by utilizing the adhesive feature, mounted in combination with other Blocklock modules on the BEEM® mounting panel (EMS #66950). This new Storage System 2000 permits blocks size "00", size "3", and BEEM® flat embedment to be indexed, combined under one cover along with any associated data sheets, and stored upright in 3-ring binders, on the shelf, at your reach for ready reference.

This system is infinitely expandable to high or low volume block storage. The choice is yours.

► 1. Capsule Blocklock Storage Modules

incorporate an innovation that allows blocks to snap into cavities specially designed to retain them so they cannot be inadvertently dislodged. Number and letter identify each cavity. Available with three configurations:

- Model 2006 measures 2 $\frac{1}{8}$ "L x 2" W x $\frac{1}{4}$ "H (74 x 50 x 8mm); accommodates 12 size "00" blocks
- Model 2007 measures 4 $\frac{1}{8}$ "L x 3 $\frac{1}{2}$ " W x $\frac{5}{16}$ "H (117 x 90 x 8mm), accommodates 40 size "00" blocks.
- Model 2008 measures 2 $\frac{1}{8}$ "L x 2" W x $\frac{1}{4}$ "H (74 x 50 x 6mm), accommodates 20 size "3" capsule blocks.

► 2. BEEM® Blocklock Storage Modules Model 2009

is the same features as Capsule Blocklocks. Measures 2 $\frac{1}{8}$ "L x 2" W x $\frac{1}{4}$ "H (74 x 50 x 8mm), accommodates 20 BEEM flat blocks. (BEEM flat embedding mold, EMS #70904-01

NOTE: Do to the rectangular shape of a BEEM flat embedment; it must be inserted into the cavity in a Blocklock module #69959 as follows: Introduce the front of the block at a slight angle into the rear of the cavity and gently push it forward until it nests in the recess.

► 3. BEEM® Blocklock Storage Boxes

Heavy-duty, two tone plastic boxes are supplied with indexed, translucent labels, which can be applied to the top or bottom of the box.

- Box #69906-B and #69908-B are the same size and are two-tone blue/clear. Overall measurement: 3"(L) x 2 $\frac{1}{8}$ "(W) x $\frac{1}{2}$ "(H) (78 x 54 x 13mm).
- Box #69957-B is two-tone blue/clear. Overall measurement: 4 $\frac{1}{4}$ "(L) x 3 $\frac{3}{4}$ "(W) x $\frac{1}{2}$ "(H) (120 x 94 x 13mm)
- Box #69959-B is two-tone black/clear. Overall measurements are the same as #69956-B and #69958-B

► 4. BEEM® Mounting Panel

with clear cover is designed to accept both Blocklock Storage Modules and BEEM original Dial-A-Grid (EMS #71148) and Block Storage Modules (EMS #69922), which can be attached to the panel using double sided adhesive tape. Grid storage boxes from other manufacturers may be attached this way also if they do not exceed 3/8" in height.

The panel inside measures: 10 $\frac{1}{2}$ "(L) x 7 $\frac{1}{2}$ "(W) x $\frac{3}{8}$ "(H) (270 x 190 x 12mm). The overall measurement is 11 $\frac{1}{2}$ "(L) x 8 $\frac{3}{4}$ "(W) x $\frac{5}{16}$ "(H) (290 x 225 x 22mm)



► BEEM® Flat Embedding Molds

See page 252 >>>>

BEEM® Is A Registered Trademark of Better Equipment For Electron Microscopy, Inc.



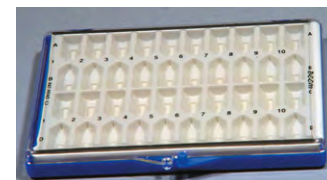
69958-B & 69958



69959-B & 69959



69956-B & 69956



69957-B & 69957



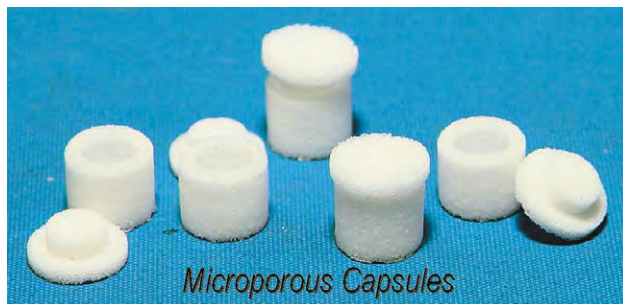
69960-10

Ordering: Note: Blocklocks and their Storage Boxes are sold separately.

Description	BEEM	EMS #	Pack
Mounting Panel with Clear Cover	2010	69950	each
Blocklock, Size "00", 12 Positions	2006	69956	each
Blocklock Storage Box for #69956	2006B	69956-B	each
Blocklock, Size "00", 40 Positions	2007	69957	each
Blocklock Storage Box for #69957	2007B	69957-B	each
Blocklock, Size "3", 20 Positions	2008	69958	each
Blocklock Storage Box for #69958	2008B	69958-B	each
Blocklock Flat embedment, 20 positions	2009	69959	each
Blocklock Storage Box for #69959	2009B	69959-B	each
"D-Type" 3-Ring Binder, 1inch		69960-10	each
"D-Type" 3-Ring Binder, 1.5 inch		69960-15	each

► Microporous Specimen Capsules

These capsules measure 12mm in diameter and are 11mm high. They are available in three different pore sizes: 30, 78, 120-200 microns.

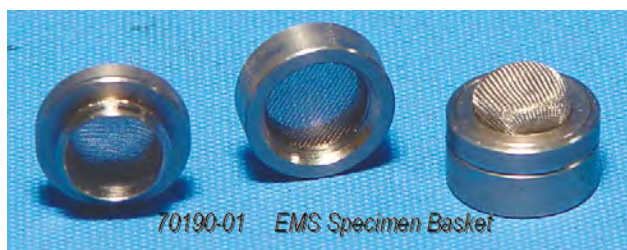


70187-10	Microporous Specimen Capsules, 78 microns	50/pk
70187-11	Microporous Specimen Capsules, 78 microns	100/pk
70187-20	Microporous Specimen Capsules, 30 microns	50/pk
70187-21	Microporous Specimen Capsules, 30 microns	100/pk

► Specimen Basket; Stainless Steel

Both the top and the bottom are made from a stainless steel mesh, which offers good fluid circulation. Has a male and a female threading for a secure closure.

Measures: 12mm(ID)x13mm(H) (1/2"x1/2")



70190-01	Specimen Basket	each
70190-06	Specimen Basket	6/pk

► Specimen/ Cleaning Basket

This basket is brass with a stainless steel mesh attached to both ends; the mesh opening is 300µm. (The inside diameter is 12.5mm, 15mm height. (16mm ODx17mmH). To use, simply screw both halves together and you can keep small specimens for long periods of time during the process of fixing, dehydration or even critical point drying. It can also be used to hold small parts for ultrasonic cleaning.

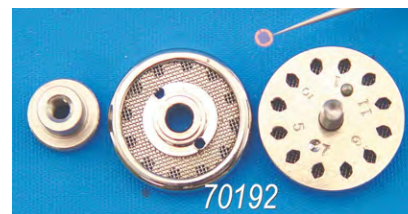


70190-21	Specimen/Cleaning Basket	each
70190-26	Specimen/Cleaning Basket	6/pk

► Critical Point Drier Accessories:

► 1. TEM Grid Holder

Machined from solid steel; has a stainless steel mesh on the top and the bottom. Featuring the most advanced design which assures no damage to the grids during processing. These holders are Brass-Nickel plated, very sturdy, and withstand all critical conditions. Holds 12 grids in numbered slots. Dimensions: 24mm(D)x24mm(H)



70192-01	Grid Holder	each
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► 2. Coverslip Holder

Brass/Nickel plated. Coverslips can be stacked with spacers (up to 15 coverslips with a thickness up to 2mm) with samples placed on top of each coverslip. Fluids freely exchange between coverslips. Both spacers and weights come with the unit. The upper part of the holder is grooved to accept tweezers.



Available in two configurations:

- Coverslip Holder 1: for 9 to 13 mm diameter coverslips; accommodates 10 coverslips. Dimensions: 16mm(D)x24mm(H).
- Coverslip Holder 2: for 16 to 22 mm diameter coverslips; accommodates 10 coverslips. Dimensions: 24mm(D)x25mm(H).

70193-01	Coverslip Holder 1	each
70193-02	Coverslip Holder 2	each

► 3. Specimen Holders

Machined from solid steel, brass/nickel plated; incorporates a stainless steel mesh top and bottom to allow for fluid exchange.

- 12 Specimen holder: comes with two sections; each section holds 6 specimens into 6 cavities, each cavity measuring 7.5mm (D)x6mm(H). The overall unit measures: 24mm(D) x 24mm(H).
- 24 Specimen holder: comes with two sections; each section holds 12 specimens into 12 cavities, each cavity measuring 4.5mm(D) x 6mm(H). The overall unit measures: 24mm(D) x 28mm(H).
- 4 Specimen holder: comes with one section which holds 4 or multiples of or large samples 4-9mm(D)x16mm(H) cavities. The overall unit measures: 24mm(D)x28mm(H).



70194-12	12 Specimen Holder	each
70194-24	24 Specimen Holder	each
70194-04	4 Specimen Holder	each

► Stainless Steel Baskets with Multiple Compartments

EMS has introduced and is now available a variety of Stainless steel baskets with lids and multiple compartments for critical point Drying. These baskets are either 15mm in diameter or 23mm.



Cat. #	Description	Pack
70194-26	Tissue basket with Lid 15mm(D) x 10mm (h)	each
70194-27	Tissue Basket with Lid 23mm(d) x 18mm (h)	each
70194-28	4 Compartment Tissue Basket with Lid 15mm(d) x 10mm (h)	each
70194-29	4 Compartment Tissue Basket with Lid 23mm(d) x 18mm (h)	each

► Stainless Steel Tissue Capsules

- A secure positive snap-on cover.
- Perforated on the top and bottom for easy fluid circulation.
- Can be partitioned for up to 4 sections.

The separator is not included.

Measurements: 37mm(I.D.)x6mm(deep) (1 $\frac{1}{16}$ "x $\frac{3}{16}$ ")

62320-01	SS Tissue Capsule	each
62320-06	SS Tissue Capsule	6/pk
62320-20	Tissue Capsule Separator	2/pk



► Plastic Tissue Capsules

- Molded from polyethylene; resistant to all processing chemicals, including Zenker's fixative.
- A three compartment divider which is removable for specimens up to 35mm.
- A weighted end floats the capsule in a upright position to conserve space.



Plastic Tissue Capsules

- Perforated on the top and bottom for better circulation of the fluid.

- Snap-on hinged cover.

They measure: 35mm(I.D.) x 35mm(I.D.) x 10mm(deep) (1 $\frac{3}{8}$ "x $\frac{3}{8}$ ")

62322-12	Plastic Tissue Capsules	12/pk
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► Biopsy Foam Pads

A cellular polyester blue foam that has uniform air pockets throughout the pad for optimal fluid flow. It prevents either small or fragmented tissue specimens from being lost.

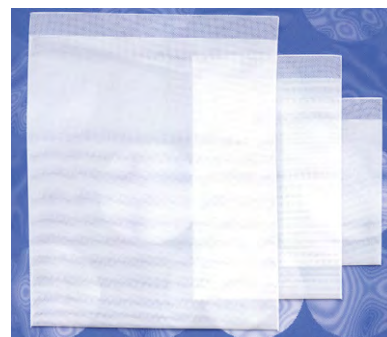
To Use: Place small samples or specimen fragments between the two pads and place the specimen in a cassette or capsule.



Cat. No	Foam Pad Size	Use With	Pack
62325-01	25mm Diameter	29mm Capsules	1000/pk
62325-04	35mm Diameter	38mm Capsules	1000/pk
62325-06	25mmx32mm	1x1 $\frac{1}{4}$ " Cassettes	1000/pk

► Biopsy Bags

- Made from nylon cloth, 0.2mm mesh diameter. All seams are heat-sealed.
- Allows for unrestricted fluid movement around the tissue.
- Reduces the loss of small biopsy specimens.
- Reduces cross contamination and pressure artifacts by using sponges.



Cat.#	Bag Measures	Qty
62324-35	Nylon Biopsy Bag 35 x 50mm	100/pk
62324-75	Nylon Biopsy Bag 45 x 74mm	100/pk
62324-98	Nylon Biopsy Bag 98 x 75mm	100/pk

► Paper Biopsy Bags



Due to the amazing demand from our customers, EMS is re-introducing the original Paper Biopsy Bags. These bags are made from porous paper which provides maximum tissue safety during processing. The bags permit proper fluid exchange and drainage.

To Use: Simply introduce the specimen into the bag and fold its end, enclosing the cassette or capsule – you are now ready to process as usual.

Bag measurement: Overall 1 $\frac{1}{4}$ " W x 3" L (45 x 75 mm), Inside Seam: 1 $\frac{1}{8}$ " W (35 mm)

Cat. #	Description	Qty
62326-01	Paper Biopsy Bags	100/pk.
62326-05	Paper Biopsy Bags	500/pk.

► **Cloth; Lint Free, Twill Jean**

A twill jean cotton wipe made from 100% cotton fiber that is woven in an extremely tight construction. The extractable trace elements are effectively reduced in the cleaning process which removes impurities in the cotton as well as any starches or binders used in the manufacturing process.



71750 - 71752 Lint Free Cloth

FEATURES:

- Highly absorbent
- Excellent wipeability
- Thermal stability; good for high heat applications
- Acid resistant and solvent compatible
- Low metallic ion content
- Low static generation

71750	Lint Free Cloth 9"x9"	100/pk
71752	Lint Free Cloth 9"x9"	300/pk
71753	Lint Free Cloth 12"x12"	150/pk

► **Cheese Cloth**

Cotton woven cloth in the pattern of 44x36 (44 lines/inch horizontally and 36 lines/inch vertically) which makes it suitable for cleaning and polishing. Supplied in 60 yard rolls (continuous) 36" in width; This configuration allows you to cut out the exact length you desire.



71748-00 Cheese Cloth

71748-00	Cheese Cloth	box
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► **EMS Lens Tissue**

EMS Lens Tissue is the world's finest optical tissue. It's extremely soft and virtually lint-free. Safe for any optical surface such as camera lenses, microscopes, telescopes, and eye glasses. Each tissue is perforated for easy removal from the booklet.



71712-01 EMS Lens Tissue

Tissue size: 4" x 6", 50 sheets/bk

71712-01	EMS Booklet Lens Tissue	50/bk
71712-10	EMS Booklet Lens Tissue	10 bk/lot



► **Lens Tissue – EMS (Ross)**

EMS (Ross) Lens tissue does not lint or scratch and it is free from mineral or vegetable filler.



71700	Lens Tissue, 4½" x 5"	1000 sheets/box
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► **Towel; Disposable**

A large size towel (13.3"x23") suitable for many uses around the lab. High absorbency and strong, even when wet.



72610	Towel; Disposable	45 towels/box
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Coated Grids, See Grid Section pages 116-133 >>>>

Colloidal Compounds, See Chemicals and Scanning sections, pages 12-16 & 640-645 >>>>

Graphite Conductive Adhesives, See Chemicals and Scanning sections, pages 12-16 & 640-645 >>>>

Cutter; Paper Cutter, See Photography Section pages 728-729 >>>>

Desiccators and Desiccants, See pages 1064-1071 >>>>

Derma-Plus Skin Protection, See page 1106 >>>>

Tapes for making glass knife trufs, See page 257 >>>>

Desiccator Cabinet; Low Temperature, See Equipment Section pages 1065 >>>>

Desiccator Cabinet 1, See Equipment Section page 1065 >>>>

Desiccator Cabinet 2, See Equipment Section, pages 1065 >>>>

Auto Desiccator Cabinet, See Equipment Section pages 1064-1065 >>>>

For Our Line of Mini Scribers, See Tweezers Section pages 837-839 >>>>

Diamond Tip Scribers, See pages 838-839 >>>>

Desiccant Canister; Reusable, See Equipment Section page 1071 >>>>

Diamond Knife Cleaning Kit For a complete description, See Cleaning Section page 944 >>>>

EMS Diamond Knife Wash: For a complete description see Cleaning Section page 944 >>>>

Triton -X-100 - Diamond Knife Soaking Solution (0.08% solution): For a complete description, See Cleaning Section page 944 >>>>

Cloths & Wipes, A Complete Line, See Cleaning section, pages 950-951 >>>>

Cleanser: Alcohol Packets, See Cleaning Section, page 940 >>>>

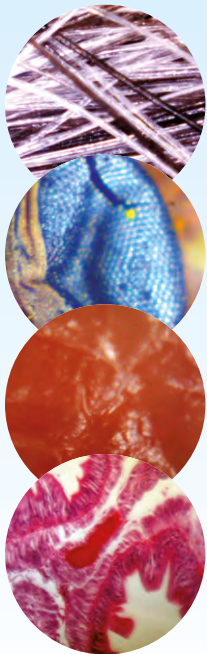
Cleaning Solutions, See Cleaning Section, pages 940-941 >>>>

ProScope Mobile, the world's first handheld digital microscope, is now portable.

The Wireless ProScope, ProScope HR and ProScope HR2 Digital Handheld Microscopes

Wireless offers new practical applications, which include:

- Field scientists can examine specimens on site without destroying them in transit to the lab
- Doctors can show patients live images and add them into practice management apps and software
- Teachers can simultaneously show images to a classroom of students using iPads
- Crime scene investigators can send images from the iPhone to a colleague in the lab or to a collaborative agency



ProScope HR
high resolution handheld microscope



ProScope Applications

- Law Enforcement
- Science Education
- Quality Inspections

Designed and developed for law enforcement, the ProScope Stand will steadily hold the ProScope in a wide variety of positions. Perfect for law enforcement, industrial inspection, and biology when working at high magnification.



For more information, see pages 870–877 >>>>

► Disposable Bibulous Paper

- Highly absorbent white fiber paper
- Lint and dust free
- Recommended for drying microscope slides and other small lab glass items
- Size: 4 x 6"



Cat. #	Description	Qty.
70086-01	Disposable Bibulous Paper Book, each	50/pk.
70086-10	Disposable Bibulous Paper Book, 10 each	50/pk.

► Thirsty Stix

Sterile - Disposable - Absorbent filter paper sticks - great for absorbing, cleaning, and lubricating.

- Highly absorbent
- Adhesive, residue free
- Extremely low lint content
- Ideally to be used with the microtome to remove excess water from the boat
- Multiple uses
- Excellent to remove excess water or solution from tubes and plates
- Size: 6" long x 0.20" thick



Cat. #	Description	Qty.
70996	Thirsty Stix	250/pk.

► All Glass Nebulizer

An all glass unit for the simple production of microdroplets. An object is held vertically in front of the nebulizer outlet and by squeezing the atomizer a fine spray is created. The nebulizer set comes with an All Glass Nebulizer bulb and Atomizer.



70505-01	Nebulizer Set	Set
70505-05	Nebulizer Set	5 Sets
70506-01	Nebulizer Only	each
70506-05	Nebulizer Only	5/pk.
60804	Atomizer	each

► **Dip Miser,
for 3" x 1"
Slide Coating,
10ml Capacity**

Slide coating cup with stand and cleaning brush. Glass cup is Pyrex and is designed to conserve expensive autoradiographic emulsion when coating glass slides. Needs only ¼ the volume of solution previously required. Single piece holder permits immersion in a water bath and provides a stable darkroom stand to prevent spills, and faster temperature adjustment of the emulsion.



70510 Dip Miser Set

**EMS
EXCLUSIVE**

70510	Set	each
70520	Dip Miser Cup Replacement,	each
70530	Dip Miser Cleaning Brush, LOA 6", ½" diameter x 2¼" brush, Nylon turned tuft	1 doz

► **Liquid Release
Agent**

**EMS
EXCLUSIVE**

A hydrosoluble mold-release agent for use

in the flat embedding of micro-organisms, and as a replacement for the PTFE coating of glass slides to produce a smoother, even surface. The reference below describes the selection and precisely oriented sectioning of single cells by light microscopy, prior to examination by EM. Raymond, O.L. & Picket-Heaps, J.D., (1983) J. Microscopy, 130, 179.



70880	Liquid Release Agent	100ml
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► **PTFE-like Spray/Mold
Release Spray**

A PTFE-like, TFE release agent, dry, lubricant. No discernible transfer, no migration, no build-up. Contains: Isopropanol, Poly-TFE, 1,1-Dichlorofluoroethane and Carbon Dioxide. Contains no silicones, CFCs or Methyl Chloroform. Its working temperature is up to 140°F.



72619

72619	PTFE-Like Spray	15 oz.
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► **Cleaner and Remover**

*This All Natural Cleaner Removes
What Soap & Water Can't*

XENIT contains more than five high-performance ingredients such as Citrus 66, an all natural, highly refined extract of citrus fruit. XENIT is specially formulated to break down the complex molecules found in sticky materials. With this unique character, XENIT may be used to quickly remove labels, decals, and adhesive from glass, wood, vinyl and metals. XENIT removes chewing gum from carpet and upholstery. It cleans permanent marker, crayon, and lipstick from walls, woodwork, and counter tops. XENIT also remove shoe scuffs and heel marks from vinyl and wood flooring, and grease and dirt from carpet, fabrics and upholstery. It even removes dried latex paint.



► **XENIT Degreaser**

XENIT Degreaser is a powerful, non-flammable solvent cleaner that quickly removes grease, oil, carbon deposits, gums, varnish, and dirt from metal surfaces. It is fast drying and evaporates completely and leaves no residue.

► **XENIT Foaming Cleaner**

This is the fast, easy way to remove dirt, grime, and food stains, pen ink, soda pop, soap scum. Cleaned surface dry quickly and leave no marks.

► **XENIT Citrus Cleaner/Remover**

XENIT all natural citrus cleaner is the fast, easy way to remove sticky stuff, stains and gunk. XENIT removes greasy, grimy soils that soap and water can't. Cleans most surfaces in seconds. It cleans crayons, dry latex paint, gum, heel mark, ink, permanent markers, lipstick, shoe polish, sticker, tape, tar and sap.

Cat. #	Description	Qty.
60810-20	XENIT Foaming Cleaner	13 oz.
60810-30	XENIT Citrus Cleaner/Remover	10 oz.

► **Glass Cleaner – Invisible Glass**

Specially formulated, Invisible Glass quickly and easily removes dust, dirt, oil, grease, fingerprints, smoke film, haze and more from glass surfaces, such as windows, mirrors, computer screens, display cabinets, and photocopiers. Invisible Glass contains no water and soaps, surfactants or foams so it will leave no residue that will either streak or haze.



60811-01	Invisible Glass	19 oz.
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► Diamond Tip Scribers/Scribers

Sturdy scribers are in wide use throughout the laboratory. It leaves a permanent marking on virtually any surface, including metal, glass, or plastic. Each Scriber features a hexagonal aluminum pencil shaped body, mill finish, natural diamond tip and protective cap. Different styles are available to fit all of your needs.



► A. Straight Head:

Overall length 6", Shank Length 1/8", Handle 1/4" x 5 1/2", 60° tip finish.

70030	Straight Tip Scriber	each
70031	Straight Tip Scriber	6/lot



► B. Angled Head:

Overall Length 6 1/2", Shank 1/6" Dia. x 1/4" Long, Handle 1/8" x 6" Long, 75° tip finish.

70032	Angle Tip Scriber	each
70033	Angle Tip Scriber	6/lot



► C. Retractable Scriber:

This is a high quality chrome pen that features appearance as well as utility. The diamond is mounted in a stainless steel tip and refills are available. The tip is finished at a 60° angle.

70036	Retractable Scriber	each
70037	Retractable Scriber Refill	each

► High Precision Fine Diamond Scriber

This diamond scriber is the ultimate scribing instrument offering the most precision for the most delicate applications. It is available in straight or bent configurations.

APPLICATIONS INCLUDE:

- Fine scribing under the microscope - for silicon wafers and glass coverslips
- Precision scribing and repairing - for thin film circuits and microcircuits, etc.



These diamond mountings are 0.8mm diameter with a reduced shank size of 0.5mm or 0.25mm diameter, which holds the diamond stylus. The natural diamond has a 60° included angle and a 0.12mm tip radius. The integrated 6.35mm anodized hexagonal (non-rolling) aluminum handle has a positive finger grip in the form of grooves for easy control and non-slippage. Each diamond scriber is packaged in a protective plastic tube.

Cat. #	Configuration and Shank Size
62107-ST	Straight Mounting, 0.5mm diameter
62107-BT	Bent Mounting, 0.5mm diameter
62108-ST	Straight Mounting, 0.25mm diameter
62108-BT	Bent Mounting, 0.25mm diameter

► EMS Engraving Tool

Permanently be able to mark all of your important tools and samples. The Engraver comes with a Battery Pack and is operated on two "AA" Batteries

Our EMS Engraver Engraves Test Tubes, Bottles, Racks, Keys etc as well as anything made from glass, metal, stone as well as bone. Engravings are permanent and will not disappear in the presence of chemicals and solvents. The Engraver is 7" in Height (17.8cm)

We offer a Stand for the EMS Engraver that is made from polypropylene and it measures (3 1/2" x 3 3/4").

Cat. #	Description	Qty.
72096-01	EMS Engraver	Kit
72096-02	EMS Engraver Tool Stand	Kit



► The Glascribe® Pen

The Glascribe® Pen, with retractable tungsten carbide tip, lets you inscribe on glass, ceramics, and plastic. The pen has a pocket clip, so it is always handy when needed.

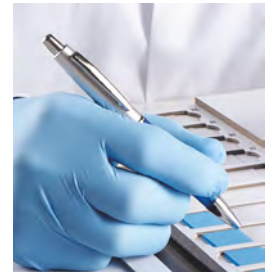


Cat. #	Description	Qty.
72151	Glascribe® Pen	each

► Tungsten Point Lab Pen

Permanently mark Glass Slides and all glass labware

These unique EMS pens have a sharp tungsten carbide tip which is able to etch glass, ceramic, and even plastic. The tip retracts for safe storage and it measures 9.8mm in diameter and the pen is 137mm long.



Cat. #	Description	Qty.
41148	Tungsten-Point Lab Pen	each

► Rotary Diamond Micro-Engraver Pen

An amazing tool that may be used to mark samples, engrave tools, indicate a sample area for finding in the SEM, deburring and so much more.

Easy to handle and control, this micro engraver is ideal for detailed engraving on almost any surface--wood, metal, ceramic, glass and more! The micro engraver features a contoured grip for comfort and control and a precision-ground stainless steel bit with a diamond point tip. This diamond-tipped ballpoint micro engraver is also as small as a pen, so it easily fits in your pocket or purse for easy transport.

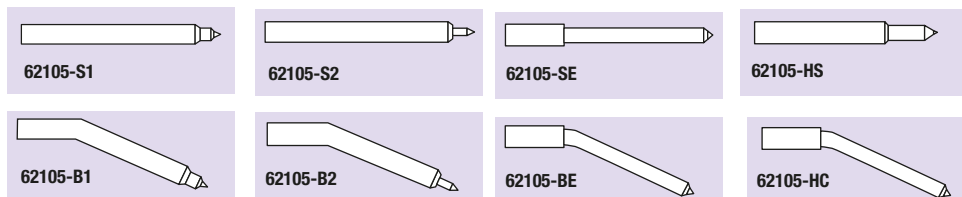
- Contoured grip for comfort and control
 - Pen-type design fits in a shirt pocket or purse and goes anywhere
 - Precision-ground stainless steel bit with diamond point tip
 - Requires two AAA batteries, included
- Measures: 6 1/4" Product Weight 1.86 lbs.

Cat. #	Description	Qty.
50465-15	Rotary Diamond Micro-Engraver Pen	each



► High Precision Diamond Scribing Tools

A newly designed diamond scribing tool set containing eight precision natural diamond scribes in various sizes and configurations. This set is perfect for precision work in microscopy. The set consists of eight diamond tips, 3 mm in diameter and are mounted in interchangeable tool cones and an MT-1 tool handle. The tool and handle are all housed in a hardwood instrument case. Individual scribes can be purchased separately.



62105-S1	Straight tip, .02" (.50mm) dia. by .06" (1.5mm) tip length	each
62105-B1	Bent tip, .02" (.50mm) dia. by .60" (1.5mm) tip length	each
62105-S2	Straight tip, .01" (.25mm) dia. by .06" (1.5mm) tip length	each
62105-B2	Bent tip, .01" (.25mm) dia. by .06" (1.5mm) tip length	each
62105-SE	Straight extended tip, .02" (.5mm) dia. by .2" (5.0mm) tip length. Good for tight areas	each
62105-BE	Bent extended tip, .02" (.5mm) dia. by .2" (5.0mm) tip length. Good for hard to reach areas	each
62105-HS	Straight, heavy duty tip, .03" (.8mm) dia. by .12" (3.1mm) tip length	each
62105-HC	Bent, heavy duty tip, .03" (.8mm) dia. by .12" (3.1mm) tip length	each
62090-00	MT-1 Tool Handle, 4.75" (112mm) long, gold anodized	each
62105-00	High Precision Diamond Scribing Tools, (8 tools & handle)	set

► Precision Pin Vise Handle and Diamond Stylus

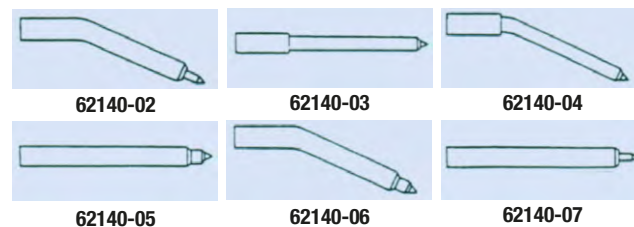
This high precision pin vise handle is machined from the finest material, non-rolling gold-anodized aluminum, which makes it lightweight and versatile. It comes complete with a precision drawbar for positive collets chuck clamping. It features an 8mm (0.31") hexagonal barrel dimension by 100mm (4") long (overall length is 115mm fully assembled) and it has a knurled finger-grip for positive precision control for handling and tool manipulation.

The vice is supplied with a standard collet chuck opening of 2mm (0.78") diameter and will hold a selection of our specially designed tools - and collets adapter 0.8mm (0.003") for diamond stylus chucking.



Cat. #	Description	
62140-00	Precision Pin Vise & Collets	each
62140-50	Diamond Stylus, 0.5mm	each
62140-25	Diamond Stylus, 0.25mm	each

Following are Diamond Scribing Tools, with a 0.80mm (0.003") diameter mounting shank, for use with above Precision Pin Vise and Collets:



Cat. #	Description and Configuration	
62140-02	Bent tip scriber, 0.010" (0.25mm) Diameter. 1.5mm tip length	each
62140-03	Straight extended tip scriber, 0.020" (0.50mm) diameter by 0.200" (5.0mm) tip length. This tool is a must for reaching into and in between high density components.	each
62140-04	Bent extender tip scriber, 0.020" (0.50mm) diameter by 0.200" (5mm) tip length. Use for tight places	each
62140-05	Straight tip scriber 0.020" (0.50mm) diameter by 0.60" (1.5mm) tip length.	each
62140-06	Bent tip scriber, 0.020" (0.50mm) diameter by 0.60" (1.5mm) tip length	each
62140-07	Straight tip scriber, 0.010" (0.25mm) by 0.60" (1.5mm) tip length	each
62140-60	Set of 6 Diamond Scribing Tools and Pin Vise	set

► BUTLER Block Trimmer

A precision made device to aid in hand trimming resin tissue blocks to the desired shape for ultramicrotomy. The knurled knife guide swivels to help the trimming blade to cut the sides of the block. May be utilized with any stereomicroscope with epi-illumination. The trimmer is supplied with a standard chuck to accommodate the block size 00.



(Stain Technology, Vol. 49, No 4: pp. 129-132, 1974)

69945-01 BUTLER Block Trimming each

► Ultramicrotomy Chucks



Precision machined from aluminum. These special chucks are made to accommodate small specimen blocks, which have been polymerized in Eppendorf tubes. In addition, we also have chucks that hold all sizes of flat embedding blocks (fitting all Leica and RMC instruments), and chucks for LKB instruments.

69990 Flat embedding Chuck each
69991 LKB Chuck each
69992 Eppendorf Chuck for RMC each
69993 Eppendorf Chuck for LEICA each

► Chucks, Block Holders and Molding Cup Trays

► 1. Aluminum Chucks



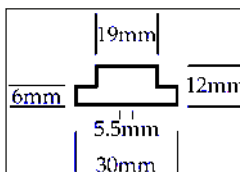
70174-10 **70174-14** **70174-20**

Catalog #	Description	Pack
70174-10	ABH-JB Chuck for Hacker, A/O Reichert Rotary and Autocut, JB-4 and JB-4A, LKB Ultratomes and Shandon Hypercut. Stem measures: 11 x 11 mm	each
70174-14	ABH-LKB Huxley Chuck. Stem measures: 11 x 25 mm	
70174-20	ABH-JBA Chuck: with three point recessed block holder attachment for LKB Histo-Range and Reichert Super-Cut in addition to microtomes using ABH-JB chucks (70174-20). Stem measures: 11 x 11 mm	each

► 2. EBH-2 Block Holder

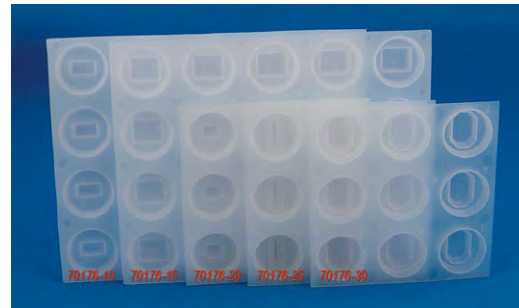
Molded from hard plastic. EMS# 70175-50, 6m thick is shown to the right.

- Easy to store block holders attached to Aluminum chucks (ABH)
- Frosted surface for easy marking.
- Large center hole prevents bubble formation.



70175-40 4mm Thin Embedding Stubs 100/pack
70175-50 6mm Thick Embedding Stubs (shown above) 50/pack
70175-60 10mm Thick Embedding Stubs, Mixed Colors 100/pack

► 3. Molding Cup Tray



These polyethylene trays are ideal for casting specimen blocks embedded with JB-4 or equivalents and are used with our block holders and chucks shown above.

Catalog #	Molding Cup Size	Cavities	Pack
70176-10	6 x 12 x 5mm	20	each
70176-15	12 x 16 x 5mm	20	each
70176-20	6 x 8 x 5mm Hexagon	9	3/pk
70176-25	2 x 15 x 5mm	9	3/pk
70176-30	13 x 19 x 5mm	9	3/pk

► Polyethylene Molds – Individual

Molded from polyethylene, three popular sizes are available to meet your needs. These Individual Molds can be used with EBH2 Block Holders, #70175-50, 70175-60, or with colored stubs 70175-70.



Aluminum Embedding Tray is available with 6-position to hold these Individual Mold during polymerization. Comes with anodized blue and natural color.

Suitable for JB-4®, JB-4-Plus®, Immuno-Bed, LR White, LR Gold® or Paraffin embedding.

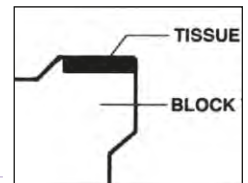
70177-12	Individual Mold, 12 x 8 mm	100/pack
70177-16	Individual Mold, 16 x 8 mm	100/pack
70177-19	Individual Mold, 19 x 13 mm	100/pack
70178-04	Embedding Tray, Aluminum, (2 Blue & 2 Natural colors)	4/pack

► Chien Silicone Universal-Mold

A two-directional mold that allows for single embedded specimens to be sectioned both laterally and transversely. Tissues to be embedded are accurately trimmed and placed so that both sides of the tissue are against both edges of the cavity tip.

Chien, K., et al. (1985) Proc. Ann. EMSA Meeting 43, 460.

70140 Chien Silicone Mold each
70141 Chien Silicone Mold 10/lot

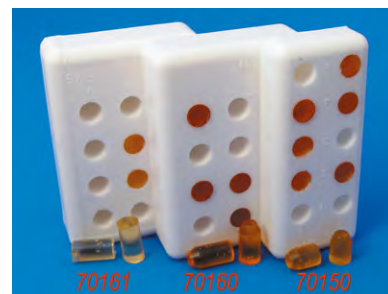


► Capsule Molds

Our molds are made from the strongest possible silicone rubber providing extremely high tear resistance. They are all reusable and produce embedding blocks of numerous shapes and sizes with a wide variety of tips. We also offer a mold which produces blocks to be used for re-embedding. Choose the one that best suits your embedding needs!

70150	Capsule Molds Type A: 10 cavities, 8mm diameter body, 5mm diameter tip, 11mm height, tapered tip	each
70160	Capsule Molds Type B: 12 cavities, 8mm diameter body, 5mm diameter tip 16mm height, tapered tip	each
70161	Capsule Molds Type C: 12 cavities cylindrical shapes, 8mm diameter 16mm height, flat tip	each

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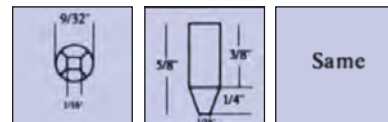
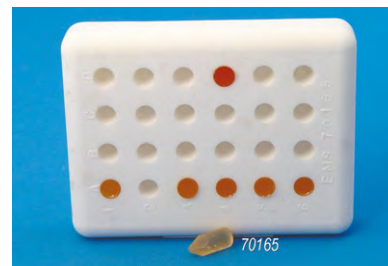
► The Embedding Capsule Substitute

This 24 cavity mold produces a block similar to the embedding capsule block but with the following advantages:

- Resin polymerizes better in silicone rubber than in polypropylene or polyethylene—the rubber heats more evenly and retains the heat better than in plastic.
- It is easier to see inside the well when centering the specimen in the tip.
- It is easier to remove the block from the well. There is no need for razor blades or press devices.
- The finished blocks have finer tips so when you trim deeper into the block the face doesn't increase in size rapidly; therefore, constant retrimming is not necessary.

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70165	Embedding Capsule Substitute	each
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70165: Block Shape

► The Mold for Long Tissues

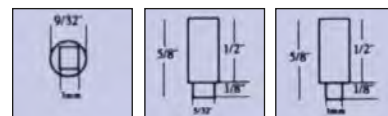
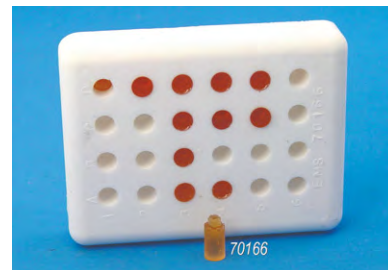
This mold accommodates longer pieces of tissues (muscle, skin biopsies, and many plant specimens)

ADVANTAGES:

- Easy to embed long specimens and orient them properly. The tissues lie flat in the well; therefore, no horizontal trimming is needed.
- It is ideal for any specimen that needs immediate sectioning (e.g. cell monolayer).
- 24 cavities

**EMS
EXCLUSIVE**

70166	The Mold for Long Tissues	each
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70166: Block Shape

► The Cell Culture Mold

This mold is designed primarily for embedding cell culture specimens grown either directly on the bottom of a dish or on the filter when cross sections of the cells are needed:

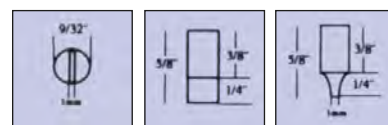
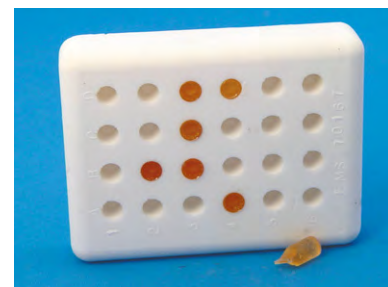
- (a) Cells grown on petri dishes are cut into strips just before the propylene oxide dehydration step; when Propylene Oxide is added, the strips lift right off the bottom.
- (b) When the strips are ready for embedment, they are rolled on an applicator stick into a wad and gently lowered into the well (the strips should not float).

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ADVANTAGES:

- Many cells can be examined in cross section
- There is no need for trimming — sectioning can begin immediately
- The curved side makes the tip very strong in spite of its thinness
- Easy detection of a strip of cells
- The label is placed on the round part so as not to interfere with the specimen.
- 24 cavities.

70167	The Cell Culture Mold	each
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70167: Block Shape

► Chang Monolayer Molds

Designed by Dr. J.P. Chang for the embedding of a monolayer of cells. This specially designed mold has proven useful in the processing of frozen sections, ascite cells, fresh imprints, as well as blood and marrow smears. J. of Ultrastructural Res., 37,370 (1971).

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70910	Chang Mold 12 cavities, 20x10x1mm	each
70920	Chang Mold 9 cavities, 20x20x1mm	each

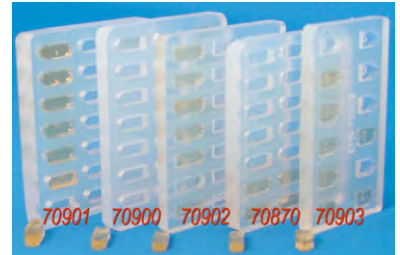


► Flat Embedding Molds

► Single Tapered Ends

A clear silicone rubber with very high tear strength. It can be reused more times than the conventional silicone molds. It is resistant to most epoxy resins and its clear base allows positioning of the specimen lighted from beneath.

70900	Standard flat embedding mold, 21 numbered cavities measures: 14mm(L)x5mm(W)x4mm(D). (Clear silicone)	each
70901	Same as #70900, but each of the 21 numbered cavities measures: 14mm(L)x5mm(W)x6mm(D). (Clear silicone)	each
70902	Same as #70900, but each of the 21 numbered cavities measures: 14mm(L)x5mm(W)x3mm(D). (Clear silicone)	each



► Small Flat Embedding Mold

Made from clear silicone, the overall measurements are 1.65" x 3" with 12 cavities. Each cavity measures 0.427"(L) x 0.25"(W) x 0.156" Deep (10mmL x 6mmW x 4mm Deep). This mold produces 12 embedding blocks with tapered ends.

70903	Small Flat Embedding Mold	each
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► Double Tapered Ends

A standard flat embedding mold where both ends are tapered. This enables you to embed specimens in both ends of each casting. Made from clear silicone, 21 numbered cavities, each cavity measuring: 14mm(L)x4mm(W)x4mm(D).

70870	Double Tapered Ends Mold	each
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► Triple Tapered Ends

A new design with 10 triple numbered, tapered tip cavities to save you time and handling. Holds firmly in a chuck during trimming or sectioning. Made from white silicone, each cavity measures 8mm from tip to center, 5mm deep.

70875	Triple Tapered Ends Mold	each
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► BEEM* Flat Embedding Molds

Molded from polyethylene. The critical surfaces of the mold are transparent, facilitating accurate specimen orientation through bottom illumination. Molds are reusable and each mold is supplied with a protective box.

The cavity measures: 12mm(L) x 5mm(W) x 3mm(D) Overall mold measures: 52mm(L) x 40mm(W) x 5mm(H) Storage box measures: 2½"(L) x 1¾"(W) x ½"(H) (57 x 45 x 12.5mm)

70904-01	BEEM* Flat Embedding Mold	ea
70904-12	BEEM* Flat Embedding Mold	12/pk

*Beem Is A Registered Trademark of Better Equipment For Electron Microscopy, Inc.



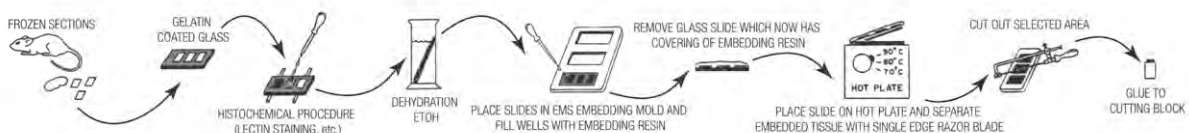
► Flat Embedding with Convenient Box

No more stickiness with new storage box

Most resins are not a problem to flat embed when in combination with the cocoon box. The system withstands temperatures up to 70 Degrees C, and flat embedding of many resins is made easier.

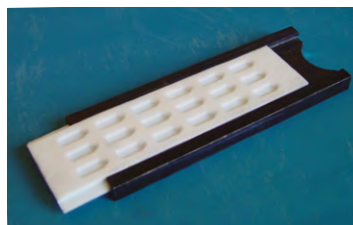
70900-CB	4mm Flat Embedding Mold w/Cocoon Box	set
70901-CB	6mm Flat Embedding Mold w/Cocoon Box	set
70900-CB	4mm Flat Embedding Mold w/Cocoon Box	set
70870-CB	Double End Flat Embedding Mold w/Cocoon Box	set

TECHNICAL TIP Method for Slide Embedding Cat. # 70170



► **PTFE Embedding Mold**

Machined from PTFE block. This mold offers flat embedding for most resins, including LR White®, LR Gold®, JB-4, Immuno-Bed and Lowicryl®. This PTFE Flat Embedding Mold can be used for both UV/low temperature and thermal cure, and may be used as a substitution for the silicone molds. The individual cavities are pre shaped to reduce block trimming.



For curing anaerobic material, we recommend using Aclar® film, cut-to-size of the mold and lower on top of the mold after you "just over-fill" the cavities with embedding resin. Due to the flexibility of the PTFE, you just bent the mold to pop out the cured resin blocks. After all the cast blocks have been removed, reinsert the mold to its holder to re-shape the mold. The mold holder is machined from aluminum and anodized black.

Mold with 18 cavities, each cavity measures 5mm W x 14mmL x 4mm Deep
Overall mold measures: 5 1/2" x 3" x 1/4" (140x50x8mm)

Mold is available as a set (includes one PTFE mold and one aluminum holder).

70143	PTFE Flat Embedding Mold, set	each
70143-R	PTFE Flat Embedding Mold only	each

► **Stepped Microtome Embedding Mold**

EMS Embedding Mold is a new mold designed with Michael J. Dykstra Ph.D. from North Carolina State University Department of Veterinary Medicine. This Mold produces blocks of the best dimension to be held securely by Reichert/Leica Ultracut stepped microtome chucks. There are 24 cavities and the depth of each cavity is 4mm which will prevent breakage of the blocks during razor blade trimming.



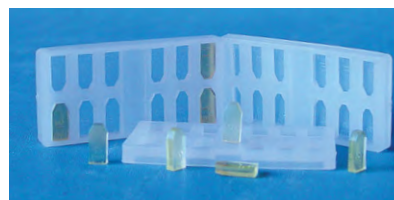
Mold Measurements: 3 3/4" x 3" (85 x 77mm)

Cavity Measurements: 15mm x 7mm x 4mm deep

70907	Embedding Mold-Dykstra	each
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► **Plastic Flat Embedding Mold**

- Injected molded polyethylene.
- Resistant to most embedding materials.
- Easy peeled-off the blocks.



Mold fits perfectly inside the cocoon box BE8 (64300-8); See Cocoon Box section.

When the mold and the box BE8 are used together, the set allows for the use of oxygen-prohibited embedding materials (ie: LR White) to be polymerized in a flat orientation. These molds are reusable. Each cavity measures 12mm(L) x 5mm(W) x 3.5mm Deep. Overall mold measures: 94 x 56 x 14mm.

Cat. #	Description	Qty.
70905-01	EMS Molded Flat Embedding Mold	ea
70905-12	EMS Molded Flat Embedding Mold	12/pk

► **Tissue Culture Monolayer Embedding Mold: Thompson Embedding Mold**

This invention is a mold used for embedding mammalian cells in monolayer culture in preparation of sectioning for light or electron microscopy. Tissue culture monolayer embedding molds eliminate the need for traditional Beem capsules. The improved molds can be used to transfer the majority of cells from the entire surface of a cover slip to avoid losses of large amounts of cellular information occurring only randomly. In addition, other problems such as surface blemishes caused by air entrapment associated with Beem capsules are eliminated. Each mold comes with references and an instruction sheet.



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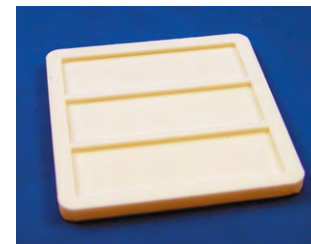
ADVANTAGES:

1. The mold yields several individual blocks of resin from a single slip-cover.
2. The resin blocks fit directly into a chuck for flat specimens.
3. The embedded surfaces are free from blemishes caused by entrapped air.
4. The mold uses a minimum amount of resin.

70924	Thompson Mold	each
70925	Thompson Mold	4/lot

► **Slide Duplicating Molds**

Uses a 1x3" glass slide as a base, and duplicates the slide using the resin of your choice. Tissue sections are embedded against the flat glass surface. This duplicated resin slide can be studied under the Light Microscope, then cut, remounted, resectioned, and studied under the EM. A three cavity mold, each cavity measuring: 1"(W)x3"(L)x3/2"(D). References & Instructions come with each mold.



Slide with Cover Slip Duplicating Mold

The same design as 70170 but with the addition of three round cavities which are 17mm in diameter and 1mm deep.

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70170	Slide Duplicating Mold	each
70172	Slide Duplicating w/Cover Slip Mold	each

Cover Slips, See pages 324-327 and 568-571 >>>



► Plastic Weighing Boats; "Anti-Static"

They are utilized to weigh liquid or solid samples. Anti-static. Recessed corners facilitate controlled pour-off. Square shape, contour bottom.

70040	Micro Boat 1 $\frac{1}{2}$ " x $\frac{3}{8}$ "H	500/pk
70041	Medium Boat 3 $\frac{3}{8}$ "x $\frac{3}{4}$ "H	500/pk
70042	Large Boat 5 $\frac{1}{2}$ "x $\frac{3}{8}$ "H	500/pk



► Plastic Weighing Canoes; "Anti-Static"

Flexible dishes for handling liquids or solids. Ideal for controlled pour-off. These Anti-Static Canoes with contoured sides provide a convenient non-slip gripping surface. As well, they allow for more accurate weighing and reading of a sample. The canoe shape enables pouring of weighed samples.

Dimensions:

- Small Canoe: 1 $\frac{1}{2}$ "x1 $\frac{1}{2}$ "x $\frac{1}{2}$ " deep
- Medium Canoe: 2 $\frac{1}{2}$ "x4 $\frac{1}{4}$ "x1 $\frac{1}{4}$ " deep
- Large Canoe : 3 $\frac{3}{8}$ "x6 $\frac{5}{8}$ "x1 $\frac{1}{8}$ " deep

70043-10	Small Canoe	500/pk
70043-20	Medium Canoe	500/pk
70043-30	Large Canoe	500/pk

► Glassine Weighing Dish

Weighing samples is made easier with these newly introduced Glassine Weighing Boats:

- No Static Build-Up – Glassine is free of static electricity that plagues disposable plastic weighing dishes.
- Contaminant Free – Pure glassine is an ultra-clean paper product
- Preformed 3.5" diameter Dish—convenient to use
- Color contrast – Chocolate-colored glassine reveals every particle of material
- Dish measures: 3.50" Dia x 0.5" Depth (87.5 x 13mm)



Cat. #	Description	Qty.
70084-01	Glassine Weighing Dish	150/pk.
70084-CS	Glassine Weighing Dish	24pks/case



► Aluminum Weighing Dish

Inexpensive, disposable aluminum foil dishes with crimped sides, flat smooth bottoms, and a finger tab handle on the rim. They may be used for routine weighing and moisture testing, as well as an embedding mold.

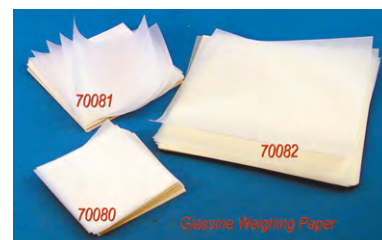
- Small Dish measures: 2" dia.x $\frac{1}{2}$ " deep (43 x 12mm)
- Medium Dish measures: 2 $\frac{1}{2}$ " dia.x $\frac{1}{2}$ " deep (57 x 16mm)
- Large Dish measures: 3" dia.x $\frac{1}{2}$ " deep (70 x 16mm)
- Tall Dish measures: 4.2oz, 2 $\frac{1}{16}$ " Dia x 1 $\frac{1}{8}$ " Deep (75mm x 47mmDeep)



Catalog #	Description	Qty
70048-01	Small Aluminum Dish	100/pk
70048-10	Small Aluminum Dish	1000/cs
70050-01	Medium Aluminum Dish	100/pk
70050-10	Medium Aluminum Dish	1000/cs
70051-01	Tall Aluminum Dish	100/pk
70051-10	Tall Aluminum Dish	1,000/cs
70052-01	Large Aluminum Dish	100/pk
70052-10	Large Aluminum Dish	1000/cs
70053-01	Large, Smooth Aluminum Dish	100/pk
70053-10	Large, Smooth Aluminum Dish	1000/cs

► Glassine Weighing Paper

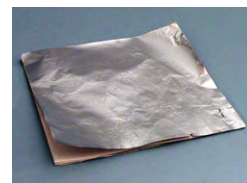
Our glassine weighing paper is moisture-resistant and non-absorbent.



70080	Glassine Paper size 3" x 3"	500/pk
70081	Glassine Paper size 4" x 4"	500/pk
70082	Glassine Paper size 6" x 6"	500/pk

Aluminum Foil Squares Aluminum Foil Squares interleaved for easy separation.

- Weigh samples quickly and economically
- Cap labware for storage or autoclaving



Catalog #	Description	Qty/Box
70056-04	Aluminum Foil 4 x 4"x 0.001" Thick	500/box
70056-06	Aluminum Foil 6 x 6"x 0.001" Thick	500/box
70056-08	Aluminum Foil 8 x 8"x 0.0015" Thick	500/box
70056-12	Aluminum Foil 12 x 12"x 0.0015" Thick	500/box

► Foil Rolls

These foil rolls which are designed to work with out Mini Bin™ Foil Dispenser and offer minimal waste.

Custom sized pieces of foil can easily be created for covering small surfaces such as beakers, flasks, tubes, and Petri dish. Ideal for autoclaving, freezing, incubating, protecting lab ware, lining, sealing and general storage. Available in two sizes .



70058	Foil Roll 102mm (4") x 152.4m	each
70059	Foil Roll 153mm (6") x 152.4m	each

► Mini Bin™ Foil Dispenser

This Mini Bin Foil Dispenser allows you to safely cut foil to any size and it is a great alternative to wasteful giant-sized foil rolls and expensive pre-cut foil squares. Compact to fit in limited work space areas and easy to transport. Safe to use – load the foil roll, press the cover to activate the safety blade and cut to the desired length. For use with 102 mm or 153 mm (4 or 6 inch) foil rolls (sold separately- see below).The dispenser measures 19 x 10 x 12 mm.

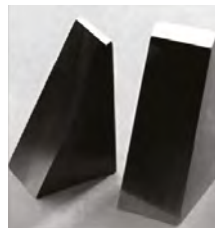


The unit has a non-slip base, has a safe - unique cutter guard with a safety blade and it is compact – for limited spaced work areas . It is able to hold 102 mm or 153 mm (4 or 6 inch) foil rolls The unique – foam strip prevents the foil from retracting back into the unit.

70057	Mini Bin TM Foil dispenser	each
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► Triangular Tungsten Carbide Knife

These Knives will fit most any ultramicrotomes and take the place of using glass knives. Perfect for trimming blocks, block facing, and for sectioning hard samples. The quality does compare to glass knives and these blades can be resharpened if desired.

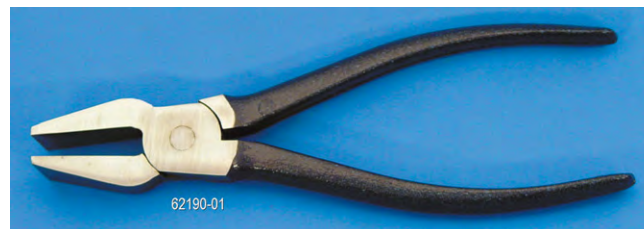


SPECIFICATIONS:

Cutting edge length:38" (9.6 mm)
 Blade height:.....1.0" (25.4 mm)
 Blade thickness:38" (9.6 mm)
 Cutting angle:40°
 Material:100% high grade, solid Tungsten Carbide
 Section thickness:2-15 microns

Cat. #	Description	Qty.
71019-10	Triangular Tungsten Carbide Knife	each

► Glass Knife Making Pliers



These pliers are specially designed with its jaws ground to a special shape for ease of preparation when making glass knives.

62190-01	Glass Knife Making Pliers	each
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► Diamond Glass Cutter



Metal parts are made from nickel-plated brass, set into a maple handle. The rack can be used to crack single or double strength glass.

70038	Diamond Glass Cutter	each
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► Glass Knife Scoring Jig

These set of jigs assist in the production of making glass knives by hand.



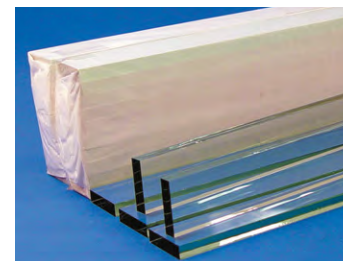
T-square jig: when the edge of this jig is placed against the edge of the glass knife strip the subsequent score will be 26 mm or 1" long. After breaking, the square of the glass can be scored at a 45 degree angle by using the other jig.

62192-02	Glass Knife Scoring Jig	2/set
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Tape to make Glass Knife Boat, see page 257 >>>>

► Glass Knife Strips ► Ultramicrotomy and Histology Glass Strips

Specially selected glass strips for making glass knives. Its hardness produces a durable and sharp edge suitable for thick, semi thin, or ultrathin sections.



Ultramicrotomy Grade:

71012	Size 6.4mm x 25mm x 400mm	30 strips/pk
71013	Size 8mm x 25mm x 400mm	24 strips/pk
71014	Size 10mm x 25mm x 400mm	18 strips/pk
71015	Size 12mm x 50mm x 100mm	16 strips/pk

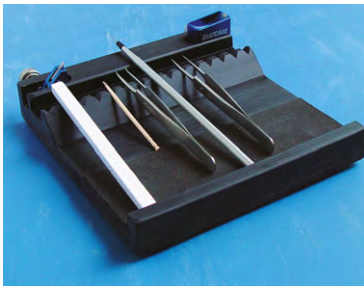
Histology Grade:

71016	Size 6.4mm x 25mm x 400mm	30 strips/pk
71017	Size 8mm x 25mm x 400mm	24 strips/pk
71018	Size 10mm x 25mm x 400mm	18 strips/pk

Glass Knife Makers, see page 596 >>>>

► EMS Ultra-Microtome Aid

Made from hard plastic (Delrin) with a beautifully machined finish to handle many of your instruments that need to be at your fingertips during sectioning.



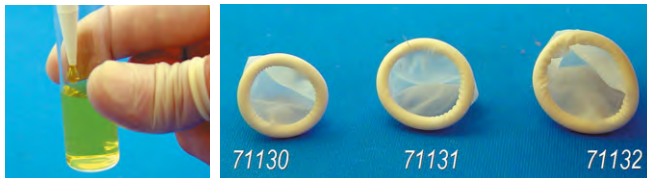
This EMS Ultra-microtome Aid is a safe place to rest your diamond knife, diamond trimming tool, tweezers, hair curl or eye lash, diamond knife cleaning rods, perfect-loop for picking up sections.

Note: This unit is not a safe device to store your sectioning knives, such as diamond or glass knives, after you're done the sectioning.

70612 EMS Ultramicrotome Aid each

► Finger Cots; Latex—Powder Free

Inexpensive, expandable finger cots. Seamless. Protective dexterity without covering the entire hand. Powderless, non-rolled. 3/8mil (0.0030"), 2 3/4" (40mm)L.



71130 Latex Finger Cots Small 1 gross/pk
71131 Latex Finger Cots Medium 1 gross/pk
71132 Latex Finger Cots Large 1 gross/pk

► EMS Diamond Knife Wash

**EMS
EXCLUSIVE**

This new concept of washing the Diamond knives using magnetic stirring action (with special stirring bar) gives you a fast, clean and safe method to remove particles that are left on the knives edge after sectioning.



Since most of the EM labs already have stirring plates, the Diamond Knife Wash has been designed for use with your existing unit, saving you the need to purchase an extra one. It is universal and can be used for all type and brands of Diamond Knives, including the Diatome Histo Knife. Warning: Never use on a hot plate. If used on a combination Stirrer/Hot Plate, make sure the heat is off.

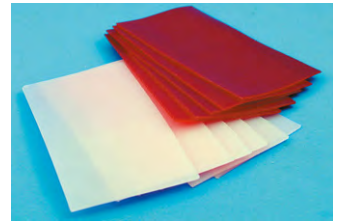
70605 Diamond Knife Wash each

TECHNICAL TIP

When using wax to make trufs for glass knives, the wax sheet should be at room temperature or slightly above (70-80°F). Simply cut desired strip, form a truf to the knife, and melt the edges with a heat pen for a water seal.

► Dental Wax Sheets

We supply dental wax sheets. Pink wax: a hard and thick wax sheet that is ideal for mincing and cutting tissues. Approximately 31 to 35 sheets per pound. Each wax sheet measures: 5 3/4" x 2 7/8" x 1/16" thick



72660 Pink Wax 11lb/bx
72670 Pink Wax 5lb/bx

► Hot Pen – Wax Pen; A Tool for Separating Sections or Cauterizing

Powered by AA batteries. This pen helps to flatten and separate tissue sections and reduces compression in thin sections.



72678

Available in two models: Wax Pen 1 is powered by one AA battery; Wax Pen 2 is powered by two AA batteries.



72679

Both pens are using the same tip. Replacement tip (Cat. #72679-RT) is a straight one. Replacement tip (Cat. #72679-03) is a set of three different configurations: Straight, Hook, and 'U' Shaped Tips.

Cat #	Description	Length with		Diameter	Pack
		Tip w/o Cap	w/Cap		
72678	Wax Pen 1 (A)	6 1/2"	6 3/4"	3/4", 18mm	each
72679	Wax Pen 2 (B)	8 1/4"	8 3/4"	3/4", 18mm	each
72679-RT	Replacement Tip				each
72679-03	Replacement Tips	Set of Three Variable Tips			

► Portable Heat Pen; Soldering Iron

This portable heat pen is able to heat up to 700°C and automatically recharges every time it is placed back into its recharging stand. It will last approximately 40 minutes on a full charge. Tip length 1". It is useful for the sealing of wax onto glass knife boats and small soldering jobs around the lab. The set includes the heat pen and recharging stand.



72677-10 Portable Heat Pen Set each
72677-50 Replacement Fine Tip each
72677-51 Replacement Heavy Tip each

► Nail Polish; Clear

Used for sealing the boats made from tape to the glass knives.

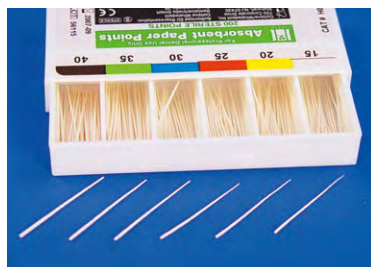
72180 Nail Polish 1/2oz



72180

► Absorbent Paper Points

Machine rolled paper with a tapered end which offers good water absorbency, and assists you in the removal of surplus water from the knife boat, on the block face, and from the grids.



Available in two assortment sizes: (The bigger the number the larger the point.)

- **Selection 1:** contains 200 assorted points sizes 15, 20, 25, 30, 35 and 40.
- **Selection 2:** contains 200 assorted points sizes 45, 50, 55, 60, 70, and 80.

71011-01	Paper Points, Selection 1	200/bx
71011-02	Paper Points, Selection 2	200/bx

► Glass Knife Boats

These disposable plastic boats which easily attach to the triangular glass knife making a trough. To use: Simply slip the boat on the glass knife back and seal with either hot melted wax or nail polish.



Available in three sizes: To fit 6.4mm, 8.0mm and 10.0mm triangular glass knives.

71007	6.4 mm Glass Knife Boat	50/pk
71008	6.4 mm Glass Knife Boat	100/pk
71008-10	10.0mm Glass Knife Boat	100/pk

► Glass Knife Boat; Quick Boat

These boats are made from aluminum and are anodized black. They come complete with a set screw on one side. The area where the glass knife will be attached, is cut to fit to the width of the knife and is cushioned by silicone rubber to ensure a tight seal and no leakage.



71009-60	Quick Boat, for 6.0mm Knife	each
71009-64	Quick Boat, for 6.4mm Knife	each
71009-80	Quick Boat for 8.0mm Knife	each
71009-10	Quick Boat for 10.0 mm Knife	each

► Glass Knife Box

Has a soft silicone base, anti-slip pads underneath, and a clear plastic, hinged dust cover for storing glass knives. Holds 10 6.4mm glass knives. Measures: 6 1/8" (L) x 2 3/8" (W) x 1 1/2" (H) (115mm x 58mm x 37mm).



71010	Glass Knife Box	each
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► Hair Curl

Made from human hair; good for removing sections, and cleaning the diamond knife.



71180	Hair Curl	each
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► Eyelash Manipulator; A Traditional EM Tool

For direct manipulation of sections and small tissue samples this tool is perfect for any occasion. May be used during ultramicrotomy to carefully tease sections that are in the Diamond Knife boat. The Eyelash comes on a Sable Brush handle made from the highest quality wood.



These Eyelashes may be cleaned and sterilized with alcohol and a tissue.



71182	Eyelash Manipulator	each
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For More Ultra Microtomy Tools, see pages 255-256, 700-716 >>>>

► Flat Emery Sticks

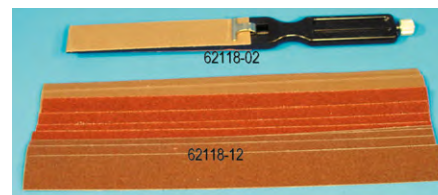


Cat. No.	Grit	Pack
62119-04	4/0	12/pk
62119-03	3/0	12/pk
62119-02	2/0	12/pk
62119-01	1/0	12/pk
62119-10	1	12/pk
62119-20	2	12/pk
62119-30	3	12/pk
62119-40	4	12/pk

Emery paper which is glued to a wooden handle. 11" long x 3/4" wide (279x19.1mm). Very useful for filing excess resin of sample block tips. Grit size ranges from number 4/0 (finest) to 3 (coarsest).

► Filing/Polishing Stick and Strips

A plastic handle, 10 1/2" (267mm) long, holds strips of emery paper or cloth 11"x1" (279x25.4mm). Strips are easily replaced.



Comes complete with 2 strips/set (grit 120 and 240).

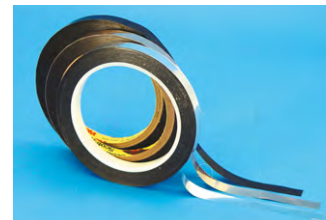
Cat. No	Description	Pack
62118-02	Filing and Polishing Stick And Strips	set
62118-12	Emery Refills in 12 Assorted Grits	set

Emery Paper, see page 830 >>>>

► Silver Tape

Color Tapes, also see Photography and Tape Sections, page 738 >>>>

Silver coated polyester tape, 3/8" width, 72 yards long, 3" core; good for making glass knife boats.



77700	Silver Tape	each
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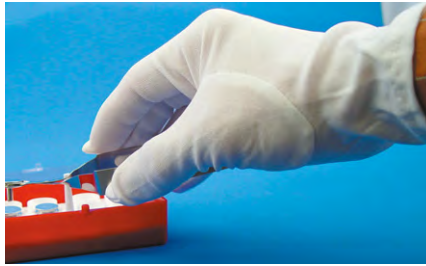
► Cotton Gloves



These well tailored, high quality gloves are made from 100% cotton. They offer softness and comfort. A perfect choice for handling photographs.

Cat. #	Size	Qty.
71118-01	Small	6prs/pk
71118-03	Medium	6prs/pk
71118-05	Large	6prs/pk

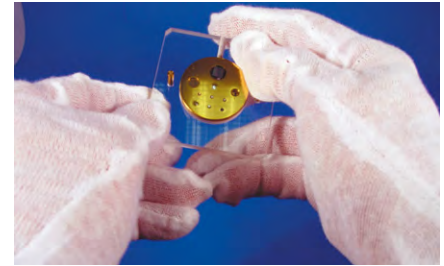
► Gloves; Lint Free, Clean-room



Finest quality, stretch nylon, one size fits all.

Cat. #	Size	Qty.
71090	Mens	6 pair/pk
71092	Womens	6 pair/pk

► Lightweight Cotton Inspector Gloves



These gloves are un-hemmed and lint-free. They are tailored cotton gloves which are ideal for inspection jobs. These gloves are available in one-size fits all for either men or women.

Cat. #	Size	Qty.
71119-01	Women	12/pk
71119-05	Men	12/pk

► Gloves; Latex Exam Gloves With Aloe Vera and Vitamin E

Made from 100% natural latex with the addition of Aloe Vera and Vitamin E, offering the softness, tactile sensitivity and skin protection. Economical ambidextrous style, beaded cuff, and are chemically resistant to acids, alcohols, ketones and alkalis. Packed in a convenient dispenser box, 100/box. Non-sterile. Available either with powdered (biologically cornstarch dusting, ~ 2mg/glove) or powder-free gloves.

Product specification		
Mean Tensile Strength:	Before aging	24Mpa
	After aging	20Mpa
Elongation:	Before aging	750% min.
	After aging	700% min.
Thickness	Finger	0.15mm ± 0.01mm
	Palm	0.14mm ± 0.01mm
	Cuff	0.11mm ± 0.01mm



Latex Conform®

Cat. #	Size	Qty.
Light Powdered Latex Gloves		
71110-01	Small	100/bx
71110-20	Small	10bxs/cs
71111-01	Medium	100/bx
71111-20	Medium	10bxs/cs
71112-01	Large	100/bx
71112-20	Large	10bxs/cs

Cat. #	Size	Qty.
Powder-Free Latex Gloves		
71114-01	Small	100/bx
71114-20	Small	10bxs/cs
71115-01	Medium	100/bx
71115-20	Medium	10bxs/cs
71116-01	Large	100/bx
71116-20	Large	10bxs/cs

Cat. #	Size	Qty.
Powder-Free Latex Gloves with Aloe-Vera and Vitamin E		
71114-50	Small	100/bx
71114-51	Small	10bxs/cs
71115-50	Medium	100/bx
71115-51	Medium	10bxs/cs
71116-50	Large	100/bx
71116-51	Large	10bxs/cs



Latex Powder Free

► Nitrile Exam Textured Gloves

Powder-Free Green Gloves with Aloe Vera

Made from 100% synthetic nitrile, contains no latex. It is an extremely tough glove yet gentle on the hand. It offers superior textile strength and they are puncture resistant when compared to other similar thickness of latex or vinyl gloves. There are no natural rubber protein allergens as is present in natural latex rubber gloves. With the addition of Aloe Vera, the powder-free gloves will provide the user with superior comfort, excellent flexibility and dexterity. Textured gloves provide a positive grip on wet and or dry surfaces. The nitrile compound provides a broad range of hand protection against accidental chemical splashes.

Product specification

Type:	Nitrile exam gloves – non-sterile - Textured	
Color:	Blue (w/o Aloe Vera), Green (with Aloe Vera)	
Mean Tensile Strength:	Before aging	24Mpa
	After aging	20Mpa
Elongation:	Before aging	740% min.
	After aging	730% min.
Thickness	Finger	0.21mm ± 0.03mm
	Palm	0.14mm ± 0.03mm
	Cuff	0.11mm ± 0.03mm

Cat. #	Size	Qty.
Powder-Free Nitrile Gloves		
71106-20	Small	100/bx
71106-21	Small	10bxs/cs
71106-30	Medium	100/bx
71106-31	Medium	10bxs/cs
71106-40	Large	100/bx
71106-41	Large	10bxs/cs
71106-50	X-Large	100/bx
71106-51	X-Large	10bxs/cs



Cat. #	Size	Qty.
Powder-Free Nitrile Gloves with Aloe-Vera		
71107-20	Small	100/bx
71107-21	Small	10bxs/cs
71107-30	Medium	100/bx
71107-31	Medium	10bxs/cs
71107-40	Large	100/bx
71107-41	Large	10bxs/cs
71107-50	X-Large	10bxs/cs
71107-51	X-Large	100/bx

► Vinyl Exam White Gloves

Made from synthetic polyvinyl chloride, powder-free, ambidextrous, medical grade non-sterile gloves, Seamless, chemical resistant and excellent sensitivity, these vinyl gloves offer a unique balance of softness flexibility and strength.

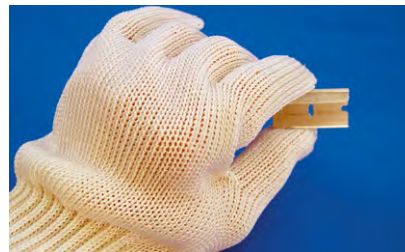


Product specification	
Type:	Vinyl exam gloves – non-sterile – Ring Roll Bead Cuffs
Color:	White
Mean Tensile Strength:	9Mpa
Elongation:	740% min.
Thickness	Finger 0.10mm ± 0.01mm Palm 0.10mm ± 0.01mm
Overall Length, mm:	235 (Small & Medium), 245 (Large & x-Large)

Cat. #	Size	Qty.
71108-10	Small	100/bx
71108-12	Small	10bxs /cs
71108-20	Medium	100/bx
71108-22	Medium	10bxs/cs
71108-30	Large	100/bx
71108-32	Large	10bxs/cs
71108-40	X-Large	100/bx
71108-42	X-Large	10bxs/cs

► Cut-Resistant Gloves; Safeknit™

The comfortable choice when choosing a high performance cut resistant glove. Safeknit is a blend of abrasion-resistant Spectra® fiber and other synthetics. The mix of these fibers form a rugged cut resistant barrier that offers the histologist sensitivity for manipulation but with extreme comfort and productivity.



NOTE: These gloves are neither puncture proof nor water resistant. They should not be used to protect against intentional cutting. Avoid use near moving blades. For applications which are related to fluids where a water resistant glove is required, we recommend either double gloving or using Nitrile Gloves, (Cat # 71106-71109 or 71068.)

71066-06	Medium Duty Safeknit™ Glove	Size 6	each
71066-07	Medium Duty Safeknit™ Glove	Size 7	each
71066-08	Medium Duty Safeknit™ Glove	Size 8	each
71066-09	Medium Duty Safeknit™ Glove	Size 9	each
71066-10	Medium Duty Safeknit™ Glove	Size 10	each
71066-11	Medium Duty Safeknit™ Glove	Size 11	each

► Finger Cots; Latex– Powder Free

Inexpensive, expandable finger cots. Seamless. Protective dexterity without covering the entire hand. Powderless, non-rolled. 3/8mil (0.0030"), 2 3/4" (40mm)L.



71130	Latex Finger Cots Small	1 gross/pk
71131	Latex Finger Cots Medium	1 gross/pk
71132	Latex Finger Cots Large	1 gross/pk

SAFETY TIP

The standard latex surgical gloves do not offer adequate skin protection when handling glutaraldehyde. Nitrile or Neoprene gloves provide the protection that is needed. However, dexterity is inhibited with these gloves. Therefore, double-gloving with latex gloves is recommended for delicate work.

Raewyn Eager, Dept. of Zoology, Auckland University. EM News. Newsletter of the New Zealand Society for Electron Microscopy. No. 24, Dec. 1992

SAFETY TIP

In the past several years there has been documentation in the medical literature of numerous cases of latex allergy in medical and other laboratory personnel. Many people are experiencing itchy hands, shortness of breath or other signs of allergic reactions when they use latex gloves in their laboratory work. Some people are changing to powder free gloves with some relief; however, other people get relief only after changing to another type of glove.

E. Ann Ellis, Ellis EM Consulting Service, 1316 SW 61st Terrace, Gainesville, FL. 32607

For Skin Protection, see Dermaplus Safety Section page 1106 >>>>

For our complete line of Protective Gloves and Supplies, See pages 948-949 >>>>

► Gloves Dispenser

- Easy to mount with keyholes, tape
- Accepts most brands of gloves
- Available either top loading or side loading
- Color white and clear front



EMS #	Description, (L x W x H)	
64365-01	Single Gloves Dispenser, 11.5" x 4.75" x 5.25"	each
64365-02	Double Gloves Dispenser, 11.50" x 4.75" x 10.25"	each
64365-03	Triple Gloves Dispenser, 11.5" x 4.75" x 15.25"	each

Marking Pens, See Specimen Preparation, pages 310-311 >>>>

Fro-Marker - A pen for use with frozen sections See Specimen Preparation, page 309 >>>>

Para-Marker - A pen for use with paraffin sections See Specimen Preparation, page 309 >>>>

► Perfect Loop

Using this PERFECT LOOP, you can place your thin sections, cut on the ultramicrotome, easily on the grid mesh without creases.

**EMS
EXCLUSIVE**

Perfect Loop for Ultra thin sections

70944	Set of Handle & Loop	set
70945	Loop only	each
70946	Loop only	5/each
70948	Handle only	each



Perfect Loop for Light Microscopy (large sections).

The outside diameter of the loop is 7mm.

70940	LM Set of Handle & Loop	set
70941	LM Loop only	each
70942	LM Loop only	5/each
70943	LM Loop Handle	each

TECHNICAL TIP

The Perfect Loop For Section Pick Up

The Perfect Loop (EMS cat # 70944) allows you to pick up sections consistently without causing any damage to the sections. It is the only loop that is currently available where the outside diameter of the loop is the same as the grid and the inside diameter is slightly larger than the observation area of the electron microscope. The thickness is about 40 microns. Due to the fact that the loop and the grid are of the same diameter they are attracted to one another when in water and attach together through the surface tension of the water. Even if the section touches the inside of the grid during blotting the touching area is minor and, therefore, the section is not damaged. When the grid is removed from the loop the section remains in place without fail. The area equals the observation field (about 2mm diameter) of the electron microscope; thus pieces can be fully observed.

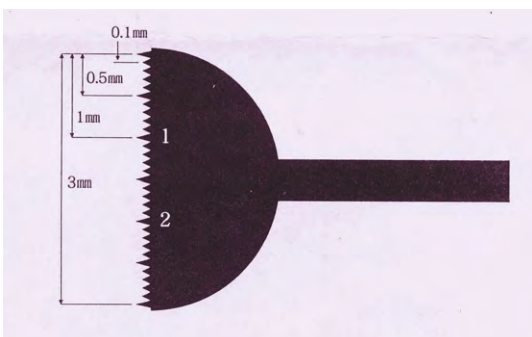
► Deluxe Perfect Loop

As in our standard Perfect Loop this device allows you to pick up sections with ease. This set utilizes the Perfect Handle complete with protective collar (#70616-HD).

**EMS
EXCLUSIVE**



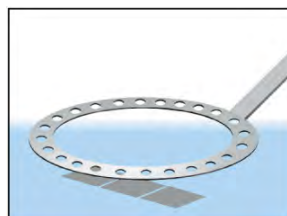
70939	Deluxe Perfect Loop Set	Set
70616-HD	Perfect Handle Only	each



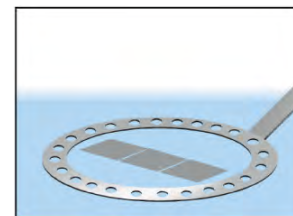
► Perfect Scale

Made from Nickel alloy, 3mm in length with 1/10 mm divisions. The Scale fits the Perfect Handle(70616-HD). The Perfect Scale comes complete with one scale and a handle.

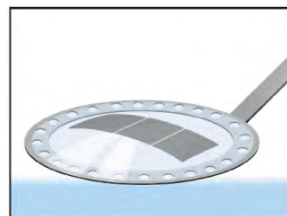
70617-10	Perfect Scale Set	each
70617-20	Perfect Scale Only	each
70616-HD	Perfect Handle Only	each



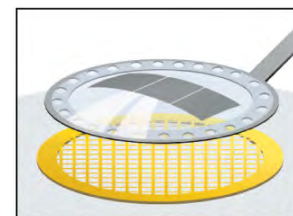
1. Centre the LOOP above the sections



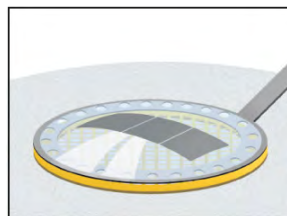
2. Slowly lower the LOOP over the sections and touch the water.



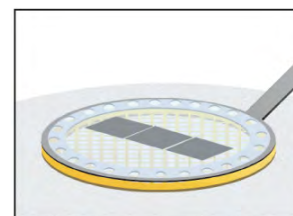
3. Gently lift up the LOOP with the sections in a droplet of water.



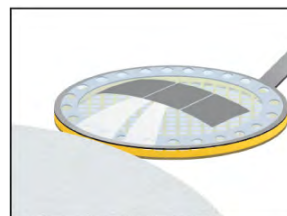
4. Lower the LOOP onto a grid and lift up again.



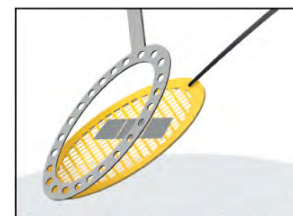
5. The grid holds to the LOOP by surface tension.



6. Lower the LOOP to the filter paper to remove water.



7. For coated grids, touch with filter paper to remove water.



8. Separate the grid from the LOOP with an eyelash.

► Parafilm M and Dispenser

Laboratory film used to prevent evaporation, contamination and hydration. Seals labware quickly and efficiently. Used in EM for drop staining and to pick up thin films when coating grids.



70990	4"x250', 1" core	each
70991	2"x250', 1" core	each
70992	Cutter dispenser	each

► ABS Parafilm® Dispenser

Unique design for maximum safety

Store, dispense, and cut Parafilm®, tape, labels, and Tough-Tags®.

ABS plastic dispenser designed with a safety razor that slides and cuts with no danger to your fingers. Dispenser holds one or two 2-inch rolls, or one 4-inch roll. They measure 120x156x171mm (WxHxD)



Parafilm is a registered trademark of American Can Company.

70993-01	Parafilm Dispenser Blue	each
70993-02	Parafilm Dispenser Green	each
70993-03	Parafilm Dispenser Red	each
70993-04	Replacement Blades for Dispenser	5/Pack

► DuraSeal™

A Durable Heat-Resistant, Solvent-Proof Laboratory Stretch Film Heat-Resistant And Microwave Compatible -

Withstands temperatures up to 100°C (boiling water)

Chemically Resistant - Resists essentially all solvents and caustic agents

Tear Resistant - Film can stretch 500-800% before breaking or tearing

Clings - Film can cling to itself following stretching

Tight Sealing - Forms an airtight barrier

Permeability Information:

Oxygen:	125cc/100in2/24 hrs at 23°C
Carbon Dioxide:	1300cc/100in2/24 hrs at 23°C
Water Vapor:	1.0g/100in2/24 hrs at 38°C and 90% R.H.



70994-01	DuraSeal 1"x150ft	each
70994-02	DuraSeal 2"x500ft	each
70994-04	DuraSeal 4"x250ft	each
70994-05	DuraSeal 4"x500ft	each
70994-06	DuraSeal 5"x150ft	each
70994-20	DuraSeal Dispenser	each

► DuraSeal Cling

It Clings - Film can cling to itself and glass vessels.

Heat Resistant - Softens at 100°C.

Strong - Film can stretch 300-400% before breaking or tearing.

Tight Sealing - Forms an airtight barrier when stretched across openings.



70994-07	DuraSeal Cling for Test Tubes, 1" x 150'	Roll
70994-08	DuraSeal Cling, 2" x 500'	Roll
70994-09	DuraSeal Cling, 4" x 500'	Roll
70994-10	DuraSeal Cling, 5" x 150'	Roll

► Peel n' Seal

Pre-Cut, Breathable and Non-Breathable Sealing Membranes for Flasks

Breathable - A breathable option is available for cell culture applications

Non-Breathable - A non-breathable option is available for general sealing applications

Sterile - All membranes have been gamma irradiated to remove cytotoxins and other contaminants

Protects - Liquid-tight membranes keep solutions safe from outside contamination during storage

Proven - Non-breathable Peel-n-Seal is made from our Titer-Tops material and breathable Peel-n-Seal is made from our Breathe-Easier material; both are trusted and proven throughout the life science industry

Temperature Ranges

Breathable: -20°C to 80°C/Non-Breathable: -40°C to 100°C

Peel-n-Seal Utilizes: Breathe-Easier and Titer-Tops

Cat. No.	Description	Flask Size	Qty
Breathe-Easier			
77578-10	Breathable Peel-n-Seal, 1.50" (38.1mm) dia.	250ml	50/pack
77578-20	Breathable Peel-n-Seal, 1.63" (41.4mm) dia.	500ml	50/pack
77578-30	Breathable Peel-n-Seal, 2.13" (54.1mm) dia.	1,000ml	50/pack
Titer-Tops			
77578-40	Non-Breathable Peel-n-Seal, 1.50" (38.1mm) dia.	250ml	50/pack
77578-50	Non-Breathable Peel-n-Seal, 1.63" (41.4mm) dia.	500ml	50/pack
77578-60	Non-Breathable Peel-n-Seal, 2.13" (54.1mm) dia.	1,000ml	50/pack



► SecurTainer™ I Tamper Evident Specimen Containers

Container made of polypropylene - Closure made of polyethylene

This shatter resistant, especially designed for collection, transport and specimen storage.



- Unique integrated leak resistant seal
 - High clarity to allow specimen to be viewed without opening
 - The magenta lids are ribbed for easy opening
 - Containers are stackable with straight side format.
 - SecurTainer™ I is a unique tamper evident to ensure no alter allow. (SecurTainer™ can be used without using the tamper evident locking mechanism)
 - For color coding purpose, use CapInsert (Cat. #68106-series)
- Both containers and caps are manufactured without the use of plasticizers or mold release agents. All material used are free from latex. All containers are 95kpa compliant. Non sterile, container and caps are packaged separately in bag of 100.

EMS #	Description	Qty
64236-02	SecurTainer I, Size 20ml	500/pk
64236-04	SecurTainer I, Size 40 ml	500/pk
64236-06	SecurTainer I, Size 60 ml	500/pk
64236-09	SecurTainer I, Size 90 ml	400/pk
64236-12	SecurTainer I, Size 120 ml	300/pk

► SecurTainer™ II Tamper Evident Specimen Containers

This model uses a different tamper evident concept compared to the SecurTainer I above. No locking tab to push up is necessary when the tamper evident is used. Simply screw the cap on the container and the tamper evident sealing ring is automatically locking in place. When unscrewed, the ring is detached from the cap. All other features are the same as SecurTainer I.



EMS #	Description	Qty
64237-02	SecurTainer I, Size 20ml	500/pk
64237-04	SecurTainer I, Size 40 ml	500/pk
64237-06	SecurTainer I, Size 60 ml	500/pk
64237-09	SecurTainer I, Size 90 ml	400/pk
64237-12	SecurTainer I, Size 120 ml	300/pk

CapInsert: available with colors:

EMS #	CapInsert™ Color	Qty
61806-B	CapInsert, Color Blue	100/pk
61806-L	CapInsert, Color Lilac	100/pk
61806-R	CapInsert, Color Red	100/pk
61806-Y	CapInsert, Color Yellow	100/pk
61806-W	CapInsert, Color White	100/pk
61806-AS	CapInsert, Assorted Colors	100/pk

EMS Click-Leak-Proof Container

WE'VE ADDED A CLICK AND REMOVED THE LEAK.

Our new EMSClick container was designed to eliminate leakage that occurs during specimen transport. The container produces an audible "clicking" sound when the leak-proof seal has been properly engaged, assuring accurate closure and specimen integrity during transport.



Say Goodbye to Messy Clean-Ups and Unnecessary Exposure

- 100% virgin medical grade plastic(HDPE) provides consistent vial to vial performance
- Audible proof of closure confirms engagement of leak-proof seal
- Cap designed to enhance seal during positive and negative pressure differentials
- Rounded knurls on cap offer an easy gripping surface for users
- Vial "ears" prevent cap from backing off during rough transport
- Independently tested to perform with a 0% leak rate under requirements detailed in:

United Nations Model Regulations Packing Instruction 620/650

U.S. Department of Transportation's Title 49 Code of Federal Regulations, §173.196

International Civil Aviation Organization (ICAO) Packaging Instruction 620/650

International Air Transport Association (IATA) Packaging Instruction 620/650

International Safe Transit Association (ISTA) Random Vibration Under Low Pressure Test

The Vials are 20 ml in capacity and they measure 3.04 CM in Diameter and are 4.43 cm in height.

Cat. No	Description	Qty.
64233-08	EMSClick Container, 20 ml	100/Pack
64233-09	EMSClick Container	800/Case

► FlexTainer™ Containers

Made of polypropylene

This is a space-saving expandable accordion-style jug with flattens down for easy transport and storage.



Great ideal for storing and carrying numerous types of fluids, it is suitable for any laboratory. Made of high strength polyethylene, it features comfortable carry grip and screw-on cap with on/off spout. It is available in many sizes up to 8 liters. Come with individually wrapped.

Cat. #	Description	Qty
64228-13	Flex-Tainer™, 3 L	12/pk
64228-43	Flex-Tainer™, 3 L	48/pk
64228-15	Flex-Tainer™, 5 L	12/pk
64228-45	Flex-Tainer™, 5 L	48/pk
64228-18	Flex-Tainer™, 8 L	12/pk
64228-48	Flex-Tainer™, 8 L	36/pk

► PetriStickers™

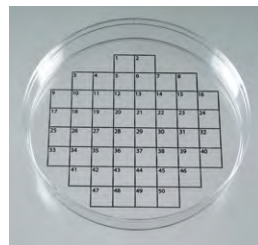
Stickers for Labeling Petri Dishes

Easy to Use - Label Petri dishes quickly, neatly, and reliably.

Temperature Resistant – Labels remain firmly intact in temperatures from 4°C to 42°C

Convenient – Instantly form an imprint Petri dish for quick reference, then remove if you wish

Ideally Sized - PetriStickers™ are 3" or 76 mm diameter.



70630-32	32 - Square Grid	36/pk.
70630-50	50 - Square Grid	36/pk.
70630-70	70 - Square Grids	36/pk.
70630-100	100 - Square Grids	36/pk.
70631-06	6 - Sector Pie	36/pk.
70631-08	8 - Sector Pie	36/pk.
70631-12	12 - Sector Pie	36/pk.
70631-16	16 - Sector Pie	36/pk.

► PetriSEAL™ and ContainerSEAL™

Ideal sealing Tapes for Petri Dishes, Microplates, Lids, Caps and other Lab Items.

Conformity – Stretches, conforms and seals the irregular perimeter of microplates or Petri dishes

Waterproof & Chemical Resistant – Tapes and adhesive resist most solvents and caustic agents

Temperature Resistant – Seal remains flexible in moderate freezer temperatures and withstands intermittent exposure to 100°C

NEW ContainerSEAL XL™

Enjoy all the benefits of PetriSEAL and ContainerSEAL in a new wider format. Container SEAL XL makes it easier to seal large containers and bottles and to cover wider gaps ensuring a tight seal.



70500-B	PetriSEAL, Blue	0.50 x 108	Roll
70500-C	PetriSEAL, Clear	0.50 x 108	Roll
70500-R	PetriSEAL, Red	0.50 x 108	Roll
70500-Y	PetriSEAL, Yellow	0.50 x 108	Roll
70500-W	PetriSEAL, White	0.50 x 108	Roll
70501-R	ContainerSEAL, Red	0.75 x 108	Roll
70501-W	ContainerSEAL, White	0.75 x 108	Roll
70501-Y	ContainerSEAL, Yellow	0.75 x 108	Roll
70502-R	ContainerSEAL XL Red	1" x 108'	Roll
70502-W	ContainerSEAL XL White	1" x 108'	Roll
70502-Y	ContainerSEAL XL Yellow	1" x 108'	Roll

High-Contrast PetriStickers™

Quick Reference - PetriStickers correspond to wells on a microplate for fast colony identification

High Contrast - Colored grid allows colonies to stand out from the Petri dish background

Updated Design - Rectangular shape leaves ample space above and below grid for writing on the dish

Two Layouts - Reference wells numerically (1-96) or alpha numerically (A1-H12)

Ideally Sized - PetriStickers are 2.8" x 1.75" or 71mm x 44.5mm, to fit most common Petri dishes



Alpha numeric sticker mimics well plate layout



1-96 layout assigns a number to each well

Cat. No.	Description	Qty.
70556-14	96-Well layout, 1-96	36/pk
70556-18	96-Well layout, A1-H12	36/pk

Petri Dish Support N Seal

Vertically Oriented Support Structure for Sealing Petri Dishes

Provides An Extra Hand - Support N Seal provides a stabilizing vertical slot in which the Petri dish and lid are held closely together while allowing rotation as a sealing tape is applied around the dish



Any Tape Any Time - Compatible with most sealing tapes including: Breathe Easy Breathable Strips, PetriSeal, DuraSeal and Parafilm®

Stable - A wide base and non-slip feet ensure that Support N Seal remains in place while in use

Universal - Fits Petri dishes up to 100mm in diameter and 15mm high (including lid)

Cat. No.	Description	Qty.
70556-12	Petri Dish Support N Seal	each

Petri-Sleeve™

Seal-To-Size Poly tubing for Petri Dish Storage

Cut-To-Size - Petri-Sleeve™ can be sized to accommodate any number of Petri dishes

Minimize Waste - Each length of sleeve can be sized to prevent baggy packaging and prevent excess waste

Separate Storage - Petri dishes pretreated prior to use can be stored labeled and stored in separate sleeves to prevent contamination

Labeled Stacks - 3" white squares every 6" allow for easy, high-contrast labeling

Versatile - 7" diameter easily fits a wide variety of popular dish sizes, as well as microplates



Cat. No.	Description	Qty.
60412-10	Petri-Sleeve™	each

► Petri Orienter and Stand

For Working Comfortably with Solid State Media

The Petri Dish Stand

Prevent Fatigue – 30 angle creates a more comfortable work surface for streaking, transferring, and counting.

Unique Design – Rear slot accepts all PetriOrienters to create a custom layout.

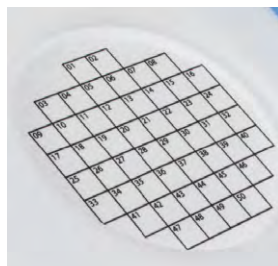
The Petri Orienter

Accuracy – Quickly create a consistent area of reference on your petri dish.

Clarity – Sharp characters and lines allow for fast and easy position recognition.

Flexible – PetriOrienters are available in several layouts of grids or pie sectors to accommodate colonies of any size.

70498-01	PetriDish Stand 88mm diameter	each
70498-02	PetriDish Stand 100mm diameter	each
70498-03	PetriOrienter, 32-square grid	Pack
70498-04	PetriOrienter, 50-square grid	Pack
70498-05	PetriOrienter, 70-square grid	Pack
70498-06	PetriOrienter, 100-square grid	Pack
70498-07	PetriOrienter, 6-sector pie	Pack
70498-08	PetriOrienter, 8-sector pie	Pack
70498-09	PetriOrienter, 12-sector pie	Pack
70498-10	PetriOrienter, 16-sector pie	Pack



► Petri Dish Dividers™

Adhesive Dividing Wells for Cell Growth

Flexible – Grow multiple cell types in one dish OR grow similar cell types and apply different treatments

Save Space – One dish does the job of many on the benchtop, at the microscope and in the incubator

Save Media – Smaller growth areas means less media needed to grow cells

Sterile – Gamma irradiated to ensure sterility

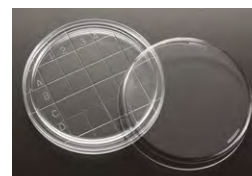
70632-20	Petri Dish Dividers 6-Sector Pie	15/pack
70632-30	Petri Dish Dividers 8-Sector Pie	15/pack



► Contact Plate

Made of polystyrene

These dishes are free from optical distortion. The dish has 16 of 10 x 10 mm square grids, which is marked numerically in one direction and alphabetically in the other. The model 70692-20 is designed with a convex bottom to save on culture medium. Dishes are packaged 20 per sleeve and are radiation sterile.



EMS #	Description	Vol.	Qty
70692-10	Contact Plate, 60x15mm	20 ml	500/pk
70692-20	Contact Plate, convex bottom, 60x15mm	15 ml	500/pk

► Petri Dishes –Sterile Petri Dishes

Made of polystyrene

Our Petri Dishes are available in a variety of shapes and sizes for use in routine procedures and with automated equipment. Economical, optical clarity, dishes are precision-molded from biomedical grade polystyrene so cultures are clearly visible without distortion. Dishes are packaged 20 each in sturdy polyethylene sleeves. These dishes are not recommended for tissue culture application, due to non treated by "corona effect".



EMS #	Model	Description (actual Dimension)	Vol	Qty
70678-10	D210-7	Dish 90x20mm – Commonly referred to as a 100x20mm dish. For unimpaird observation of specimen growth with raised straight ridge around top for stable stacking	500 ml	100/pk
70678-20	D210-7WL	Dish 90x20mm – Commonly referred to as a 100x20mm dish. This dish has three venting ribs into the underside of the lid to prevent condensation build-up	100 ml	500/pk
70678-30	D210-8	Dish 90x25mm – Commonly referred to as a 100x25mm dish. Accommodates deeper fills for longer culture periods. Used for fungal cultures, plant propagation. This dish has three venting ribs into the underside of the lid to prevent condensation built-up	125 ml	500/pk
70678-40	D210-8R	Dish 90x25mm – Commonly referred to as a 100x25mm dish. Similar to D210-8 but with no-vented lid having a raised straight ridge around top for stable stacking.	125 ml	500/pk
70678-50	D210-13	Dish 55x13mm – Commonly referred to as a 60x15mm dish. For use whenever a small quantity of culture is desirable. For unimpaird observation of specimen growth with raised straight ridge around top for stable stacking. Dish has three venting ribs on the edge of the dish to prevent condensation build-up.	28 ml	500/pk
70678-60	D210-14	Dish 50x8mm – Commonly referred to as a 60x9mm dish. Box type dish, for classroom studies, culturing of mycobacteria aerosol testing, membrane filter and immunodiffusion techniques. Tight lid prevents sample dehydration.	12 ml	500/pk
70678-70	D210-15	Dish 35x10mm – Commonly referred to as a 35x10mm dish. Selected for small quantities culture media. For unimpaird observation of specimen growth with raised straight ridge around top for stable stacking. This dish has three venting ribs into the underside of the lid to prevent condensation build-up.	9 ml	500/pk

► Square Petri Dish

Made of polystyrene – Radiation sterile
This dish commonly referred to as a 100 x 15 mm dish. Free from optical distortion and sterile, these dishes are ideal for phase typing, susceptibility testing, plate counts, and probe assays.



The square Petri dish with grid is consists of 36 of 13 x 13 mm squares, each 13 mm grid is marked numerically in one direction and alphabetically in the other. This dish has four venting ribs into the underside of the lid to prevent condensation build-up.

Cat. #	Description	Qty
70691	Square Petri Dish with Grid, 10/sleeve	100/pk
70691-CS	Square Petri Dish with Grid, 500/cs	500/pk
70690	Square Petri Dish, Plain, 20/sleeve	100/pk
70690-CS	Square Petri Dish, Plain, 500/cs	500/pk

► Bacterial Cell Spreader

Made of high impact polystyrene

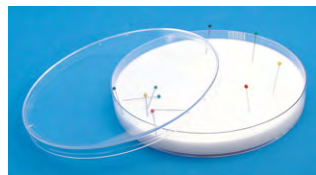
No flame sterilization needed.
Designed for easy spreading of cells onto the surface of an agar plate. Supplied sterile in individually packs. Total length of handle: 176 mm, width of spreader: 36mm. Color green



EMS #	Description	Qty
62452	Bacterial Cell Spreader	100/pk

► Dissecting Dish

A silicone pad placed inside a 150mm x 20mm deep plastic petri dish. The mat can be removed, washed, and returned to the dish for reuse. The pins come in 10 different coded colors.



An optional Pyrex Glass Petri dish is available for use when sterilization is needed

70540	Dissecting Dish w/Plastic Dish	each
70540-50	Dissecting Dish w/Pyrex® Dish	each

► PYREX® brand, Culture, Petri Dish

These flat, clear dishes will withstand repeated sterilization (wet or dry). The edges are beaded to provide greater mechanical strength. The bead also provides a means to equally space the sidewalls of the bottom and cover, thereby reducing the capillary action of condensed moisture on the slides. They are not effected chemically or thermally by any of the methods commonly employed in laboratories where sterilization is a major factor in routine or in specialized work. The covered dish is not airtight.

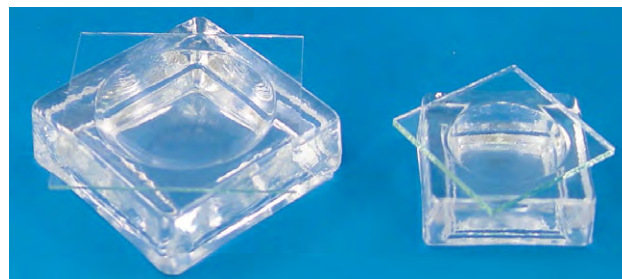
The tops are marked in blue enamel and the bottoms are marked in white enamel to make sorting easier. Bottoms also have a triangular, enamel reference point for serial dilutions.



Cat #	Description	Size, mm	Approx. Dia x Hgt, mm	Qty
70648-10	Complete Petri Dish	60x15	58x15	12/pk
70648-14	Complete Petri Dish	100x15	98x15	12/pk
70648-18	Complete Petri Dish	150x20	148x20	12/pk

► Embryo Dishes

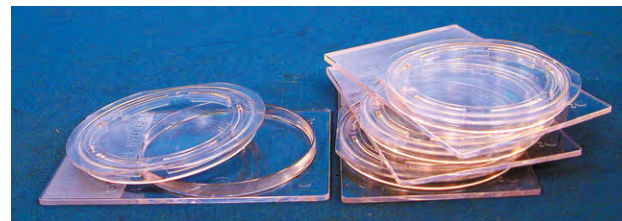
These dishes are molded from clear glass and come with a glass lid for the viewing or staining of free-floating specimens.



Cat. #	Description	Pack
70543-30	Embryo Dish, 30 mm Dia. x 12 mm Deep	each
70543-45	Embryo Dish, 45 mm Dia. x 12 mm Deep	each

► Petri Dish; Analyslide

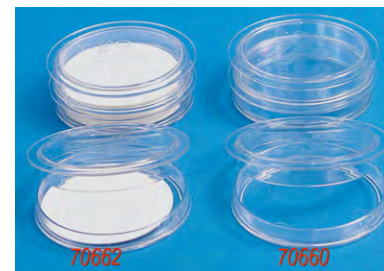
Slide measures 3"(L) x 2"(W) x 1/16"(H), chamber is 3mm deep. The analyslide is like a petri dish on a slide. Use it as an examination and storage container for 47mm filters. Its rectangular base fits any microscope stage; an inner cover ring offers airtight security for the samples and it does not interfere with viewing. It is also ideal for drying coated grids and absorbing water from grids that are supporting sections.



70650	Analyslide	100/pk
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► Petri Dishes; Open with One Hand

A 50x9mm petri dish design that is easily opened with one hand, yet closes to a tight seal by its unique double rim. Specimen samples are preserved until you are ready to analyze them. Humidity remains locked in. When loaded with a 47mm absorbent pad, it is ideal for drying coated grids, removing water from grids that are supporting sections.



Available with or without absorbent pads. The dishes are sterilized by Gamma Irradiation.

70660	Without Absorbent pads	100/pk
70662	With Absorbent pads	100/pk
70664	Absorbent pad kit: (1000 pads, 47mm, and dispenser) Kit	

► Petri Dishes; Disposable

Our petri dishes are available in a variety of sizes and shapes for use in routine procedures and automatic equipment. Manufactured from Polystyrene, with excellent optical clarity. The dishes are sterile and each lot is tested to assure uniform quality and sterility.



70680	100x15mm Standard Round	100/pk
70682	100x15mm Bi-Petri	100/pk
70684	100x15mm Tri-Petri	100/pk
70686	100x15mm Quad-Petri	100/pk
70690	110x15mm Square	100/pk

► Specialized Dishes

► 35x10mm Untreated Polystyrene Dish

35x10mm dish for the culture of cells in suspension; radiation sterilized.

70340	35x10mm Suspension Dish	100/pk
70342	35x10mm Suspension Dish	500/pk



► 60x15mm Permanox Dish

Permanox is a strong, biologically inert material, resistant to nonchlorinated hydrocarbons, acetone, and many other EM reagents. Our EMbed-812 and other embedding resins can be used to embed cells in these dishes with excellent results. Permanox has not been shown to be autofluorescent, and has a low oxygen solubility which makes it suitable for experiments performed under anoxic conditions. The dishes have high optical quality that provide excellent and consistent viewing where microscopic examination is required.

70350	60x15mm Permanox Dish	40/pk
70353	60x15mm Permanox Dish	100/pk
70356	60x15mm Permanox Dish	500/pk

► Dissecting Pan and Mat

This dissecting pan is made from aluminum, which is rust free and easy to clean. It comes with a removable reusable vinyl pad, which accepts dissecting as well as push-pins to hold down your specimen during dissecting. The pad measures 13 3/8" x 9 3/8" x 2 1/4" thick



63313 Dissecting Pan & Vinyl Mat each

► Cover Glass Bottom Sterile Culture Dish

EMS introduces the High Quality Thin Glass Bottom Sterile Culture Dishes, meeting your research requirements.

IDEAL FOR:

- Fluorescence microscopy
- Confocal (laser) microscopy
- High resolution image analysis
- Cell culture
- Electrophysiology

A new series of sterile, optical quality, glass bottom dishes which provide exceptional imaging quality for many applications requiring the use of inverted microscopes. Conventional plastic or glass petri dishes and chambers limit the use of the inverted microscope for many applications because the thick plastic or glass bottom requires a long working distance objective available only in lower magnifications. Moreover, plastic dishes cannot be used for DIC or any polarization microscopes due to their inherent birefringence. EMS New

Glass Bottom Dishes eliminates these problems, making them ideal for applications such as: patch clamp recordings where fluorescent-tagged (GFP) receptors can be identified for selective study; and many other fluorescent microscopy applications, which require low background scattering of light and reduce intrinsic "auto" fluorescence that occurs when using standard plastic dishes. Furthermore, the glass bottom is designed flush with the whole base of the dish, therefore allowing direct contact between the entire glass surface and the warming stage. This eliminates any air gaps that may otherwise exist between the glass dish and the warming stage and hence optimize heat-transfer, allowing homogeneous heating and cooling of the glass bottom.

FEATURES:

- Non-cytotoxic, non-pyrogenic and sterile until opened.
- Dish diameters: 35 and 50 mm, with internal glass well diameter of 12, 22, 30 and 40 mm.
- Available sterile either individually packed in a medical-style blister or in sleeves of 20 dishes.
- Each dish has a flat (0.17mm thick) optical quality glass bottom.
- Production is carried on in a Class 10,000 clean room, certified under EN46001, EN 46002, ISO9001 and ISO 9002.
- All dishes are gamma irradiated (EN 552) and sterile.
- A typical dish is shown in Fig. 1

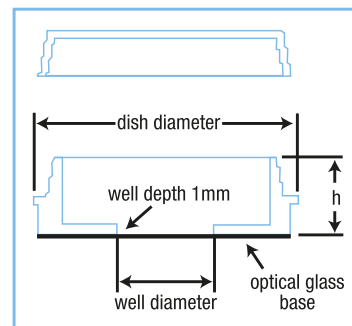


Figure 1

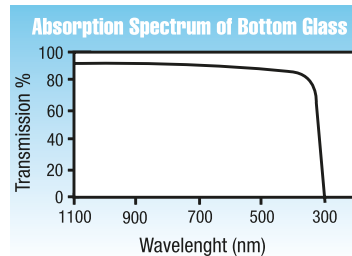


Figure 2

► **Cover Glass Bottom Sterile Culture Dish (continued)**

OPTICAL PROPERTIES

- Wide optical range of transmission – UV, IV and IR (300 nm to 2500 nm) **Figure 2.**
- Flat (0.17 mm thick) optical quality glass bottom provides the following advantages:
 - a. use of a much shorter working distance immersion objective.
 - b. larger numerical aperture (NA) objectives.
 - c. higher magnification (up to 100x).

MICROSCOPY, IMAGING AND SPECTROSCOPY

- Confocal (laser) microscopy.
- Two-/multi Photon Confocal Microscopy.
- DIC and Polarization Microscopy.
- High-resolution Imaging System.
- Infrared imaging (e.g., brain slide recordings).

SOME APPLICATIONS

- **Cell Biology:** STEM Cell Research, Cell growth cycle monitoring, cell culture.
- **Protein Chemistry:** Green fluorescent protein identification of Histotags, etc.
- **Molecular Biology:** Phenotyping and other complex Genetic Research.



1. Clear Dishes

Dish Size Dia x H	Glass Well Dia.	Individual Blister Pack		Bulk pack in Sleeve	
		20/pk	120/cs	20/Sleeve	200/cs
35x10 mm	12 mm	70670-02	70670-12	70670-52	70670-62
35x10 mm	22 mm	70671-02	70671-12	70671-52	70671-62
50x7 mm	30 mm	70673-02	70673-12	70673-52	70673-62
50x7 mm	40 mm	70674-02	70674-12	70674-52	70674-62

2. Black Dishes – to black out light for fluorescence microscopy

Dish Size Dia x H	Glass Well Dia.	Individual Blister Pack		Bulk pack in Sleeve	
		20/pk	120/cs	20/Sleeve	200/cs
35x10 mm	12 mm	70666-02	70666-12	70666-52	70666-62
35x10 mm	22 mm	70667-02	70667-12	70667-52	70667-62
50x7 mm	30 mm	70668-02	70668-12	70668-52	70668-62
50x7 mm	40 mm	70669-02	70669-12	70669-52	70669-62

3. Willco-dish™ Kit-Dishes

The WillCo-dish®KIT ("KIT") dishes, of which we have four (4) types in polystyrene (PS) and all four in both "transparent -" as well as in "black walled" dishes, we designed to offer Scientists the opportunity, to use any chosen "material - as well as different thicknesses", for the bottom of a "WillCo® dish".

As a standard, we offer our (German glass) Borosilicate cover slips, in Thickness: # 1.0 (130-160 micron), as well as # 1.5 (160-190 micron).

The WillCo-dish® KIT Glass Bottom dishes are composed of several components, each of the highest quality of their kind. Below please find a summary and description of these components..

Components

1. Dish (Polystyrene or polycarbonate surrounds and -lids, clean room molded, 500 units each).
2. Pressure sensitive Double Sided [Medical] Adhesive rings, FDA approved (500 units). This DSA-Adhesive reaches its maximum bonding quality after 4 hours, at room temperature.
3. Glass coverslips: German glass, 0.17 mm. - # 1.5 coverslips (500 units). Other thicknesses available on request.
4. One pair of tweezers, to protect fingers from these thin, razor-sharp glass coverslips.
5. Optional: Round, anodized, aluminum "Assembly Devices" for a quick, accurate and safe positioning and assembly of the glass coverslip and the adhesive ring.

Assembly Device:

Note: The 2 part aluminum ASSEMBLY DEVICE comes separate, because you need to purchase it only once per type, in a life time.

Again, using an ASSEMBLY DEVICE with the KIT-dishes makes assembling these fine dishes "easy, accurate and safe", also saving a lot of time and funds. The (glass) bottom of the WillCo-dish® KIT dishes is always flush with the warming-stage and flat, a requirement for High Quality Imaging.

These features ensure even distribution of the temperature inside the dish, as well as great imaging results.

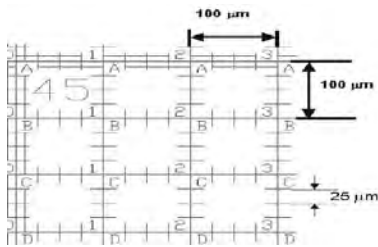
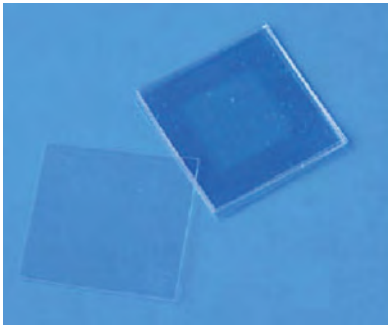
We are sure you will very much appreciate working with the EMS WillCo-dish®KIT "Do-It-Yourself" Glass Bottom dishes

Ordering Information

Catalog #1	70665-01	70665-03	70665-05	70665-07	70665-09	70665-11	70665-13	70665-15
Number #1.5	70665-02	70665-04	70665-06	70665-08	70665-10	70665-12	70665-14	70665-16
Bottom	Glass	Glass	Glass	Glass	Glass	Glass	Glass	Glass
Size(mm)	35x10	35x10	50x7	50x7	35x10	35x10	50x7	50x7
Aperture	12mm Glass	22mm Glass	30mm Glass	40mm	12mm Glass	22mm Glass	30mm Glass	40mm
Volume(ml)	400	1000	1500	4000	400	1000	1500	4000
Vents	Yes	Yes	No	No	Yes	Yes	No	No
Glass Thickness	#1(0.13-0.16mm) #1.5(0.16-0.19mm)	#1(0.13-0.16mm) #1.5(0.16-0.19mm)	#1(0.13-0.16mm) #1.5(0.16-0.19mm)	#1(0.13-0.16mm) #1.5(0.16-0.19mm)	#1(0.13-0.16mm) #1.5(0.16-0.19mm)	#1(0.13-0.16mm) #1.5(0.16-0.19mm)	#1(0.13-0.16mm) #1.5(0.16-0.19mm)	#1(0.13-0.16mm) #1.5(0.16-0.19mm)
Packed	Dish, Glass, Adhesive Rings	Dish, Glass, Adhesive Rings	Dish, Glass, Adhesive Rings	Dish, Glass, Adhesive Rings	Dish, Glass, Adhesive Rings	Dish, Glass, Adhesive Rings	Dish, Glass, Adhesive Rings	Dish, Glass, Adhesive Rings
Case	500	500	500	500	500	500	500	500
Color	Transparent	Transparent	Transparent	Transparent	Black	Black	Black	Black
Material	Polystyrene	Polystyrene	Polystyrene	Polystyrene	Polystyrene	Polystyrene	Polystyrene	Polystyrene

Catalog Number	70665-20	70665-21	70665-22	70665-22
Size (mm)	50x20	50x20	60x20	60x20
Aperture	12mm Glass Diameter	22mm Glass Diameter	30mm Glass Diameter	40mm Glass Diameter
Packed	2 Parts Glass and Adhesive	2 Parts Glass and Adhesive	2 Parts Glass and Adhesive	2 Parts Glass and Adhesive
Case	Each	Each	Each	Each
Material	Aluminum	Aluminum	Aluminum	Aluminum

► Cellattice™ - Micro-Ruled Plastic Cell Culture Surfaces



Purposes:

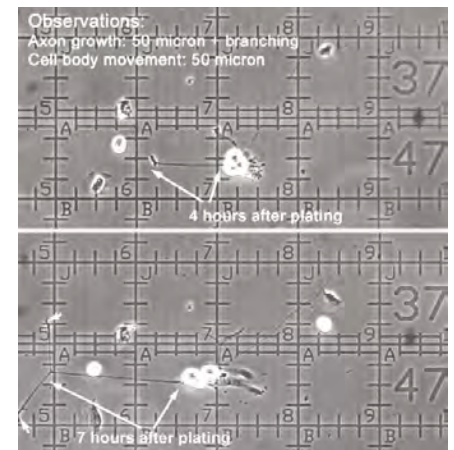
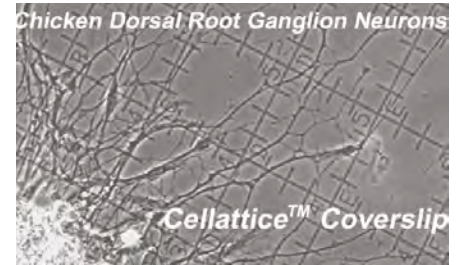
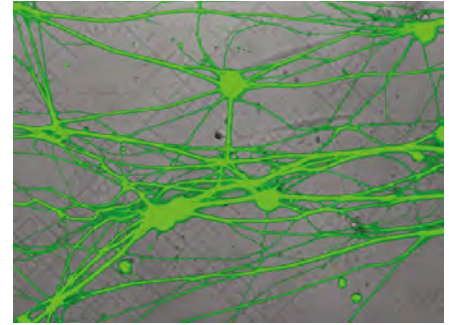
Measure the Same Cell: Cell cycle, axon growth and differentiation
Direct Cell Count: Proliferation and cytotoxicity without removing attached cells

Introduction

Cellattice™ micro-ruled Plastic Cell Culture Surfaces consists of a cell culture surface with microscopic identification and measurement markers. It is manufactured with high optical quality plastic suitable for phase contrast and other standard cell-based assay measurement techniques. Cell cultures on the Cellattice™ are identifiable within 25 micrometers.

The built-in markers on the Cellattice allow direct measurement of cell growth and movement without image acquisition. Same cell or cell clusters can be measured throughout the time course of the experiment, even after each incubation period.

Cellattice™ can be used to monitor morphology, cell movement and differentiation at the individual cell level. Cell proliferation is measured directly with multiple reading.

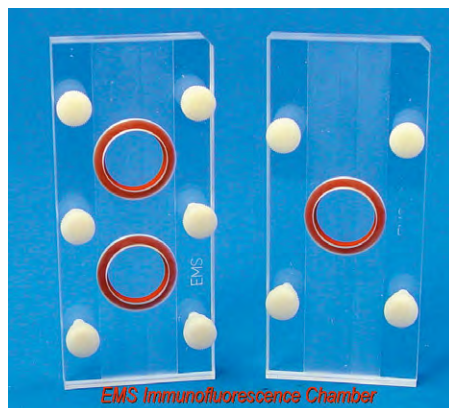


► Cellattice™ Coverslips and Slides

BENEFITS:

- Measure axon growth directly without image acquisition and image analysis
- Count Cells after attachment
- Measure cell proliferation directly with multiple readings without detaching
- Monitor same cell or cell cluster for morphology, cell movement and differentiation

Catalog #	Size	Thickness	Grid Area	Pack
63570-15	15 x 15 mm	0.12 – 0.16 mm	10 x 10 mm	50
63571-25	25 mm Dia	0.12 – 0.16 mm	10 x 10 mm	50
63572-75	75 x 25 mm Slide	0.76 x 0.78 mm	10 x 10 mm 4 Quadrants)	50



► EMS Immunofluorescence Chamber

A two well incubation chamber for use in immunocytochemistry (by Miguel Berrios, SUNY Stony Brook). Also available in a one well version.

This chamber accepts regular microscope slides or coverslips and is assembled without any bonding substrates. Antibody incubation and washing are done in the chamber wells. It is then taken apart before microscopic examination. It is a proven solution to contamination spills, non-specific fluorescent signals, and sample dehydration in indirect immunofluorescence assays.

Overall measurement: 4½"(L) x 2"(W) x ¾"(T) (113 x 51 x 12mm). Cavity: ¾" (dia.) x ¼"(D) (20mm x 6mm).

ADVANTAGES:

- Very reliable and will accept a variety of samples and antibody washing conditions.
- Drastically reduces non-specific backgrounds.
- Elimination of contamination.

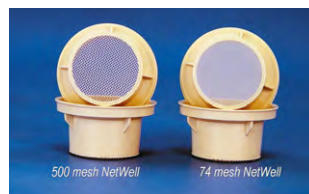
70330	Immunofluorescence Chamber, 2 well	each
70331	Immunofluorescence Chamber, 1 well	each

**EMS
EXCLUSIVE**

► Tissue Processing Well; Netwell™

A modular and disposable system which can be used for the following procedures:

- Handling and processing of tissue slices.
- In immunocytochemical staining.
- In 3-dimensional tissue culture.
- In explant tissue culture.



Home made devices are no longer necessary. These tissue processing wells are ready to fill all of your needs with the added convenience of being able to process up to 12 tissue specimens at one time (with one unit) .

► Netwell™ Inserts

The Netwell™ is a polystyrene insert fitted with a polyester mesh bottom for use in 6 and 12-well plates. Available in two mesh sizes and two diameters; the Netwells provide ultimate flexibility in retaining fragile tissues during processing and staining.

► Netwell™ Carrier Kit

A set of carrier plates and handles for moving the Netwells in and out of the 6 or 12-well plates. The handle can be attached or detached to the plate at any time.

► Netwell™ Reagent Tray

Thermo-formed polystyrene. Holds 150ml of reagent solution. Netwells are transferred to the reagent tray by the Carrier kit, where fixing and staining is performed. Reagent trays are available in white for colorimetric reaction contrast, and in black for better visibility of tissue sections.

APPLICATIONS

- The polyester mesh acts as a tissue carrier and strainer for immunocytochemical staining and biological and histological fixation. It avoids the risk of losing valuable samples associated with paint-brush transfer.
- For 3-D tissue culture, the sterile Netwell provides efficient media permeation and support to cultures grown in gels.
- As well, Sterile Netwells allow for easy processing of tissue explants and microcarrier-grown cells.

Ordering Information:

Catalog #	Dia.	Mesh Size	Sterile	Units/cs
64710-00	15 mm	74 µm	Yes	48/cs
64711-00	15 mm	500 µm	Yes	48/cs
64712-00	24 mm	74 µm	Yes	48/cs
64713-00	24 mm	500 µm	Yes	48/cs

Netwell Accessories:

Catalog #	Description	Units/cs
64730-00	Netwell Reagent Tray, Black	200/cs
64730-10	Netwell Reagent Tray, Black	10/cs
64732-00	Netwell Reagent Tray, White	200/cs
64732-10	Netwell Reagent Tray, White	10/cs
64735-00	Netwell Carrier Kit, 15 mm	8/cs
64735-01	Netwell Carrier Kit, 15 mm	1/cs
64736-00	Netwell Carrier Kit, 24 mm	8/cs
64736-01	Netwell Carrier Kit, 24 mm	1/cs

For your convenience, the NetWell™ sets are available ready to use. The set consists of:

- 6 Netwells of 24mm diameter or 12 Netwells of 15mm diameter
- Two Reagent Trays, one black and one white
- One Carrier Kit: one carrier plate and one handle

Cat. #	Netwell™ Dia.	Netwell™ Mesh	Pack
64740-00	15mm, Sterile	74µm	set
64742-00	15mm, Sterile	500µm	set
64743-00	24mm, Sterile	74µm	set
64745-00	24mm, Sterile	500µm	set



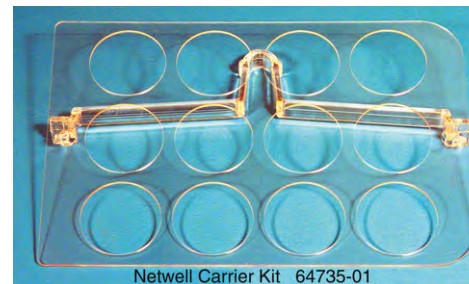
NetWell 15mm Diameter Starter Set
64740-00 or 64742-00



NetWell 24mm Diameter Starter Set
64743-00 or 64745-00



Reagent Trays (Black & White)



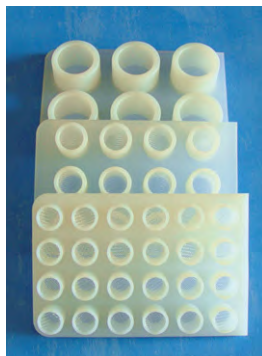
Netwell Carrier Kit 64735-01



Netwell Carrier Kit for 24mm Diameter Inserts

► MeshWell Plates; Section Processing and Immunocytochemical Trays

These plates are made from polypropylene and the bottom of each of the wells is an ETFE monofilament screening fabric with a 500µm (0.0197) opening. These MeshWell Plates are available with 6, 12, and 24 well configurations, and they fit into the 6, 12 and 24 Costar/Corning Cell Culture Clusters listed above for processing tissue slices, otherwise, these MeshWell Plates are also able to process tissue slices with Reagent Trays (64730 - 64732). MeshWell Plates come with one Plate and two Reagent Trays, one Black and one white. For your convenience we offer a Meshwell Plate set which includes one Meshwell and one cluster plate.



Cat. #	Description	Quantity
64700-06	MeshWell Plate, 6-Well	each
64700-12	MeshWell Plate, 12-Well	each
64700-24	MeshWell Plate, 24-Well	each
64702-06	MeshWell Plate, 6-Well w/Cluster	set
64702-12	MeshWell Plate, 12-Well w/Cluster	set
64702-24	MeshWell Plate, 24-Well w/Cluster	set
64730-10	Reagent Tray, Black	10/pk
64732-10	Reagent Tray, White	10/pk

► Costar® Brand Cell Culture Clusters



Tissue culture plates are designed and treated for a wide range of applications.

Plates are made from optically clear, medical grade polystyrene with flat bottoms of uniform thickness, allowing for distortion-free observation and microscopic examination. Alphanumeric coordinates are placed on the same focal plane as cell growth for easy referencing of well position.

These plates are also for use with our NetWells and our MeshWell Plates (see Tissue Processing Well; NetWells, and MeshWell Plates listed above.)

Ordering:

Well Format	Well Dia, mm	Well Growth Area, ml	Total Well Volume	Working Volume	Packaging	Corning Costar No	Catalog Number	Quantity
6	35	9.5	17 ml	5 ml	5/bag	3506	64705-05	100/pk
6	35	9.5	17 ml	5 ml	1/bag	3516	64705-01	50/pk
12	22.6	4	7 ml	3 ml	5/bag	3512	64706-05	100/pk
12	22.6	4	7 ml	3 ml	1/bag	3513	64706-01	50/pk
24	16	2	3.4 ml	2 ml	5/bag	3527	64707-05	100/pk
24	16	2	3.4 ml	2 ml	1/tray	3526	64707-01	50/pk

► Zerostat Anti-Static Gun

This device operates on a piezoelectric effect to emit positive (trigger squeeze) and negative (trigger release) charges to neutralize static on virtually any surface. The gun emits no radioactivity and it does not require electricity or batteries. The unit measures 4 x 6".

60610 Zerostat Anti-Static Gun each



► Falcon™ Cell Strainers

These nylon meshed devices provide more uniform cell suspensions, and are a perfect tool for separating



cells from either clumps or primary tissues. There is no longer a need to fabricate filters from gauze, cotton, paper or fabric. Cell strainers are compatible with 50ml conical tubes (#64760 or #64762). The strainers are available in 35, 40, 70 and 100 micron sizes. The 35 micron mesh comes in a non-sterile configuration and it is an integral part of the 6ml tube cap that can be used to collect the dissociated sample for downstream processing in instruments. Ideal for: dissociating clumped cells in separation for cell counting or sub-culture, separating enzymatically dissociated cells from undigested tissue for the initiation of primary cell growing, tissue processing such as fixation, dehydration, and staining. Each strainer is individually wrapped and gamma sterilized, except for the 35-micron mesh which comes with a 6ml tube and is packed 25/sleeve.

Ordering:

Catalog #	Mesh size	Sterile	Fit Tube	Units/cs
64750-00	35 µm	No	6 ml	500/case
64750-25	35 µm	No	6 ml	25/case
64751-00	40 µm	Yes	50 ml	50/case
64751-10	40 µm	Yes	50 ml	10/case
64752-00	70 µm	Yes	50 ml	50/case
64752-10	70 µm	Yes	50 ml	10/case
64753-00	100 µm	Yes	50 ml	50/case
64753-10	100 µm	Yes	50 ml	10/case

Clusters are commonly used in the following applications:

- Maintenance of stock cultures
- In vitro toxicology
- Cell cloning
- Drug binding studies
- Hybridoma fusions
- Virus isolation
- Scale up culture
- Viral plaque assay
- Clone expansion
- Transformation
- 3H-Thymidine
- Carcinogenicity testing
- 51Cr Release assay
- Mutagenicity testing
- MTT assays

▶ FLOWMI™ Cell Strainers (40µm Porosity)

*Disposable Cell Strainers
for P1000 pipette tips
(40 microns)*

These unique cell strainers provide quick and efficient filtering of small volume samples (up to 1000µl) prior to FLOW or FACS Analysis.** FLOWMI is compatible with most 1000µl tips including Fisherbrand Sure-One, VWR brand, Axygen, Nichiryo, Eppendorf, and more. Flowmi™ strainers are sterile and packaged in re-sealable, zip-style bag. Product sterility can be maintained when opened and re-sealed in a laminar flow hood. Compact, covered tray holds 50 Flowmi™ strainers oriented for direct press and fit attachment to the pipette tip

- Preserve volume when filtering small samples
- Decrease the potential for clogging of FLOW or FACS* instruments by effectively filtering cellular debris
- Tray features a sliding cover for easy, one handed use
- Patent pending.

* FACS is a registered trademark of Becton-Dickinson Corporation

** FLOWMI is recommended for use with samples having a maximum concentration of 2MM cells/ml.



Cat No.	Description	Qty.
64709-60	Flowmi™ Cell Strainers	50/pk



▶ Tissue Grinders

Wheaton Tissue Grinders enable primary cells to be prepared from excised tissues, as well as sub-cellular components from harvested cell packs. Tissue grinders are used to extract DNA, RNA and proteins for blot or other procedures. They are also used to enhance recovery of other cell products. Capacities on the grinders range from 0.1 ml to 55 ml. There are many grinders to suit your needs.

- Tapered Tissue Grinders are ideal for connective tissue including heart, muscle, and lung. These glass-on-glass grinders feature a long taper design that minimizes grinding efficiency.
- Potter-Elvehjem Tissue Grinder incorporates a serrated pestle design to disperse homogenate into the mortar cylinder. Standard unit with PTFE pestles are well suited for soft tissue, such as brain and liver.
- Tenbroeck Tissue Grinders have a hollow handle that allows packing with ice, making them suitable for tissues such as liver, intestines and heart.
- Dounce Tissue Grinders are supplied with two types of pestles: a loose-fitting pestle for sample reduction and a second, tighter pestle for complete homogenization. The ball-shaped pestles leave cell nuclei intact in soft tissue.
- The Wheaton Micro Tissue Grinder Kit offers a complete selection of micro tissue grinders.

All Wheaton tissue grinders are manufactured from Wheaton 33 low extractable borosilicate glass that conforms to USP Type 1 and ASTM E-438 Type 1, Class A requirements. Replacement parts can be purchased separately.

▶ Dounce Tissue Grinder

- Ideal for soft tissue
- Provide with loose and tight pestle
- Wheaton 33 low extractable borosilicate glass
- Autoclavable.

This grinder designed to retain a high percentage of cell nuclei and mitochondria in soft tissues from cell cultures. When use, the pestle ball is encircled in liquid, which is avoid heat buildup by reducing friction. This grinder is ideal for enzyme studies. The initial grinding is performed using the "loose" pestle. The grinding process is completed using the "tight" pestle.. This grinder is used by moving the pestle up and down, and work best with cell suspensions or very soft tissues. The mortar has a large reservoir and pouring lip and is supplied with "loose" and "tight" pestles.

Tight Pestle "A" Specification: 0.0010 – 0.0030" (0.025 – 0.076 mm)
Loose Pestle "B" Specification: 0.0035 – 0.0055" (0.089 – 0.14 mm)



Cat. #	Size, mL	Mortar, OD x Length, mm	Overall Length	Qty/cs
64790-01	1	11 x 48	125	2/pk
64790-07	7	13 x 82	175	2/pk
64790-15	15	22 x 94	210	2/pk
64790-40	40	32 x 140	285	2/pk

► Tissue Grinders (continued)

► Dounce Dura Grind[®] Tissue Grinder

- Rugged alternative to glass Dounce Tissue Grinder
- Precision machined from No.316 stainless steel
- Mortar and Pestle provided as a matched set
- Not autoclavable.



Wheaton Dura-Grind[®] Stainless Steel Dounce Tissue Grinder provides a rugged alternative to glass Dounce tissue grinders. Smooth pestle action requires less effort than glass tissue grinders. This unit is precision machined of No. 316 stainless steel to the tolerance of 0.0005 in. (0.013mm). The mortar has flat bottom allowing it to stand upright. Single pestle and mortar are supplied as a matched set; they are NOT autoclavable. Weight 2 lb (0.9 kg)

Cat. #	Size, mL	Mortar, OD x Length, mm	Overall Length	Qty/cs
64791-07	7	35 x 114	171	1/pk
64791-15	15	35 x 114	171	1/pk
64791-40	40	44 x 114	171	1/pk

► Potter-Elvehjem Tissue Grinder

- Ideal for tissue homogenates
- Use with power homogenization
- Parts interchangeable
- PTFE pestle
- Autoclavable



These grinder are precisely constructed with completely interchangeable parts to allow easier cleaning or replacement of damaged mortars. They are designed for use in preparation of tissue homogenates and other similar applications. The PTFE pestle is for soft tissues such as brain or liver. The stainless steel rod is 0.25" (6.3mm) diameter. The grinding chamber clearance is 0.004" to 0.006" (0.1 to 0.15mm). This unit is autoclavable and can be used for power homogenization as with overhead stirrer. However, we strongly recommend the use of safety-coated tissue grinder (64793-series) for added safety. This unit is manufactured from Wheaton 33 low extractable borosilicate glass that conforms to USP Type 1 and ASTM E-438 Type 1, Class A requirements.

Cat. #	Size, mL	Mortar, OD x Length, mm	Overall Length	Qty/cs
64792-02	2	11 x 45	203	2/pk
64792-05	5	13 x 66	219	2/pk
64792-10	10	16 x 74	219	2/pk
64792-15	15	19 x 94	219	2/pk
64792-30	30	24 x 118	266	2/pk
64792-55	55	30 x 130	266	2/pk

► Potter-Elvehjem Tissue Grinder Replacement Parts

Cat # Mortar only	Size	Qty	Cat # Pestle only	Size	Qty
64792-70	2 ml	2	64792-80	2 ml	2/pk
64792-71	5 ml	2	64792-81	5 ml	2/pk
64792-72	10 ml	2	64792-82	10 ml	2/pk
64792-73	15 ml	2	64792-83	15 ml	2/pk
64792-74	30 ml	2	64792-84	30 ml	2/pk
64792-75	55 ml	2	64792-85	55 ml	2/pk

► Potter-Elvehjem Tissue Grinder

With Radial Serrations

All features are similar to the series 64792-series, with additional:

- Radial serrated PTFE pestle
- This grinder has a serrated PTFE pestle that disperses homogenate into the mortar cylinder more efficiently. Depth of the serration is 0.20" to 0.25" (0.1 to 0.15 mm).



Cat. #	Size, mL	Mortar, OD x Length, mm	Overall Length	Qty/cs
64795-02	2	11 x 45	203	2/pk
64795-05	5	13 x 66	219	2/pk
64795-10	10	16 x 74	219	2/pk
64795-15	15	19 x 94	219	2/pk
64795-30	30	24 x 118	266	2/pk
64795-55	55	30 x 130	266	2/pk

► Replacement Parts:

Cat # Mortar only	Size	Qty	Cat # Pestle only	Size	Qty
64792-70	2 ml	2	64795-80	2 ml	2/pk
64792-71	5 ml	2	64795-81	5 ml	2/pk
64792-72	10 ml	2	64795-82	10 ml	2/pk
64792-73	15 ml	2	64795-83	15 ml	2/pk
64792-74	30 ml	2	64795-84	30 ml	2/pk
64792-75	55 ml	2	64795-85	55 ml	2/pk

► Potter-Elvehjem Safe-Grind[®] Tissue Grinder

All features as the same as 64792-series, with the addition:

- Exterior plastic coated glass mortar provide greater safety

Wheaton Safe-grind plastic coated tissue grinders afford an added measure of safety over uncoated glass tissue grinders. The heavy plastic coating protects the mortar from becoming scratched or checked, and assures you of sure grip. The transparent coating allows an unobstructed view of the homogenate during grinding. The grinders are fully autoclavable.



Cat. #	Size, mL	Mortar, OD x Length, mm	Overall Length	Qty/cs
64793-02	2	11 x 45	203	2/pk
64793-05	5	13 x 66	219	2/pk
64793-10	10	16 x 74	219	2/pk
64793-15	15	19 x 94	219	2/pk
64793-30	30	24 x 118	266	2/pk
64793-55	55	30 x 130	266	2/pk

► Potter-Elvehjem Tissue Grinder Replacement Parts

Cat # Mortar only	Size	Qty	Cat # Pestle only	Size	Qty
64793-70	2 ml	2	64792-80	2 m	2/pk
64793-71	5 ml	2	64792-81	5 ml	2/pk
64793-72	10 ml	2	64792-82	10 ml	2/pk
64793-73	15 ml	2	64792-83	15 ml	2/pk
64793-74	30 ml	2	64792-84	30 ml	2/pk
64793-75	55 ml	2	64792-85	55 m	2/pk

► Tissue Grinders (continued)

► Potter-Elvehjem Micro Tissue Grinder

- Made from Wheaton 33 low extractable borosilicate glass
- Micro size for extremely precise work
- Reservoir and pouring lip are incorporated into the design
- Autoclavable



Similar to the all glass Potter-Elvehjem style, but micro size is for extremely precise work. This unit is designed for delicate hand operation. Clearance between pestle and tube is 0.004" to 0.006" (0.1 – 0.15 mm)

Cat. #	Size, mL	Mortar, OD x Length, mm	Overall Length	Qty/cs
64794-01	0.1	4 x 65	110	2/pk

► Replacement Parts

Cat #	Description	Qty
64794-70	0.1 ml size Pestle only	2/pk
64794-80	0.1 ml size Mortar only	2/pk

► Tapered Tissue Grinder

- Homogenizes connective tissue including heart, muscle and lung
- Made from Wheaton 33 low extractable borosilicate glass
- Interchangeable components takes the hassle out of matching parts
- Autoclavable



This is new design grinder with longer tapered surface on both the mortar and pestle, offering grinding more efficient and less time require. The conical surface allows initial size reduction followed by passage through the cylindrical section for the final homogenization step.

When the pestle is "bottomed" within the mortar, the clearance is uniform 0.004" to 0.006" (0.1 to 0.15 mm)

The components are interchangeable. Therefore no need keep parts matched during cleaning. The ground glass surface on both the mortar and pestle are capable of homogenizing connective tissue such as heart, muscle and lung, as well as skin and plant tissue.

Cat. #	Size, mL	Mortar, OD x Length, mm	Overall Length	Qty/cs
64796-01	1	11 x 49	130	1/pk
64796-03	3	11 x 86	220	1/pk
64796-05	5	13 x 93	220	1/pk
64796-15	15	18 x 114	240	1/pk

► Replacement Parts:

Cat #	Mortar only	Size	Qty	Cat #	Pestle only	Size	Qty
64796-70	1 ml	2	64796-80	1 ml	2/pk		
64796-71	3 ml	2	64796-81	3 ml	2/pk		
64796-72	5 ml	2	64796-82	5 m	2/pk		
64796-73	15 ml	2	64796-83	15 ml	2/pk		

► Tapered Tissue Grinder

With Stainless Steel Rod Pestle

- PTFE pestle with stainless steel rod fir power homogenizer
- Homogenizes soft tissue such as brain
- Mortar made from Wheaton 333 low extractable borosilicate glass
- Interchangeable components
- Autoclavable



This unit is the same as the 64796-series, but with a PTFE pestle for soft tissues. The stainless steel rod is 0.25" (6.3 mm) diameter and is suit for use with Wheaton Overhead Stirrer.

Cat. #	Size, mL	Mortar, OD x Length, mm	Overall Length	Qty/cs
64797-01	1	11 x 49	130	1/pk
64797-03	3	11 x 86	220	1/pk
64797-05	5	13 x 93	220	1/pk
64797-15	15	18 x 114	240	1/pk

► Tapered Tissue Grinder Replacement Parts:

Cat #	Mortar only	Size	Qty	Cat #	Pestle only	Size	Qty
64797-70	1 ml	2	64797-80	1 ml	2/pk		
64797-71	3 ml	2	64797-81	3 ml	2/pk		
64797-72	5 ml	2	64797-82	5 ml	2/pk		
64797-73	15 ml	2	64797-83	15 m	2/pk		

► Micro Tissue Grinder Kit

- Complete kit includes 7 micro tissue grinders
- Made from Wheaton 33 low extractable borosilicate glass
- Replacement parts available separately
- Autoclavable



This complete selection of Wheaton Micro Tissue Grinders is conveniently packed in a lightweight protective carrying case. The 0.5 ml micro tissue grinder with screw cap can be used for tissue grinding as well as for additional procedures. This particular tissue grinder mortar can be safely joined with another threaded glass component if needed, using the Wheaton Connection[®]. The Kit is packed in high-density polyethylene case with foam inserts.

Cat. #	Description	Qty/Case
64800	Complete Kit	each

► Replacement Parts

Cat. #	Description	Qty/Kit	Qty/Case
64798-01	1 ml Tenbroeck Tissue Grinder	1	2/pk
64802-05	0.5 ml Tissue Grinder, GPI 13-425 cap	1	2/pk
64790-01	1 ml Dounce Tissue Grinder	1	2/pk
64794-01	0.1 ml Tissue Grinder	1	2/pk
64799-02	0.2 ml Tissue Grinder	1	2/pk
64792-02	2 ml Potter-Elvehjem Tissue Grinder	1	2/pk
64797-01	1 ml Tapered Tissue Grinder	1	1 ml

► Tissue Grinders (continued)

► Tenbroeck Tissue Grinder

- Ideal for grinding liver, heart, and intestine tissue
- Made from Wheaton 33 borosilicate glass
- Hollow pestle can be pack with ice
- Pour lip on mortar – Autoclavable



All glass Tenbroeck tissue grinders are precision made, interchangeable pestles and tubes, no need to keep to keep component matched, also offer easier replacement of damaged parts. The clearance between pestle and tube is 0.0035 to 0.0065" (0.09 – 0.16 mm) While this grinder is designed for hand operation, it can be slow speed motor-driven by inserting a rubber stopper (side 00) and metal rod into pestle. This unit also features an expanded reservoir and pouring lip.

Cat. #	Size, mL	Mortar, OD x Length, mm	Overall Length	Qty/cs
64798-01	1	11 x 48	140	2/pk
64798-02	2	11 x 50	140	2/pk
64798-07	7	16 x 82	190	2/pk
64798-15	15	22 x 94	250	2/pk
64798-40	40	32 x 140	320	2/pk

► Micro Tissue Grinder with PTFE Spacer

- PTFE spacer aligns the pestle and reduces aerosoling of the product
- Made from Wheaton 33 low extractable borosilicate glass
- Autoclavable



This unit consists of finely ground glass pestle and tube. The mortar and pestle come as matched set.

Cat. #	Size, mL	Mortar, OD x Length, mm	Overall Length	Qty/cs
64799-02	0.2	7 x 33	115	2/pk

► Micro Tissue Grinder with Cap

- With PTFE pestle and screw cap
- Made from Wheaton 33 low extractable borosilicate glass
- Autoclavable



This unit features a screw threaded neck

for use with Wheaton connection[®]. The 13-425 cap has an open top and PTFE faced silicone rubber liner. The clearance between pestle and mortar is 0.002 – 0.006" (0.05 – 0.15 mm).

Cat. #	Size, mL	Mortar, OD x Length, mm	Overall Length	Qty/cs
64802-05	0.5	13 x 37	115	2/pk

► Replacement Parts:

Cat #	Description	Qty/cs
64802-70	Extra Mortar and Cap	10/pk
64802-80	Extra Pestle	2/pk

► Disposable Micro Tissue Grinder

- Eliminates cross contamination
- Useful for radioactive samples
- Small grinder area for high sample recovery
- Made from Wheaton 33 low extractable borosilicate glass
- Autoclavable



The disposable micro tissue grinder allows for homogenized tissue micro samples without cross contamination. This unit is especially useful for radioactive samples. No washing is needed; just disposed the set after use.

Mortar Size: 10 x 44 mm. Pestle Size: 7 mm sphere

Cat. #	Size, mL	Mortar, OD x Length, mm	Overall Length	Qty/cs
64803-07	0.75	8 x 44	88	25/pk

► Overhead Stirrer

- Allow for power homogenization or mixing
- Speed control capable of RPM / Torque combinations
- Use only with tissue grinders with stainless steel rods
- Keyless chuck accepts shaft size to 7.9 mm
- One year warranty



The Wheaton overhead stirrer is a compact unit with solid state speed control capable of providing RPM/torque combinations for most laboratory operation such as homogenizing or mixing. This Over Head Mixer should be attached only to Tissue Grinders with PTFE pestles and with stainless steel rods. Unit and motor are mounted in a housing with epoxy finish and is provided with 6" aluminum rod and clamp for attachment to support stand. Keyless chuck accepts shaft sizes up to 5/16" (7.9 mm). Support stand is not included. One year warranty.

Specifications:

Speed Range:300 – 5,000 RPM (Under load)
 Electrical:120 VAC, 50/60 Hz, 50 watts
 Dimensions:4½" x 5" x 12" (11.5 x 13 x 30 cm)
 Weight:6 lbs (2.7 kg)

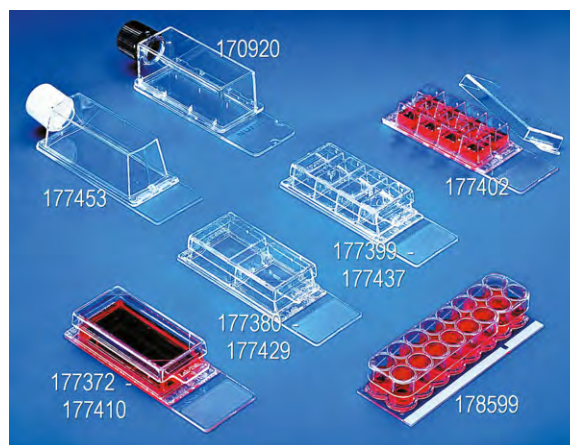
Cat. #	Description	Qty
64806-10	Overhead Stirrer Complete Unit	each

► Accessories:

Cat. #	Description	Qty
64806-50	Swivel blade paddle for stirring liquid in vessels with side entry port or for vessels with narrow openings. Shaft ¼" x 12" (6.3 x 305mm), Blade: ½" x 2" (12.7x50.8mm)	each
64806-51	Stainless steel Extension Rod, ¼" x 6" (6.3 x 153mm). For use with extension sleeve for lengthening Paddles.	each
64806-52	Stainless steel Extension Rod, ¼" x 12" (6.3 x 305mm). For use with Extension Sleeve for lengthening Paddles.	each
64806-53	Stainless steel Extension Sleeve for ¼" (6.3mm) diameter Rods, with set screws. For use in lengthening Paddles.	each

► **Lab-Tek® Chamber Slide™ System:**
Lab-Tek® Chamber Slide™,
Lab-Tek® II Chamber Slide™
and Lab-Tek® II CC2™
Chamber Slide™ Products

The growth of various cell types on plastic, soda lime glass and borosilicate coverglass were examined. The surfaces were either unmodified, coated with poly-lysine, or stably surface modified with non-biological reagents as described by Kleinfeld, et al. (1988). All substrates were assembled into Lab-Tek® and Lab-Tek®II Chamber Slide™ products.



Lab-Tek® Chamber Slide Specifications:

Growth Surface	Well Size (cm ²)	Visible Area (cm ²)	Working Volume (ml)
1 Chamber, Glass/Permanox	9.4	9.4	2.5-4.5
2 Chamber, Glass/Permanox	4.2	4.2	1.2-2.0
4 Chamber, Glass/Permanox	1.8	1.8	0.5-0.9
8 Chamber, Glass/Permanox	0.8	0.8	0.2-0.4
16 Chamber, Glass	0.4	0.4	0.1-0.2
Flaskette, Glass	10.0	10.0	2.5-5.0

Lab-Tek® II Chamber Slide Specifications:

Growth Surface	Well Size (cm ²)	Visible Area (cm ²)	Working Volume (ml)
1 Chamber, Glass, CC2	10.0	8.6	4.0-5.0
2 Chamber, Glass, CC2	4.2	4.0	2.0-2.5
4 Chamber, Glass, CC2	2.4	1.7	1.0-1.3
8 Chamber, Glass, CC2	1.2	0.7	0.5-0.6

Product Features	Lab-Tek®	Lab-Tek® II	Lab-Tek® II CC2
Configurations	1, 2, 4, 8, 16 well, flask style	1, 2, 4, 8 well	1, 2, 4, 8 well
Media chamber material	Proprietary cell culture grade polystyrene (PS)	Proprietary cell culture grade polystyrene (PS)	Proprietary cell culture grade polystyrene (PS)
Slide materials	Soda lime glass Permanox® plastic Polystyrene plastic	Soda lime glass	Soda lime glass
Cover	Clear polystyrene, no handle, facilitates microscopic viewing	Clear polystyrene, with handle for aseptic manipulations	Clear polystyrene, with handle for aseptic manipulations
Sealant	Non-toxic medical grade silicone • Remains on slide after detachment	Biocompatible acrylic adhesive • Remains with media chamber after detachment	Biocompatible acrylic adhesive • Remains with media chamber after detachment
Reagent 'Isolator'	Created by removable silicone gasket	Created by hydrophobic border	Created by hydrophobic border
Chamber separation	No separation tool required	Requires separation tools	Requires separation tools
Growth Surface	For adherent cell culture Glass slides • 6-stage high purity water wash Permanox® plastic • Cell culture treated Polystyrene • Cell culture treated	For adherent cell culture RS treated glass slide Proprietary wash	For adherent cell culture chemically modified surface that's optimal for fastidious cells Mimics a poly-lysine coated.
Biological testing	BHK-21, Hep-2 cells	BHK-21, Hep-2 cells	Primary chick brain neurons, Hep-2 cells
Leak tested	Yes	Yes	Yes
Slide background fluorescence	Glass: Minimal fluorescence Permanox®: Minimal fluorescence Polystyrene: Autofluorescence at <485nm	Glass: • No endogenous fluorescence	Glass: • No endogenous fluorescence
Coverslip compatibility	Yes, following gasket removal	Yes	Yes
Writing surface	"Sand-blasted" frosted end	Super Frost® white printed end	SuperFrost® blue printed end

► Lab-Tek® Chamber Slide™ System

- Developed for microscopy of in situ cell culture.
- DCells grow on a standard microscope slide.
- DMedia chamber can be removed when culturing is complete.
- DUseful for viral and mycoplasma testing, chromosome studies toxicity tests and immunocytology.
- DPermanox® plastic and glass do not interfere with fluorescent labels.

Permanox® is a special molding resin, which meets the growing requirements of most anchorage dependent cells; also excellent chemical resistance allows for cell fixation and the staining of organic solvents for EM and other techniques. Low oxygen permeation makes Permanox® ideal for anoxic cell growth.

Chamber slides combine a media-containing chambered super-structure with a standard soda lime glass slide or Permanox® plastic slide, sealing the two together with a biologically inert silicone gasket. After cells are grown, the chamber and gasket are easily removed. The slide may then be fixed, stained, cover slipped, and filed with the usual convenience. These slides, once fixed and stained, can be embedded using our Slide Duplicating Mold (Cat. 70170).

Lab-Tek® Chamber Slide™ System all come packed in a sterile sealed tray, 8 units per tray, 2 trays per pack and 12 trays per case.

► Lab-Tek® Glass Chamber Slide™

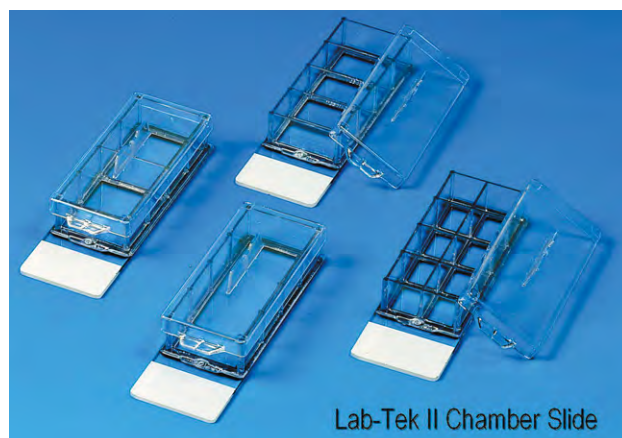
NNI #	Cat.#	Description	Pack
177372	70381	LT Glass Slide 1 Chamber	2 trays
177372	70384	LT Glass Slide 1 Chamber	6 trays
177372	70387	LT Glass Slide 1 Chamber	12 trays
177380	70391	LT Glass Slide 2 Chamber	2 trays
177380	70394	LT Glass Slide 2 Chamber	6 trays
177380	70397	LT Glass Slide 2 Chamber	12 trays
177399	70401	LT Glass Slide 4 Chamber	2 trays
177399	70404	LT Glass Slide 4 Chamber	6 trays
177399	70407	LT Glass Slide 4 Chamber	12 trays
177402	70411	LT Glass Slide 8 Chamber	2 trays
177402	70414	LT Glass Slide 8 Chamber	6 trays
177402	70415	LT Glass Slide 8 Chamber	12 trays

► Lab-Tek® Permanox® Chamber Slide™

NNI #	Cat.#	Description	Pack
177410	70380	LT Permanox Slide 1 Chamber	2 trays
177410	70383	LT Permanox Slide 1 Chamber	6 trays
177410	70386	LT Permanox Slide 1 Chamber	12 trays
177429	70390	LT Permanox Slide 2 Chamber	2 trays
177429	70393	LT Permanox Slide 2 Chamber	6 trays
177429	70396	LT Permanox Slide 2 Chamber	12 trays
177437	70400	LT Permanox Slide 4 Chamber	2 trays
177437	70403	LT Permanox Slide 4 Chamber	6 trays
177437	70406	LT Permanox Slide 4 Chamber	12 trays
177445	70410	LT Permanox Slide 8 Chamber	2 trays
177445	70413	LT Permanox Slide 8 Chamber	6 trays
177445	70416	LT Permanox Slide 8 Chamber	12 trays

► Lab-Tek® Flaskettes and 16-Well

NNI #	Cat.#	Description	Pack
177453	70417	Lab Tek™ Flaskette, glass	2 trays
177453	70418	Lab Tek™ Flaskette, glass	6 trays
177453	70419	Lab Tek™ Flaskette, glass	12 trays
178599	70420	Lab Tek™ Flaskette, glass	2 trays
178599	70421	Lab Tek™ Flaskette, glass	6 trays
178599	70422	Lab Tek™ Flaskette, glass	12 trays
171080	70423	16-Well Coverglass 22x74mm	2 oz



Lab-Tek II Chamber Slide

► Lab-Tek® II Chamber Slide System

- Sterile, Chamber Slide™ products have removable, polystyrene media chamber of 1, 2, 4, and 8-well configuration
- Low fluorescent glass microscope slide (25 x 75 x 1.2 mm) with rounded corners
- Biocompatible adhesive
- Polystyrene cover
- Inert hydrophobic well border printed on slide
- SuperFrost printed area

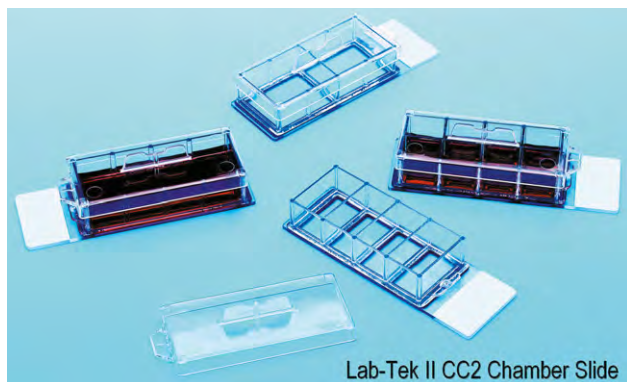


Removal of Medium Chamber from Slide

Lab-Tek® II Chamber Slide™ products offer optimal surface for excellent attachment and growth of cells, easily distinguished by the blue mark. This design allows for the removal of the media chamber and adhesive from the slide, using a separation device. The blue hydrophobic border is raised slightly and isolates the individual wells, and prevents cross contamination. The slide can be coverslipped. Lab-Tek® II CC2™ Chamber Slide™ products are the newest addition to our Lab-Tek® II Chamber Slide™ family. CC2 shares several similarities with the original Lab-Tek® II Chamber Slide, however, it's pronounced difference is that the glass growth surface has been chemically modified. This modification provides an optimal surface for growing fastidious cells such as primary neurons or poorly adherent cell lines. CC2 also are non-auto fluorescent making them ideal for fluorescent applications such as FISH (Fluorescent in situ Hybridization). The growth surface remains stable without refrigeration. Lab-Tek® II and Lab-Tek II CC2™ Chamber Slide™ Systems all come packed in a sterile sealed tray, 8 units per tray, 2 trays per pack and 12 trays per case.

► Lab-Tek® II Chamber Slide™

NNI #	Cat.#	Description	Pack
154453	70379-12	Lab-Tek® II 1 Chamber	2 trays
154453	70379-14	Lab-Tek® II 1 Chamber	6 trays
154453	70379-16	Lab-Tek® II 1 Chamber	12 trays
154461	70379-22	Lab-Tek® II 2 Chamber	2 trays
154461	70379-24	Lab-Tek® II 2 Chamber	6 trays
154461	70379-26	Lab-Tek® II 2 Chamber	12 trays
154526	70379-42	Lab-Tek® II 4 Chamber	2 trays
154526	70379-44	Lab-Tek® II 4 Chamber	6 trays
154526	70379-46	Lab-Tek® II 4 Chamber	12 trays
154534	70379-82	Lab-Tek® II 8 Chamber	2 trays
154534	70379-84	Lab-Tek® II 8 Chamber	6 trays
154534	70379-86	Lab-Tek® II 8 Chamber	12 trays



Lab-Tek II CC2 Chamber Slide

► **Lab-Tek® II CC2™ Chamber Slide™**

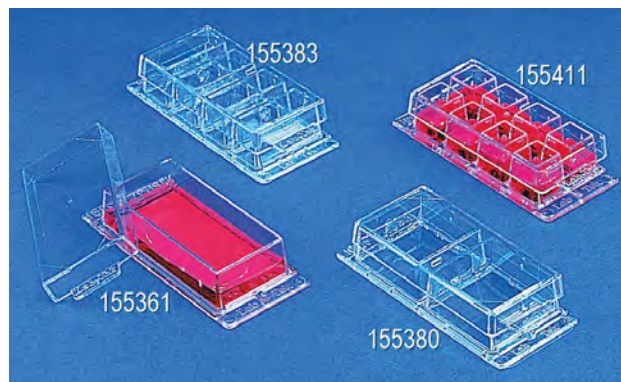
NNI #	Cat.#	Description	Pack
154739	70360-12	Lab-Tek® II CC2 1 Chamber	2 trays
154739	70360-14	Lab-Tek® II CC2 1 Chamber	6 trays
154739	70360-16	Lab-Tek® II CC2 1 Chamber	12 trays
154852	70360-22	Lab-Tek® II CC2 2 Chamber	2 trays
154852	70360-24	Lab-Tek® II CC2 2 Chamber	6 trays
154852	70360-26	Lab-Tek® II CC2 2 Chamber	12 trays
154917	70360-42	Lab-Tek® II CC2 4 Chamber	2 trays
154917	70360-44	Lab-Tek® II CC2 4 Chamber	6 trays
154917	70360-46	Lab-Tek® II CC2 4 Chamber	12 trays
154941	70360-82	Lab-Tek® II CC2 8 Chamber	2 trays
154941	70360-84	Lab-Tek® II CC2 8 Chamber	6 trays
154941	70360-86	Lab-Tek® II CC2 8 Chamber	12 trays

► **Lab-Tek® Chambered Coverglass System**

Lab-Tek® and Lab-Tek® II Chambered Coverglass products are intended for high magnification examination of living cells using an inverted microscope. The growth surface of the Lab-Tek Chambered Coverglass products are #1 Borosilicate Coverglass from American origin. The Lab-Tek® II Chambered Coverglass products are #1.5 Borosilicate Coverglass of German origin. The thin glass growth surface allows optimal optical clarity when viewing living cells with high resolution of an inverted microscope. The media chambers are available in 1, 2, 4, and 8 well formats and cannot be removed from the coverglass surface.

The Chambered Coverglass is provided sterile and ready to use.

Feature	Lab-Tek®	Lab-Tek® II
Configuration	1, 2, 4 & 8 well	1, 2, 4 & 8 well
Media Chamber Material	Proprietary cell culture grade polystyrene (PS): non-removable	Proprietary cell culture grade polystyrene (PS): non-removable
Coverglass Materials	Borosilicate Glass: American origin, #1 (0.13 -0.17 mm)	Borosilicate Glass: German origin, #1.5 (0.16-0.19 mm)
Cover	Clear polystyrene, no handle, facilitates stacking	Clear polystyrene, with handle facilitates stacking for aseptic manipulations
Sealant	Non-toxic medical grade silicone	Non-toxic medical grade silicone
Growth Surface	For adherent cell culture: Good growth with fastidious cells, e.g., Neurons	For adherent cell culture: Good growth with fastidious cells, e.g., Neurons
Biological Testing	BHK-21, Hep-2 cells	BHK-21, Hep-2 cells
Leak Tested	Yes	Yes
Background Fluorescence	Glass: Minimal fluorescence	Glass: Minimal fluorescence
Writing Surface	None	None
Packaging	8/tray, 16/pack, 96/case	8/tray, 16/pack, 96/case

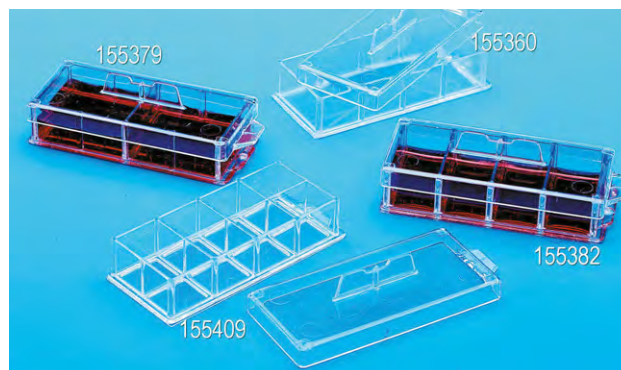


Chambered Coverglass System Specifications:

Configuration	Lab-Tek®		Lab-Tek® II	
	Well Size (cm ²)	Working Volume (ml)	Well Size (cm ²)	Working Volume (ml)
1 chamber	9.4	2.5-4.5	10.0	4.0-5.0
2 chamber	4.2	1.2-2.0	4.9	2.0-2.5
4 chamber	1.8	0.5-0.9	2.4	1.0-1.3
8 chamber	0.8	0.2-0.4	1.2	0.5-0.6

► **Lab-Tek Chamber Coverglass™**

NNI #	Cat #	Description	Pack
155361	70378-11	LT Coverglass 1 Chamber	2 trays
155361	70378-12	LT Coverglass 1 Chamber	12 trays
155380	70378-21	LT Coverglass 2 Chamber	2 trays
155380	70378-22	LT Coverglass 2 Chamber	12 trays
155383	70378-41	LT Coverglass 4 Chamber	2 trays
155383	70378-42	LT Coverglass 4 Chamber	12 trays
155411	70378-81	LT Coverglass 8 Chamber	2 trays
155411	70378-82	LT Coverglass 8 Chamber	12 trays



► **Lab-Tek® II Chamber Coverglass™ For Inverted Microscope**

NNI #	Cat #	Description	Pack
155360	70377-11	LT II Coverglass 1 Chamber	2 trays
155360	70377-12	LT II Coverglass 1 Chamber	12 trays
155379	70377-21	LT II Coverglass 2 Chamber	2 trays
155379	70377-22	LT II Coverglass 2 Chamber	12 trays
155382	70377-41	LT II Coverglass 4 Chamber	2 trays
155382	70377-42	LT II Coverglass 4 Chamber	12 trays
155409	70377-81	LT II Coverglass 8 Chamber	2 trays
155409	70377-82	LT II Coverglass 8 Chamber	12 trays

► MicroWell® Plates

MicroWell Plates are used in a broad spectrum of applications, including cloning experiments, sample incubations, and in tissue culture based analytical systems. Our MicroWell Plates have excellent cell attachment. All styles are designed to be stackable and are radiation sterilized.

► 10µl Well Plates

They are Terasaki format plates measuring 56x82mm and having 60 or 72 wells. Wells are shaped like inverted truncated cones, each with a working volume of 10ml. The well surface is Nunclon® treated for good cell attachment. Lids incorporate a stacking feature and are tight-fitting, which reduces evaporation.

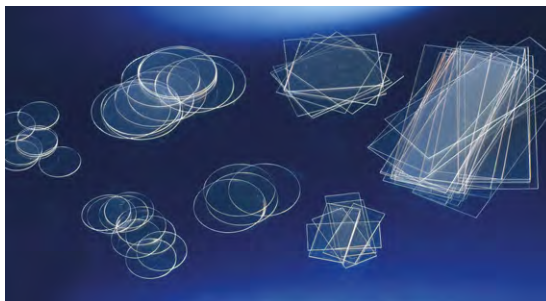
► 96 Well Plates

These plates measure 86x128mm and come in either flat or round bottom wells. Vented lids allow for gas exchange and have condensation rings to control evaporation and retain condensate. Lids are keyed so they cannot be accidentally reversed. Plates have alpha-numeric markings on its two edges. In addition, flat bottom plates have individual well coordinates beside each well for easy well identification when using an inverted microscope. Plates also have raised well rims to provide proper attachment of adhesive sealing film.

# of Wells	Well Shape	Volume Well	Culture Area cm ²	Unit per Sleeve/cs
96	Round	0.3ml	0.36	1/50
96	Flat	0.4ml	0.328	1/50
60	Conical	10µl	0.013	10/150
72	Conical	10µl	0.013	10/150

► Cover Slips; Thermanox®; TMX Coverslips

NUNC™ Brand Thermanox®, or TMX coverslips are made from a polymer (in the polyolefin family) that is highly resistant to most chemicals. Thermanox® plastic is resistant to alcohols, aldehydes, hydrocarbons, dilute acids (<10%) and dilute alkalis (<2%). TMX has limited resistance to chlorinated hydro-carbons, however, it is not resistant to concentrated acids or bases. Thermanox® plastic is a flexible, trans-parent polymer that can be sectioned using a microtome and is able to withstand high temperatures (temperature range -70°C to +150°C). Thermanox® Coverslips are culture treated on one side for enhanced cell attachment and growth. The treated side is packaged face up toward the label.



FEATURES:

- Flat and remain flat
- 0.2mm (No. 2) thickness
- Resistant to commonly used solvents
- Safe and easy to handle
- Auto fluorescent in the range 380 to 545 nm
- Thermanox® cover slips can be autoclaved at 20 minutes steam, 20 minutes dry at 120°C

Cat. #	Description	NNI #	Pack
72274-01	Size 10.5x22 mm	174934	100/pk
72274-05	Size 10.5x22 mm	174934	500/pk
72270	Size 22x60 mm	174942	100/pk
72271	Size 22x60 mm	174942	500/pk
72272	Size 24x30 mm	150067	100/pk
72273	Size 24x30 mm	150067	500/pk
72280	13 mm Round	174950	100/pk
72281	13 mm Round	174950	500/pk
72275-01	15mm Round	174969	100/pk
72275-05	15 mm Round	174969	500/pk
72282	22 mm Round	174977	100/pk
72283	22 mm Round	174977	500/pk
72285	25 mm Round	174985	100/pk
72286	25 mm Round	174985	500/pk

Thermanox® is Nalge/Nunc product.



70436-R1	96-Well, Round, Without Lid	10/pk
70436-R5	96-Well, Round, Without Lid	50/cs
70436-F1	96-Well, Flat, Without Lid	10/pk
70436-F5	96-Well, Flat, Without Lid	50/cs
70436-L1	Lid for 96-Well	10/pk
70436-L5	Lid for 96-Well	50/cs
70436-ST	Sealing Tape (80x134mm)	200/bx
70437-R1	96-Well, Round, With Lid	10/pk
70437-R5	96-Well, Round, With Lid	50/cs
70437-F1	96-Well, Flat, With Lid	10/pk
70437-F5	96-Well, Flat, With Lid	50/cs
70438-10	60-Well, Conical, With Lid	10/pk
70438-15	60-Well, Conical, With Lid	150/cs
70439-10	72-Well, Conical, With Lid	10/pk
70439-15	72-Well, Conical, With Lid	150/pk

TECHNICAL TIP

Permanox plastic is nonfluorescent and may be used with most fluorescent labels. Permanox has better chemical resistance to fixation and staining solvents than polystyrene. An aqueous based mounting medium must be used when cover slipping to prevent warping.

TECHNICAL TIP

A simple method to determine which side of the coverslip is treated is the "droplet" test. A drop of water or culture medium will spread on the hydrophilic, treated side. - If the droplet forms a bead, then the side of the coverslip is not treated. - If the droplet spreads evenly over the coverslip, the side is treated.

► Press-to-Seal Chamber and Well, see pages 354-355 >>>>>

► Multidishes Nunclon™ Surface

- Useful in all areas of cell culture including scale-up and cloning
- Raised well rims to lower risk of cross contamination
- Excellent optical quality
- Nunclon™Δ certified
- Multidish 6 is available coated with Poly-D-Lysine or Collagen



Details:

► Nunc Multidishes Polystyrene. With Lid

Polystyrene. With Lid. Sterile

Cat.#	70425 70426	70440 70440-100	70442 70442-75	70428 70428-85	70444 70444-20	70441 70441-20	70443 70443-100	70425 70426	70448 70448-75	70449 70449-85	70427	70450 70450-85
NUNC #	176740	167063	140675	140685	152035	152034	167064	150628	142475	142485	150687	152640
Specifications	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Number of Wells	4	4	6	6	6	6	8	12	24	24	48	48
Surface	Nunclon® Delta	Nunclon® Delta	Nunclon® Delta	Nunclon® Delta	Poly-D- Lysine	Collagen I, Rat Tail	—	—	—	—	—	—
Bottom Shape	Flat	Flat	Flat	Flat	Flat	Flat	Flat	Flat	Flat	Flat	Flat	Flat
Sterile	+	+	+	+	—	—	+	+	+	+	+	+
Suggested working volume, ml/well	1	5	3	3	3	3	3	2	1.0	1.0	0.5	0.5
Culture area, cm²/Well	1.9	21.8	9.6	9.6	9.6	9.6	10.5	3.5	1.8	1.8	1.1	1.1
External dimensions, mm	66 x 66	128 x 86	128 x 86	128 x 86	128 x 86	128 x 86	128 x 86	128 x 86	128 x 86	128 x 86	128 x 86	128 x 86
Unit per package/case	4/120	10/100	1/75	5/85	5/20	5/20	10/100	1/75	1/75	5/85	1/75	5/85

► Optical Bottom Microwell® Plates

The NUNC™ Coverglass Optical Bottom 96- and 384- Well Plates have the same quality design of existing NUNC well products, plus an optically clear polystyrene plate bottom. This clear base permits microscopic viewing and reading of well content from the top, bottom or both.

The plate's upper structure is offered in black (for fluorometric detection) or white (for luminescence detection).

► 1. 96 Well Optical Bottom Plates Polystyrene/Coverglass Sterile. External dimensions 128 x 86 mm.



FEATURES:

- White or black upper structure with #1.5 borosilicate coverglass
- Minimum light scatter and low autofluorescence
- Optical clarity for viewing well contents
- Flat bottom well geometry for plate reader access
- Footprint compatible with standard equipment and automated systems
- CC2™ surface modification closely mimics Poly-D-Lysine and it superior for attachment and growth of fastidious cells
- Non-treated plates are optimized for fluorescence
- Sterile for cell culture
- Working range: 50 – 200 µl/well

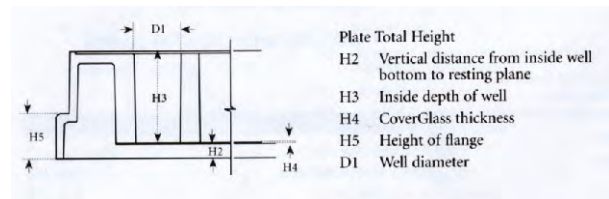


Plate total height	14.9 mm
H2 Vertical distance from inside well bottom to resting plane.....	2.5 mm
H3 Inside depth of well	12.2 mm
H4 Coverglass thickness	0.19 mm
H5 Height of flange	6.2 mm
D1 Well diameter	6.5 mm

Cat. #	64815-05	64815-10	64815-15	64815-20
NUNC #	164 588	164 590	265 300	160 376
Surface	Cell culture	Cell culture	Non-treated	CC2
Color	Black	White	Black	Black
Suggested working Vol., µl	400	400	400	400
Sterile	Yes	Yes	No	Yes
With Lid	Yes	Yes	No	Yes
Units per pack/case	6/30	6/30	5/30	6/30

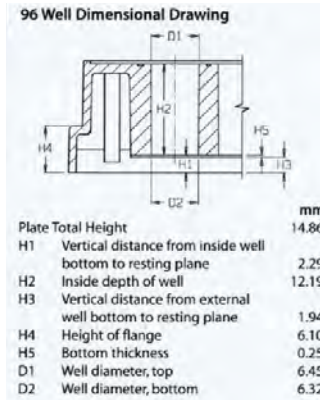
➤ Optical Bottom Microwell® Plates (continued)

➤ 2. 96 Well Optical Bottom Plate – Polymer Base

External dimension: 128 x 86 mm

- White or black upper structure with Polymer bottom combines the optical clarity of virgin crystalline polystyrene with optimal surface for a wide range of HTS applications
- Optical clarity for viewing well contents
- Footprint compatible with standard equipment and automated systems
- Flat bottom well geometry for plate reader access
- Cell culture, poly-D-Lysine or Collagen I surfaces for cell-based array
- Non-treated plates are optimized for scintillation counting
- Working ranges: 50 –200 µl/well

Plate total height	14.9 mm
H2 Vertical distance from inside well bottom to resting plane.....	2.55 mm
H3 Inside depth of well	12.2 mm
H4 Polystyrene film	0.25
H5 Height of flange	6.2 mm
Well diameter	6.5 mm



Cat. #	64810-05	64810-15	64810-16	64810-17	64810-18	64810-19	64811-10	64811-05
NUNC #	165 306	165 305	152 036	152 040	152 028	152037	265 301	265 302
Surface	Cell culture	Cell culture	Collagen I	Collagen I	Poly-D-Lysine	Poly-D-Lysine	Non-treated	Non-treated
Color	White	Black	Black	White	White	Black	Black	White
Total Vol. µl/well	400	400	400	400	400	400	400	400
Sterile	Yes	Yes	No	No	No	No	No	No
With Lid	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Unit/pack/case	10/30	10/30	5/20	5/20	5/20	5/20	10/30	10/30

➤ 3. 384 Well® Optical Bottom Plates – Polymer Base

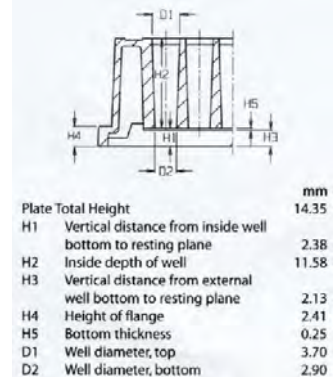
FEATURES:

- White or black upper structure with optical clear polystyrene bottom
- Can be read from top or bottom
- Rounded square wells eliminate wicking
- Optimized for scintillation counting
- Cell Culture, Collagen I or Poly-D-Lysine surfaces for cell-based arrays
- Non-treated surface for homogeneous assays
- Working range: 10 – 100 µl/well

Plate total height	14.4mm
H2 Vertical distance from inside well bottom to resting plane	2.7mm
H3 Inside depth of well	11.6mm
H4 Vertical distance from external well bottom to resting plane	2.5mm
H5 Height of flange	2.7mm
H7 Bottom Thickness	0.3mm
D1 Well diameter, top.....	3.7 x 3.7mm
D2 Well distance bottom	2.9 x 2.9mm
F1 Depth of flange.....	1.8mm

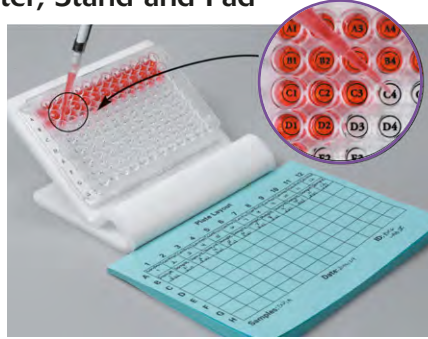
Ordering: External plate dimension 128 x 86 mm

Cat. #	NNI #	Surface	Color	µl/well	Sterile	With lid	Unit/pack/cs
64810-25	142762*	Cell Culture	White	120	Yes	Yes	10/30
64810-35	142761*	Cell Culture	Black	120	Yes	Yes	10/30
64810-40	164730*	Cell Culture	Black	120	Yes	No	10/30
64810-50	152032	Collagen I	White	120	No	Yes	5/20
64810-52	152041	Collagen I	Black	120	No	Yes	5/20
64810-54	152029	Poly-D-Lysine	Black	120	No	Yes	5/20
64810-56	152033	Poly-D-Lysine	White	120	No	Yes	5/20
64811-15	242763	Non-treated	White	120	No	No	10/30
64811-20	242764	Non-treated	Black	120	No	No	10/30* Certified



► Well Orienter, Stand and Pad

For Easy Pipetting and Identification of Samples in Microplates



The Well Orienter

- Convenient visual aid for pipetting and identification of samples in microplates
- Sharp, alpha-numeric characters compatible with 96-, 48- or 24-well microplates
- No more cross-referencing headaches!

The Well Plate Stand

- View samples at a comfortable 30° angle and pipette without strain
- The neoprene pad and rubber feet prevents slippage of the plate and stand

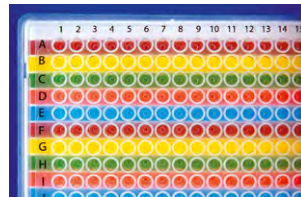
The Well Pad

- A convenient note pad that corresponds to the layout of a 96-, 48- or 24-well plate
- Keep accurate records of samples in a microplate
- Adhere sheets into a notebook to create a quick reference guide

Cat. #	Description	Qty.
70490-10	96 - Well Orienter	4/pk.
70490-11	48 - Well Orienter	4/pk.
70490-12	24 - Well Orienter	4/pk.
70490-20	Well Plate Stand	Each
70490-30	96 - Well Pad (7" x 5")	50/pad
70490-31	48 - Well Pad (7" x 5")	50/pad
70490-32	24 - Well Pad (7" x 5")	50/pad

► 96-Well & 384-Well Color Orienters

- Bright colors make it easy to distinguish between columns and rows
- Fits most standard flat and round bottom 96-well and 384-well plates
- Ideal for use with The Pipetter Guide for efficient and stress-free identification of rows and columns

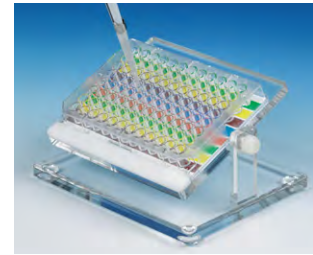


Cat. #	Description	Qty.
70490-18	96 - well Vertical Orientation	2/pk.
70490-17	96 - well Horizontal Orientation	2/pk.
70490-16	384 - well Vertical Orientation	2/pk.
70490-15	384 - well Horizontal Orientation	2/pk.

► Adjustable Well Plate Stand

A Convenient, Adjustable-Angle Stand for Pipetting

- Achieves accurate pipetting by allowing the flexibility to adjust the angle of the microplate
- Convenient knob easily adjusts the angle (45° max. tilt) required to fully view every well
- Compact design takes up little bench-top space measuring only 6" L x 4½" W x 2½" H
- Durable acrylic material will last for years if properly cared for



Adjustable Well Plate Stand shown with a 96-well Color Orienter (sold separately).

Cat. #	Description	Qty.
70493-01	Adjustable Well Plate Stand	Each

► Silver Bioguard Anti-Microbial Mats

Neutralize & Protect

— Nanoscale Silver particles bind with proteins to neutralize 99.9% of common microbes



Better Results —

Ensure consistent sample reproduction and results by significantly minimizing workspace contamination

Reliable — Silver is used extensively in medical applications where microbial contamination is a concern

Use Anywhere — Mats are less than 1mm thick and are backed with an anti-skid coating making them perfect for the benchtop or culture hood

Cat. #	Description	Qty.
77519-1	Silver Bioguard Mat, 10" x 8"	each
77519-2	Silver Bioguard Mat, 15" x 10"	each
77519-3	Silver Bioguard Mat, 24" x 20"	each
77519-4	Silver Bioguard Mat, 30" x 22"	each

► Well Orienter Stickers

- Permanently label multiple microplates
- Wells are clearly marked with its corresponding row number and column letter for quick cross-referencing
- Scored paper backing makes aligning quick and easy



The markings of each filled well are easily readable.

Cat. #	Description	Qty.
70490-14	96 - well Orienter Sticker	50/pk.

► Sealing Films

Pre-Cut-Adhesive Films For Microplate Sealing Needs

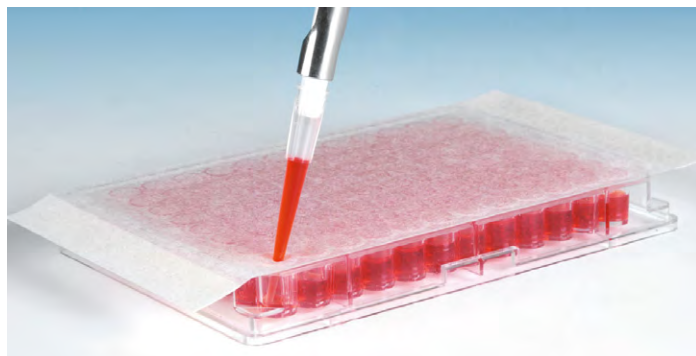
Sterile – Gamma irradiation ensures that sealing films are free of cytotoxins.

Prevent Contamination – Films eliminate well-to-well contamination, microbial and viral contamination, evaporation (excluding breathable membranes) and sample spillage.

Ideally Sized and Designed – 6" x 3.25" rectangles fit all microplates. Two scored end-tabs make film positioning and removal hassle-free.

Thermal Stability – Designed to withstand a wide temperature range.

Easy Specimen Retrieval – Pierceable sealing films facilitate easy removal of samples with a pipet tip.



Breathe-Easier membranes permit rapid, consistent gas exchange of Oxygen, CO₂ and Water Vapor for uniform cell growth.

► Breathe-Easy®

An Adhesive, Gas-Permeable, Cell

Culture Membrane

Film Type	Breathe-Easy*
Ideal Use	Cell Culture
Temp. Range	-80°C to 100°C
Thickness	1 mil (0.001 in.)
Material	Polyurethane
Gas-Permeable	Yes
UV Transparent	To 300nm

70536-10 Breathe-Easy 100/pk

► Breathe-EASIER™

A Rapid Gas Transmissible Sealing Membrane for Cell Growth. Breathe-Easier membranes permit rapid, consistent gas exchange of Oxygen, CO₂ and Water Vapor for uniform cell growth.

Film Type	Breathe-Easier™
Ideal Use	Cell Culture
Temp. Range	-20°C to 80°C
Thickness	5.5 mil (0.0055 in.)
Material	Non-woven rayon
Gas-Permeable	Yes
UV Transparent	No

70536-20 Breathe-EASIER 100/pk

► AluminaSeal™

Pre-Cut Adhesive Foil Sealing Film

Film Type	AluminaSeal™
Ideal Use	Cold Storage
Temp. Range	-80°C to 110°C
Thickness	2.7 mil (0.0027 in.)
Material	Aluminum
Gas-Permeable	No
UV Transparent	No

70534-10 AluminaSeal 100/pk

► HotSeal

PCR Sealing Film

Film Type	HotSeal™
Ideal Use	PCR
Temp. Range	-40°C to 125°C
Thickness	2.3 mil (0.0023 in.)
Material	Polyester
Gas-Permeable	No
UV Transparent	No

70534-20 HotSeal 100/pk

► Breathable Tube Membranes

Micro-permeable Membranes for Microtubes

■ Ideal for cell growth and freeze drying.

■ Permits consistent gas exchange.

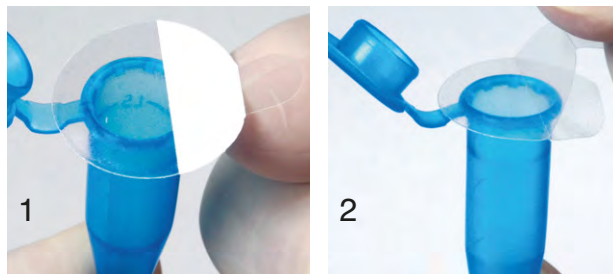
■ Easy microtube cap closure.

■ Will not bind in centrifuge rotors.

■ Easy-to-use finger tab for quick liner removal.

■ Pre-cut to fit a variety of popular tube sizes.

■ Sterile and free of cytotoxins.



1. Remove the paper liner and adhere the membrane to the tube opening.

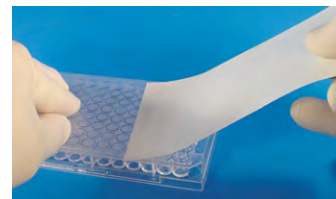
2. Remove the top protective layer to expose the breathable membrane

70537-10 Breathe-EASY Membranes 100/pk

70537-20 Breathe-EASIER Membranes 100/pk

► Titer-Tops

Titer-Tops prevents sample evaporation, well to well contamination, external contamination and sample spillage. Titer-Tops are made from 4.4 mil polyethylene film with an FDA approved non cytotoxic acrylic adhesive. Each pre-cut rectangular sheet is 6"x3.25" with a paper liner. The center section of the liner measures 5"x3.25" and once it is peeled off it leaves two hand-grip extension tabs on the two ends. These tabs allow for easy application of the Titer-Top to the plate. Titer-Tops are chemically resistant and thermally stable. The acrylic adhesive is waterproof, solvent resistant, and compatible with all plastic microtiter plates.



Titer-Tops will stay in place even when exposed to 100% humidity and temperatures ranging from -40°C to 100°C. They are easily pierced with a micropipette tip to provide access to sample wells. Titer-Tops are gamma sterile.

70538-05 Titer-Tops, 6"x3.25" 50/pk

70538-10 Titer-Tops, 6"x3.25" 100/pk

► Microplate Brayer

Uniformly seal your films to microplates with this 4" Brayer. It's perfect for all your sealing films.



70534-40 Microplate Brayer

Each

► CC Inserts – Cell Culture Inserts

► Polycarbonate membranes

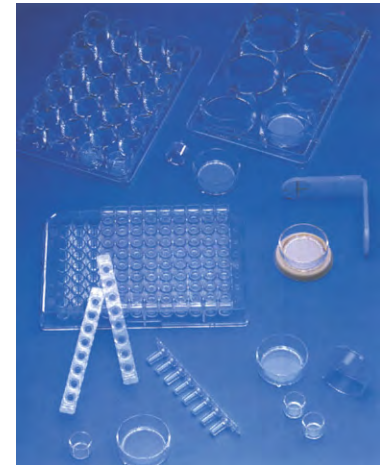
- Easy cultivation of most cell types without matrix coating
- Treated for cell culture
- Inserts with 0.02 µm membrane have maximum clarity for microscopy, and are non-auto-fluorescent and highly porous
- Polycarbonate membranes in larger pore sizes are adaptable to many uses in cell culture, including transport studies, toxicity tests, chemotaxis studies and electron microscopy
- Both membrane types are trans-parent when wet and suitable for phase contrast and Nomarski Optic Systems

► Polycarbonate membrane inserts pre-packed in multidishes

- For multidishes 6, 12, 24
- Treated and tested for cell attachment
- Easy cultivation of most cell types without matrix coating
- Used in a variety of applications, including transport studies, toxicity tests, chemotaxis studies and electron microscopy
- Non-toxic
- Packed in sterile Nunclon™ treated multidishes
- Packed in resealable bags
- Non-pyrogenic
- Tabs for better grip/handling

Typical applications for the TCI are:

- Epithelial polarization studies
- Electron microscopy
- Chemotaxis studies
- Toxicity testing
- Co-culture experiments
- Modeling of in-vivo barriers.
- Transport studies



Nunc CC Inserts

Polycarbonate membranes - Sterile. Pre-packed in multidishes.

Cat. #	Pore size, µm	For use with Nunc product	Pore density, pores/cm ²	Porosity %	Culture area, cm ²	Suggested working volume, ml	Units per pack/case
72296-16	0.4	Multidish 24	<0.85 x 108	<6.8%	0.47	0.5	12/48
72296-17	3	Multidish 24	<1.7 x 106	<7.7%	0.47	0.5	12/48
72296-18	8	Multidish 24	<0.85 x 105	<2.7%	0.47	0.5	12/48
72296-19	0.4	Multidish 12	<0.85 x 108	<6.8%	1.13	1.1	12/48
72296-20	3	Multidish 12	<1.7 x 106	<7.7%	1.13	1.1	12/48
72296-21	8	Multidish 12	<0.85 x 105	<2.7%	1.13	1.1	12/48

All Nunc CC Inserts: Suggested working volume, ml =
In addition to normal well working volume.

Nunc CC Inserts

Polycarbonate membranes - Sterile. Pre-packed in multidishes.

Cat. #	Pore size, µm	For use with Nunc product	Pore density, pores/cm ²	Porosity %	Culture area, cm ²	Suggested working volume, ml	Units per pack/case
72296-22	0.4	Multidish 6	<0.85 x 108	<6.8%	3.14	1.5	6/24
72296-23	3	Multidish 6	<1.7 x 106	<7.7%	3.14	1.5	6/24
72296-24	8	Multidish 6	<0.85 x 105	<2.7%	3.14	1.5	6/24
72296-25	0.4	Multidish 6	<0.85 x 108	<6.8%	4.1	1.75	6/24
72296-26	3	Multidish 6	<1.7 x 106	<7.7%	4.1	1.75	6/24
72296-27	8	Multidish 6	<0.85 x 105	<2.7%	4.1	1.75	6/24

All Nunc CC Inserts: Suggested working volume, ml =



Culture Flasks *Special Culture Flasks made from borosilicate glass and PTFE*

For all applications where gentle stirring is required, such as biological suspensions and micro-carrier cell cultures.

The unique stirring action uses a flexible PTFE shaft driven through a fully encapsulated rare-earth magnet to give even and complete mixing throughout the liquid. The height of the shaft is adjustable. Contact materials are PTFE and borosilicate glass only. The glass vessel has two side-arms with PTFE caps and the base is intended to aid mixing. Recommended for use up to 120 rpm max.

EMS #	Capacity	Neck	S/Arm	Flask Ht	Body Ø	Qty
Unit complete with Vessel, Rotor & two PTFE Side Arm Caps						
66220-02	250 ml	GL 45	GL 32	150 mm	100 mm	each
66220-05	500 ml	DL 45	GL 32	190 mm	100 mm	each
66220-10	1000 ml	DL 45	GL 32	230 mm	115 mm	each
Flask only – no Rotor, no Side Arm Caps						
66221-02	250 ml	GL 45	GL 32	150 mm	100 mm	each
66221-05	500 ml	DL 45	GL 32	190 mm	100 mm	each
66221-10	1000 ml	DL 45	GL 32	230 mm	115 mm	each
Rotor only (the Rotor can be used with any ISO GL 45 reagent bottle)						
66222-02	250 ml	GL 45	----	----	----	each
66222-05	500 ml	DL 45	----	----	----	each
66222-10	1000 ml	DL 45	----	----	----	each

► Mica Sheets and Disks

The Highest Quality (V-1 or V-2) for AFM Applications to the Medium Quality (V4 to V-6) for Replication, Thin Film Deposition

Introduction

EMS Mica Sheets offer a clean surface for E.M. applications, carbon filming and particle spraying, as well as for AFM applications.

There are two types of mica: muscovite and phlogopite. Generally, one differs from the other by color (Muscovite is Ruby, Green or White; Phlogopite is Amber, Yellow, or Silver) The maximum operating temperature for Muscovite is about 500 – 600°C and for Phlogopite is about 800 – 900°C.

Our line consists of High Quality Muscovite Mica. This mica peels off very thin up to 0.0001" uniform layers, exposing "virgin" mica upon splitting.

Characteristics:

Muscovite, potash type mica, sometimes known as granitic mica, is the best of all micas in dielectric strength, perfection of cleavage, and transparency.

It has the following chemical formula: $H_2KAl_3(SiO_4)_3$.

Chemical composition:

Silica	45.5%
Alumina	37.5%
Potash	12.0%
Water	5.0%

It has a vitreous luster and is colorless to gray, brown, pale green, violet, dark olive green, or rose red. It may be transparent to translucent. It has strong double refraction and is optically negative. It loses water of constitution at 600°C and is practically non-magnetic. It exhibits pleochrism, which is the property of varying in color when viewed from different angles.

RUBY muscovite is harder than green and has a pale brownish red color in thin sheets (0.020") or ruby red in thick plates (0.4"). Ruby mica can be split easily into films of 0.001" or thinner because it has such excellent cleavage. In other colors, this thinness can be obtained but at a considerable risk of cracking.

Quality Determination:

The quality of muscovite mica is verbal determination by visual quality classification ASTM (D351-57T) from the best V-1 to the worst is V-10A.

- V i-1: Clear.** – Hard, of uniform color, nearly flat, free of all stains, foreign inclusion, cracks, and other similar defects.
- V-2: Clear and slightly stained.** – Hard of uniform color, nearly flat and may contain slight crystallographic discoloration, and very slight air inclusions and not more than one fourth of the usable area.
- V-3: Fair stained.** – Hard, of uniform color, may contain slight waves, slight crystallographic discoloration, and slight air inclusions and not more than one-half of the usable area.
- V-4: Good Stained.** – Hard, of uniform color, may contain medium waves slight crystallographic discoloration, and medium air inclusion in not more than two-third of the usable area.
- V-5: Stained A Quality.** – Hard, may contain medium air inclusions, uniformly distributed in the usable area; slight green vegetable stains, medium waviness, and heavy waves if specified.
- V-6: Stained B Quality.** – Hard, may contain heavy air inclusions and heavy waves, medium green vegetable stains, slight black and red dots (mineral), and clay stain.
- V-7: Heavy stained.** – Hard, and may contain heavy air inclusions and waves, slight light black and red dots (mineral) medium cloudy stains, clay stains and green stains (vegetable). Soft, buckles, ridges, and sand blast acceptable if specified.
- V-7A: Densely Stained.** – Hard and soft. May contain heavy waves and air inclusions, cloudy stains. High black and red dots (mineral). Medium black and red stained (mineral), buckles, and ridges. Also green stain (vegetable type), clay stains, herringbones, and sand blast.
- V-8: Black dotted.** – Hard, may contain medium waves, heavy air inclusions, cloudy stains, light black and red dots (mineral), and green stains (vegetable).
- V-9: Black spotted.** – Hard, may contain medium waves, heavy air inclusions, cloudy stains, light black and red dots (mineral), and green stains (vegetable type), slight black stains (mineral), and sand blast.
- V-10: Black Stained.** – Hard, may contain medium waves, heavy air inclusions, cloudy stains, light black and red dots (mineral), green stains (vegetable type), and sand blast, medium black stains (mineral), slight red stains (mineral), and clay stains.
- 10A: Densely Black and Red Stained.** – Hard and may contain heavy waves, air inclusions, cloudy stains, light black and red dots (mineral), red stains (mineral), black and red stains (mineral), green stains (vegetable type), and sand blast, very dense black and red stains (mineral), and slight clay stains. Soft if specified

Physical Properties:

Hardness: Moh's scale:	2.8 – 3.2
Shore's Test	80 – 150
Specific Gravity, g/cm³	2.6 – 3.2
Tensile Strength, kg/cm²	~ 1750
Compression Strength, kg/cm²	1900 – 2850
Refractive Index (air=1)	1.56 – 1.60/61
Dielectric Strength	
@20°C in volt/mil	3,000 – 6,000
Max. Thermal Resistance	625°C (1,157°F)
Modulus of Elasticity, kgf/cm²x10⁻³	1400 – 2100

Optic Axial Angle	50° – 75°
Coefficient of Expansion per °C	Perpendicular to cleavage plane 9 x10 ⁻⁴ – 36 x10 ⁻⁴
Calcining Temperature	700 – 800°C
Thermal Conductivity, gm.cal/sec/cm2/°C/cm	~0.0013 (Perpendicular to cleavage plane)
Water of Constitution, %	4 – 5
Moisture Absorption	Very low

Apparent Electric Strength (0.001-0.003" thick)	120 – 200 kV/mm
Permittivity @ 15°C (60°F)	6 – 7
Power Factor (loss Tangent) @15°C	0.0001 – 0.0004
Volume Resistively @25°C (77°F), Ohm.cm	4x10 ⁻¹⁵ – 2x10 ⁻¹⁷
Acid Reaction	Affected by HF

► Mica Sheets and Disks (continued)

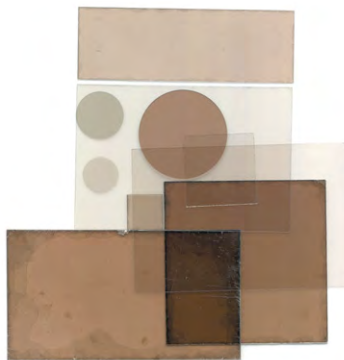
Applications:

In general, for those who are using mica for the making of carbon support films, thin films coatings research, and some AFM studies where HOPG are used to taking place, the mica V-4 or V-5 is recommended. (Mica must always use freshly cleaved surfaces).

For AFM and SPM calibration, V-1 or V-2 is recommended.

However, we believe that it is important that you know what kind of mica is being used in your lab. The information on the mica is given above should be used to make your choice.

Here at EMS we try to stock a variety of sizes with different thicknesses and classifications of quality for convenience.



Ordering Information:

Muscovite Mica V-1 Quality:

Cat.#	Mica Size	Quality	Thickness (mm)	Pack
71855-01	50 x 75mm	V-1	0.15 - 0.21	each
71855-05	25 x 75 mm	V-1	0.26 - 0.31	each
71855-10	25 x 25 mm	V-1	0.15 - 0.21	10/pk
71855-11	25 x 25 mm	V-1	0.26 - 0.31	10/pk
71855-15	15 x 15 mm	V-1	0.15 - 0.21	10/pk
71856-01	9.5 mm Diameter	V-1	0.15 - 0.21	each
71856-02	12 mm Diameter	V-1	0.15 - 0.21	10/pk
71856-03	15 mm Diameter	V-1	0.15 - 0.21	10/pk
71856-04	20 mm Diameter	V-1	0.15 - 0.21	10/pk

Muscovite Mica V2 Quality:

Cat.#	Mica Size	Quality	Thickness (mm)	Pack
71857-01	50 x 75mm	V-2	0.15 - 0.21	each
71857-05	25 x 75 mm	V-2	0.26 - 0.31	each
71857-10	25 x 25 mm	V-2	0.15 - 0.21	10/pk
71857-11	25 x 25 mm	V-2	0.26 - 0.31	each
71857-15	15 x 15 mm	V-2	0.15 - 0.21	10/pk
71858-01	9.5 mm Diameter	V-2	0.15 - 0.21	each

Muscovite Mica V4 Quality:

Cat.#	Mica Size	Quality	Thickness (mm)	Pack
71853-01	50mm x 75 mm	V-4	0.26 - 0.31	10/pk
71853-05	25mm x 75mm	V-4	0.26 - 0.31	10/pk
71853-10	25mm x 25mm	V-4	0.15 - 0.21	10/pk
71853-11	25mm x 25mm	V-4	0.26 - 0.31	10/pk
71853-15	15mm x 15mm	V-4	0.15 - 0.21	10/pk
71854-01	9.5mm Diameter	V-4	0.15 - 0.21	10/pk
71854-15	12.7mm Diameter	V-4	0.15 - 0.21	10/pk

Muscovite Mica V5 Quality:

Cat.#	Mica Size	Quality	Thickness (mm)	Pack
71850-01	50mm x 75 mm	V-5	0.15 - 0.21	10/pk
71851-05	25mm x 75mm	V-5	0.26 - 0.31	10/pk
71850-10	25mm x 25mm	V-5	0.15 - 0.21	10/pk
71850-11	25mm x 25mm	V-5	0.26 - 0.31	10/pk
71850-15	15mm x 15mm	V-5	0.15 - 0.21	10/pk
71852-01	9.5mm Diameter	V-5	0.15 - 0.21	10/pk

For the storing of Specimen Discs, see Gel Pak, page 236.

► Metal Specimen Discs for use with the Atomic Force Microscope



These are high quality metal discs with smooth edges and flat surfaces for use in Atomic force Microscopy.

Cat. #	Description	Qty
75010-10	10 mm Specimen Metal Discs for AFM	50/pk
75010-12	12 mm Specimen Metal Discs for AFM	50/pk
75010-15	15 mm Specimen Metal Discs for AFM	50/pk
75010-20	20 mm Specimen Metal Discs for AFM	50/pk



► Specimen Mount Tweezers

Dumont Specimen Mount Tweezers, the finest tweezers available. Choose the one that best suits your needs.

Polished Dumoxel Antimagnetic Steel

Cat. #	Description	Qty.
76800	Specimen Mount Tweezers 2E½ (0=12.7mm)	each
76802	Specimen Mount Tweezers 2E¼ (0=6.4mm)	each
76804	Specimen Mount Tweezers 2E⅓ (0=3.2mm)	each



► SEM Mount Forceps

Made from stainless steel with a serrated handle and a guide pin. The tip is bent at a 45 degree and formed into a ring, which has a diameter of 10mm when fully closed. 150mm long.

76805	SEM Mount Forceps	each
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► ACLAR®—Fluoropolymer Films

An Embedding/Cell Growing Film

ACLAR® is made from fluorinated-chlorinated resins. There are four basic film types—the homopolymer ACLAR® Rx Series, the copolymers ACLAR® 22A and 33C and the new ACLAR® Cx. (Honeywell/Allied Signal). The chemical make-up of all ACLAR® products provide an exceptional moisture barrier. ACLAR® is crystal clear, biochemically inert, highly resistant to most chemicals and sterilizable by heat or radiation. ACLAR® is used widely in pharmaceutical, medical, sensitive electronics and military packaging.

ACLAR® 33C is a copolymer film consisting primarily of chlorotrifluoroethylene (CTFE). It offers an outstanding moisture barrier, excellent chemical resistance and minimal dimensional change (2%), making it the best choice for use in microscopy.

Aclar® UltRx 2000 is a 2.00 mil (51 micron) PCTFE homopolymer, high performance barrier film for the pharmaceutical and medical markets. It thermoforms well on conventional blister packaging equipment and provides the best barrier of any clear film.

Features:

- Crystal clear, high UV transparency – ideal for use in UV curing of embedding resin in microscopy.
 - Chemically stable and biochemically inert – the product of choice for growing cell cultures.
 - Low dielectric constant, high electric strength and dissipation factor– offers excellent cell attachment, even through lengthy processing procedures.
 - Low surface energy – separates easily from epoxy.
 - Exhibits no detectable autofluorescence – ideal for fluorescent microscopy.
 - A non-flammable, non-aging co-polymer – which is suited for sterilization by heat or UV.
 - Crystalline melting point is 206°C (403°F) – stable in the SEM.
- Flexible and soft—can be sectioned without damage to the ultramicrotome knives.

ACLAR® Physical Data (These are only typical values and are not to be interpreted as product specifications):

ACLAR® 33C

Properties @ 73°F ~50% RH	Typical Value		Test Method
	English	Metric	
Specific Gravity		2.12	ASTM D1505
Yield	7.8 mil	1,677 in ² /lb.	2.38m ² /kg
Haze		<4.5%	ASTM D1003
Crystalline Melting Point		403°F	206°C
Dimensional Stability MD		≤2%	ASTM D1204
10 min. @ 300°F TD		≤2%	
Tensile Strength MD		3000-4600 psi	ASTM D882
TD		21-32 MPa	
Elongation (MD/TD)		50-125%	ASTM D882
Modulus, Secant MD		185,000-200,000 psi	ASTM D882
TD		1276–1379 MPa	
Tear Strength, Graves MD		425-525 g/mil	ASTM D1004
TD			
Water Vapor Transmission Rate @ 100°F/100% RH		0.003 gm/100 in ² /day	0.047 gm/m ² /day
Thermal Conductivity		4.7 x 10 ⁻⁴ cal-cm/cm ² sec °C	
Flammability		Nonflammable	
Oxygen Index		100	ASTD D2683

Cat. #	Description	Pack
50425-10	ACLAR® Film, 8"x 10", 7.8 Mil	10/pk
50425-25	ACLAR® Film, 8"x 10", 7.8 Mil	25/pk

ACLAR® Chemical Data

Chemicals	Average Weight Increase	Visible Effect on Sample
Acetone	.05%	None
Butyl Alcohol	—	None
Carbon Tetrachloride	1.6%	Slightly flexible
1,2-Dichloroethane	0.03%	None
Ethyl Acetate	6.0%	Very flexible
Ethyl Alcohol	None	None
Ethyl Ether	5.2%	Very flexible
Ethylene Oxide	4.0%	Very flexible
Formic Acid	None	None
Gasoline	None	None
All Acids (HCl, H ₂ SO ₄ ,...)	None	None
Methanol	None	None
Propylene Oxide	—	None
Toluene	1.1	Slightly flexible
Osmium Tetroxide	None	None
Plastisolve	—	None

ACLAR® UltRx 2000

Properties @ 73°F ~50% RH	Typical Value		Test Method
	English	Metric	
Specific Gravity		2.11	ASTM D1505
Yield	2.0 mil	6,567 in ² /lb.	9.34 m ² /kg
Haze		< 1 %	ASTM D1003
Crystalline Melting Point		412°	F 211°C
Dimensional Stability MD		≤ + 6 %	ASTM D1204
(10 min. @ 300°F/149°) TD		≤ - 6 %	
Tensile Strength MD		7,000–10,000 psi	ASTM D882
TD		4,500–7,500 psi	
		48–69 MPa	ASTM D882
		31–52 MPa	
Elongation MD		150 - 200%	ASTM D882
TD		175 - 250%	
Modulus, Secant MD		170,000–200,000 psi	ASTM D882
TD		170,000–200,000 psi	
		1172–1379 MPa	ASTM D882
		1172–1379 MPa	
Surface Tension (Treated Side)		≥ 42 dynes/cm	
Water Vapor Transmission Rate @ 77°F (25°C)/60% RH		0.0012	0.0186
@ 86°F (30°C)/60% RH		0.0025	0.0388
@ 104°F (40°C)/75% RH		0.0066	0.102
@ 100°F (37.8°C)/100% RH		0.0077	0.119

Cat. #	Description	Pack
50426-10	ACLAR® 2 mil thick 210(W) x 297mm (L) (11.69" L x 8.27" Wide	10/pk
50426-25	ACLAR® 2 mil thick 210(W) x 297mm (L) (11.69" L x 8.27" Wide	25/pk

References:

- 1.Kingsley R.E, Cole N. L.: Preparation of cultured mammalian cells for transmission and scanning electron microscopy using ACLAR® film. Journal of Electron Microscopy Technique, 10, 77-85 (1988)
- 2.Mauve G.M., Brenham J.C., Beattie, M.S.: Ultrastructure of HRP-labeled neurons: a comparison of two sensitive techniques. Brain Research Bulletin, 10, 551 (1983)
- 3.Masurovsky E.B., Bunge R.P.: Aclar Film in Biological Electron Microscopy. Journal of Electron Microscopy Technique, 12, 172-173 (1989)
- 4.Masurovsky E.B., Bunge R.P.: Fluoroplastic coverslips for long-term nerve tissue culture. Stain Technology, 43, 3, 161–165 (1968)

► Disc (Tab) Punches

Produces discs (tabs) from sheet materials. Ticket punching type. Comes with adjustable side gauge for centering hole, 2" maximum reach. Weight 10 oz., 6½" long. Useful for punching adhesive tabs for specimen mounts, or producing circle cover slips from ACLAR® films (EMS #50425 or #50426) for growing cells. Maximum thickness for punching is up to 67-mil (1.7 mm). Disc size available: ⅝", ¾", ⅞" and 1". Complete unit includes one punch handle and one punching die.

77850-08	Punch, ⅝" (7.94 mm) Circle	each
77850-09	Punch, ¾" (9.54 mm) Circle	each
77850-12	Punch, ⅞" (12.7 mm) Circle	each
77850-25	Punch, 1" (25.4 mm) Circle	each



► Pasteur Capillary Pipette, Reusable

- Straight or bent tip ■ Borosilicate glass ■ 1.5 to 2 mm orifice
- Reusable ■ Body outside diameter is 8mm

Type	Catalog Number	Body Length Inches (mm)	Tip Length Inches (mm)	Pack
Straight Tip:	70930-04	4 (102)	4 (102)	288/pk
	70930-03	5 (127)	3 (77)	288/pk
	70930-02	6 (152)	2 (50)	288/pk
Bent Tip:	70931-04	4 (102)	4 (102)	144/pk
	70931-03	5 (127)	3 (77)	144/pk
	70931-02	6 (152)	2 (50)	144/pk

► Pasteur Pipettes, Disposable



Good for handling infectious materials, inoculating culture media and routine sampling. Available in either Borosilicate or Flint glass, with an outside body diameter of 7 mm.

Type	Catalog Number	Body Length Inches (mm)	Tip Length Inches (mm)	Pack
Borosilicate Glass:	70950-12	3.5 (89)	2.25 (57)	250/pk
	70950-15	4 (102)	5 (127)	250/pk
Flint Glass:	70950-52	3.5 (89)	2.25 (57)	250/pk
	70950-55	4 (102)	5 (127)	250/pk

► OXFORD® Benchmate® Pipettors

► UV Stable Adjustable Pipettors

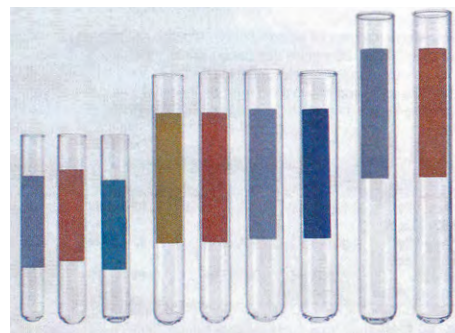
- Entire pipettor is autoclavable – no need to recalibrate after autoclaving.
- Highly resistant to chemical reagents.
- Barrel is designed to minimized dead air space for increased pipettor accuracy.
- The lightweight, slender, design reduces operator fatigue.



Cat. #	Volume Range	Adjustable Increments	Accuracy	Reproducibility (CV)
72430-02	0.2µl – 2.0µl	0.001µl	±0.024µl - ±0.06µl	≤ 9.0 – ≤ 2.0%
72430-04	0.5µl – 10µl	0.01µl	±0.05µl - ±0.1µl	≤ 5.0 – ≤ 0.50%
72430-06	2µl – 20µl	0.1µl	±0.16µl - ±0.4µl	≤ 3.0 – ≤ 0.5%
72430-08	10µl – 100µl	0.1µl	±0.5µl - ±1.0µl	≤ 1.0 – ≤ 0.4%
72430-10	20µl – 200µl	1.0µl	±0.6µl - ±2.0µl	≤ 1.0 – ≤ 0.3%
72430-12	100µl – 1000µl	1.0µl	±2.0µl - ±8.0µl	≤ 0.5 – ≤ 0.3%
72430-14	1000µl – 5000µl	10.0µl	±10.0µl - ±50.0µl	≤ 0.5 – ≤ 0.3%
72430-16	1ml – 10ml	0.05µl	±30.0µl - ±50.0µl	≤ 0.5 – ≤ 0.2%

► Disposable Glass Tubes

- Borosilicate glass
- Round bottom
- Plain top
- Labeling area in five pastel colors
- Handy fused-in color patches, accept any type of ink or pencil



Cat. #	Label Area Color	Pack
Tube Size 12mm ODx75mmL		
64635-W	White	1000/pk
64635-Y	Yellow	1000/pk
64635-G	Green	1000/pk
64635-O	Orange	1000/pk
64635-B	Blue	1000/pk
Tube Size 13mm ODx100mmL		
64636-W	White	1000/pk
64636-Y	Yellow	1000/pk
64636-G	Green	1000/pk
64636-O	Orange	1000/pk
64636-B	Blue	1000/pk
Tube Size 16mm ODx100mmL		
64637-W	White	1000/pk
64637-Y	Yellow	1000/pk
64637-G	Green	1000/pk
64637-O	Orange	1000/pk
64637-B	Blue	1000/pk
Tube Size 16mm ODx125mmL (FLINT GLASS ONLY)		
64638-W	White	1000/pk
64638-O	Orange	1000/pk
64638-B	Blue	1000/pk

► Pipette Tips—KENDALL Treated Pipette Tips

Low Binding Polymer Technology

A manufacturing process that binds a perfluorooctyl polymer to polypropylene resin—resulting in an exposed trifluoro-methyl surface.

Precision and accuracy are increasingly important in molecular biology labs. A pipetter can be 99% accurate and precise, but the tip can compromise performance by retaining or binding a sample. KENDALL's low binding tips ensure accuracy and precision by bonding a proprietary polymer to the resin.

- Reduces the surface energy of liquid and repels any substance.
- Not detectable/Non-reactive.
- Extracted only by a fluorinated solvent.
- Autoclaving will not compromise performance.
- Available in convenient hinged racked package.
- Tips and racks are fully autoclavable.

► A. P2/P10 Ultra Micro Tip – Natural



- Universal fit for ultra-micro pipettors.
- Graduation marks at 2µl and 5µl.
- Available with and without low binding surface.
- Available in QuickRack

Cat. #	Description	Packaging	Sterile	Low Retention
72440-01	0.1 -10µl P2-Micro	1000/bag - Bulk	No	No
72440-02	0.1 -10µl P2-Micro	10 Racks/case (96Tips /Rack)	No	Yes
72440-03	0.1 -10µl P2-Micro	10 Racks/case (96Tips /Rack)	Yes	Yes
72440-04	0.1 -10µl P2-Micro	10 Racks/case (96Tips /QuickRack)	Yes	Yes
72441-01	0.1 -10µl P2-Micro	2 Racks of 96 per Case	No	No
72441-02	0.1 -10µl P2-Micro	2 Racks of 96 per Case	Yes	No
72441-03	0.1 -10µl P2-Micro	2 Racks of 96 per Case /QuickRack	Yes	No

► B. 0.5 -10µl Crystal/Eppendorf Tips – Natural

Cat. #	Description	Packaging	Sterile	Low Retention
72442-01	0.1 -10µl Crystal/Eppendorf	1000/bag-Bulk	No	No
72442-02	0.1 -10µl Crystal/Eppendorf	10 Racks/case (96Tips /Rack)	No	Yes
72442-03	0.1 -10µl Crystal/Eppendorf	10 Racks/case (96Tips /Rack)	Yes	Yes



► C. 1 – 200µl Universal Tips

- Universal fit for research-grade pipettors.
- Yellow tips non-graduated, not-treated.
- Natural tips feature reference marks at 10µl, 50µl, and 100µl.
- Natural tips feature low binding surface (bulk not treated).
- Available bulk, racked, racked sterile, EcoStack racks and QuickRack tip reloading system.

Cat. #	Description	Packaging	Sterile	Low Retention
NATURAL TIPS				
72443-01	5 - 200µl Universal Reference	1000/bag - Bulk	No	No
72443-02	5 - 200µl Universal Reference	10 Racks/case (96Tips/Rack)	No	Yes
72443-03	5 - 200µl Universal Reference	10 Racks/case (96Tips/Rack)	Yes	Yes
72443-04	5 - 200µl Universal Reference	10 Racks/case (96Tips/EcoRack)	Yes	Yes
72443-05	5 - 200µl Universal Reference	10 Racks/case (96Tips/QuickRack)	No	Yes
72444-01	5 - 300µl Universal	1000/bag - Bulk	No	No
72444-02	5 - 300µl Universal	10 Racks/case (96Tips/Rack)	No	Yes
72444-03	5 - 300µl Universal	10 Racks/case (96Tips/Rack)	Yes	Yes
72445-01	101 - 1000µl Universal	1000/bag - Bulk	No	No
72445-02	101 - 1000µl Universal	10 Racks/case (96Tips/Rack)	No	Yes
72445-03	101 - 1000µl Universal	10 Racks/case (96Tips/Rack)	Yes	Yes
YELLOW TIPS				
72446-01	5 - 200µl Universal	1000/bag - Bulk	No	No
72446-02	5 - 200µl Universal	10 Racks/case (96Tips /Rack)	No	No
72446-03	5 - 200µl Universal	10 Racks/case (96Tips /Rack)	Yes	No
72446-04	5 - 200µl Universal	10 Racks/case (96Tips/EcoRack)	Yes	No
72446-05	5 - 200µl Universal	10 Racks/case (96Tips/QuickRack)	No	No



300 µl Universal Tip



1000 µl Universal Tip



► D. Gel Loading Tips

- 3 different outside dimensions (OD's)
 - 0.57mm OD for loading protein gels (SDS Page gels). A white rack.
 - 0.37mm OD for 0.4mm thick polyacrylamide sequencing gels. A yellow rack.
 - 0.17mm OD for 0.2mm thick sequencing gels. A blue rack.
- 83mm length (200µl tips) or 45mm length (10µl tips) for access to bottom of narrow vessels.
- 5µl graduation for volume QuickCheck.
- Universal fit for most research-grade pipetters.
- 200µl and 10µl tips.

Cat. #	Description	Packaging	Sterile	Low Retention
72447-01	5 – 200µl Gel Round	960/bag - Bulk	No	No
72447-02	5 – 200µl Gel Round	1 Racks of 192 Tips	No	No
72447-03	5 – 200µl Gel Round	1 Racks of 192 Tips	Yes	No
72448-01	5 – 200µl Gel Flat 0.4mm	1 Racks of 192 Tips	No	No
72448-02	5 – 200µl Gel Flat 0.4mm	1 Racks of 192 Tips	Yes	No
72449-01	5 – 200µl Gel Flat 0.2mm	1 Racks of 192 per Case	No	No
72449-02	5 – 200µl Gel Flat 0.2mm	1 Racks of 192 per Case	Yes	No
72450-01	1 – 10µl Gel Round	1 Racks of 192 per Case	No	No
72450-02	1 – 10µl Gel Round	1 Racks of 192 per Case	Yes	No
72451-01	1 – 10µl Gel Flat 0.4mm	1 Racks of 192 per Case	No	No
72451-02	1 – 10µl Gel Flat 0.4mm	1 Racks of 192 per Case	Yes	No
72452-01	1 – 10µl Gel Flat 0.2mm	1 Racks of 192 per Case	No	No
72452-02	1 – 10µl Gel Flat 0.2mm	1 Racks of 192 per Case	Yes	No



500-200 µl Gel Round Tip



5-200 µl Gel Flat Tip (0.4 mm)



5-200 µl Gel Flat Tip (0.2 mm)



1-10 µl Gel Round

► E. Filter Pipette Tips (Barrier Tips)

WHY KENDALL FILTER PIPETTE TIPS?

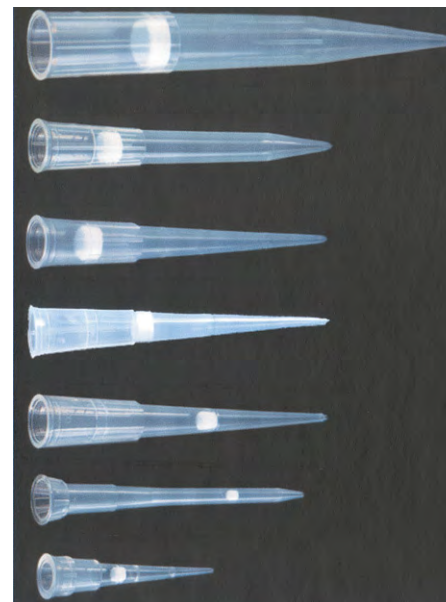
- Certified RNase / Dnaee-Free, Human DNA-Free, and PCR Inhibitor-Free.
- Low Binding Surface reduces DNA and Protection retention.
- Liquid and aerosol barrier prevent pipetter contamination.
- A universal Fit on most research-grade pipetters
- CellPack keeps tips straight for multi-channel pipetters.

FILTER MATERIAL

- High-density polyethylene (Naturally hydrophobic)

TYPES OF MEMBRANES

- Aerosol Barrier: Prevents aerosol contamination
- Self-sealing Barrier (contains cellulose): Prevents aerosol and liquid contamination. Cellulose can contaminate samples.
- Liquid Barrier: Prevents aerosol and liquid contamination. Will not contaminate samples.



Cat. #	Description	Packaging	Sterile	Low Retention
72460-01	5 – 30µl Filter Tip, Natural	96 / Rack	Yes	Yes
72460-10	5 – 30µl Filter Tip, Natural	96 / Rack; 10 racks / case	Yes	Yes
72460-02	5 – 200µl Filter Tip, Natural	96 / Rack	Yes	Yes
72460-20	5 – 200µl Filter Tip, Natural	96 / Rack; 10 racks / case	Yes	Yes
72460-03	.5 – 10µl Filter Tip, Natural	96 / Rack	Yes	Yes
72460-30	.5 – 10µl Filter Tip, Natural	96 / Rack; 10 racks / case	Yes	Yes
72460-04	.1 – 10µl Filter Tip, Natural	96 / Rack	Yes	Yes
72460-40	.1 – 10µl Filter Tip, Natural	96 / Rack; 10 racks / case	Yes	Yes
72460-05	1 – 100µl Filter Tip, Natural	96 / Rack	Yes	Yes
72460-50	1 – 100µl Filter Tip, Natural	96 / Rack; 10 racks / case	Yes	Yes
72460-06	5 – 250µl Filter Tip, Natural	96 / Rack	Yes	Yes
72460-60	5 – 250µl Filter Tip, Natural	96 / Rack; 10 racks / case	Yes	Yes
72460-07	101–1000µl Filter Tip, Natural	96 / Rack	Yes	Yes
72460-70	101–1000µl Filter Tip, Natural	96 / Rack; 10 racks / case	Yes	Yes

► Polyethylene Disposable Pipettes – The Value Choice – ISI-9001

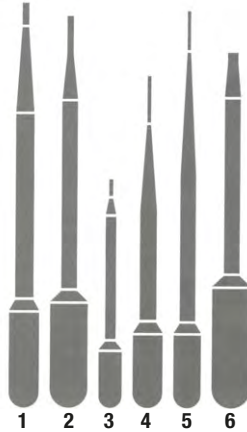
THESE DISPOSABLE TRANSFER PIPETS:

- Sterile and non-sterile
- Attached bulb avoids cross-contamination
- Can be frozen in liquid nitrogen
- Low-affinity surface
- One step biohazard disposable

► General Purpose Transfer Pipet

These pipets are good for blood banking, reagent handling, viscous liquid sampling and transferring, etc.

The non-sterile pipets are bulk packed; the sterile are individually packed.

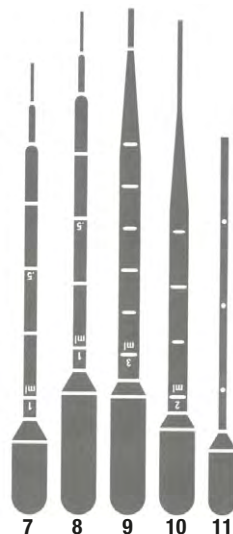


Product Description	Catalog Number for non Sterile Pipets					
	70960-1	70960-2	70960-3	70960-4	70960-5	70960-6
Length, cm	15.6	15.7	8.7	12.9	15.4	13.7
Stem Dia, mm	7.9	6.1	4.8	6.6	6.6	6.1
Overall Cap. ml	7.7	8.0	1.7	4.0	5.0	9.3
Bulb Draw, ml	3.2	4.6	0.9	1.9	1.9	4.8
Drops/ml	20	20	25	25	23	----
Quantity/pk	500	400	500	400	500	250
	70960-1S	70960-2S	70960-3S	70960-4S	70960-5S	70960-6S
	Catalog Number for Sterile Pipets					

► Graduated Transfer Pipets

These pipets are ideal for clinical applications, blood banking, remove, disperse small volume, transfer in and out of multi well plates, reagent handling, pH meter maintenance, etc.

The non-sterile pipets are bulk packed; the sterile are individually packed



Product Description	Catalog Number for Non-Sterile Pipets				
	70962-7	70962-8	70962-9	70962-10	70962-11
Length, cm	14.0	15.5	15.5	15.2	11.6
Stem Dia, mm	4.7	4.6	7.9	7.1	3.0
Overall Cap. ml	3.9	5.8	7.5	4.8	1.5
Bulb Draw, ml	2.2	3.4	3.2	1.8	0.8
Drops/ml	25	25	20	24	21
Quantity/pk	500	500	500	500	500
Graduated	1 ml	1 ml	3 ml	2 ml	0.3 ml
	70962-7S	70962-8S	70962-9S	70962-10S	70962-11S
	Catalog Number for Sterile Pipets				

► Special Purpose Transfer Pipets - Padl-Pet®

These pipets are ideal for chemical sampling or transferring, smear blood sample onto slides, mix and spread reagent, slide tests, etc. Available in bulk pack and non-sterile only

Product Description	Catalog Number		
	70963-18	70963-19	70963-20
Length, cm	13.1	13.1	12.4
Stem Dia, mm	3.8	3.8	3.6
Overall Cap. ml	1.0	1.0	0.8
Bulb Draw, ml	0.2	0.2	0.2
Drops/ml	---	---	---
Quantity/pk	500	500	500
Drop Size	25µl	30µl	50µl



► Narrow Stem Pipets - Sedi-Pet®

These Micro-tip pipets are ideal for loading gels, DNA sample removal, protein assays, lipids extractions, drop-wise additions to culture plates, using 2 ml auto sampler vials, remove or disperse small volumes etc.

Product Description	Catalog Number, Non-Sterile		
	70966-12	70967-13	70967-14
Length, cm	14.7	14.7	10.4
Stem Dia, mm	4.6	6.1	3.0
Overall Cap. ml	5.8	8.7	1.5
Bulb Draw, ml	3.3	4.8	1.0
Drops/ml	55	45	50
Quantity/pk	400	400	400
	70966-12S	70967-13S	70967-14S
	Catalog Number, Sterile		



► Narrow Stem Pipets - Sedi-Pet®

These pipets are ideal for Technique control such as loading gel, PCR workDNA sample removal, protein assays, lipid extractions, atomic absorption spectroscopy-reagent prep, reaction chamber, storage ampoule, portable aliquoting, etc.

Available in bulk pack non-sterile, and sterile individually packed.

Product Description	Catalog Number, Non-Sterile		
	70964-21	70964-22	70964-23
Length, cm	6.4	8.5	15.5
Stem Dia, mm	2.5	2.5	2.5
Overall Cap. ml	1.2	4.0	4.6
Bulb Draw, ml	0.9	3.0	3.3
Drops/ml	25	25	25
Quantity/pk	400	500	500
	N/A	70964-22S	70964-23S
	Catalog Number, Sterile		



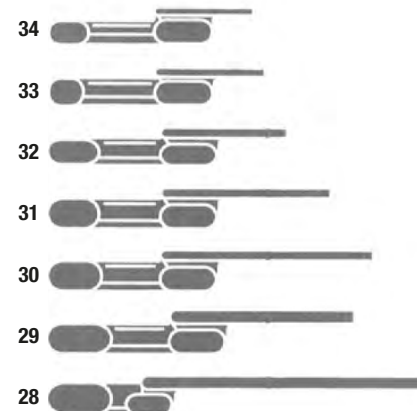
► Extra Long Transfer Pipets

These transfer pipets are ideal for sub-culturing, harvesting, sampling 15, 50, 100 ml tubes and flask; remove supernatant and media from cell cultures; wash cells; post centrifugation to remove cell layers; layer in columns / transfers in columns, loading gels; field testing; blood culture bottle, etc.

These pipets come bulk packed and they are non-sterile.



Product Description	Catalog Number for Non-Sterile	
	70968-26	70968-27
Length, cm	22.5	30.0
Stem Dia, mm	5.0	8.6
Overall Cap. ml	6.0	23.0
Bulb Draw, ml	2.3	7.3
Drops/ml	25	20
Quantity/pk	400	100
	70968-26S	70968-27S
	Catalog Number for Sterile	



► Pipets with Exact Volumes

These pipets offer the exact volume of liquid just one squeeze to the bulb. Quick and economical for disposable pipets, without the need of expensive pipetting devices. These pipets come non-sterile.

Product Description	Catalog Number (Non-sterile)						
	70969-28	70969-29	70969-30	70969-31	70969-32	70969-33	70969-34
Length, cm	10.10	7.95	8.30	7.49	6.48	5.92	5.28
Stem Dia, mm	3.0	3.0	2.5	2.5	2.5	2.3	2.0
Disperse Vol.	250µl	150µl	100µl	80µl	60µl	40µl	20µl
Quantity/pack	500	500	500	500	500	500	500

► Quick Release Pipette Filler

This pipetting device provides an easy, precise way of filling and releasing liquid. By rotating the knurled thumb wheel the liquid is drawn up or dispensed. The soft elastic chuck has a threaded collar that secures the plastic or glass pipette to the device. Sizes are color coded. Fits standard or disposable pipettes and disposable serological tooled-mouthpiece pipettes as per ASTM Standard E714-80.



70956*	Quick Release Pipette Filler, 0.2ml, Yellow	each
70957	Quick Release Pipette Filler, 2ml, Blue	each
70958	Quick Release Pipette Filler, 10ml, Green	each
70959	Quick Release Pipette Filler, 25ml, Red	each

*Note: the 70956 is not supplied with quick release valve, due to the small volume.

► Transfer Pipette; Polypropylene

It works as a syringe. Inexpensive and Disposable. Good for liquid transferring tasks. Each pipette has calibration markings from 0 to 12ml in 0.2ml increments. Tubing may be attached to the tip to suit your application, and tips may also be cut to facilitate aspiration and delivery of fluids of varying viscosities.



Useful for:

- Flushing lines in chemistry systems
- Delivers oil to machinery parts
- Aspiration of fluids
- Liquid delivery

Available in two configurations:

- Straight Tip
- Curved Tip

70986-00	Transfer Pipette, 12ml, Straight Tip 50/bx	each
70986-20	Transfer Pipette, 12ml, Curved Tip 50/bx	each

► Disposable Pipettes – Sterile

Crystal Grade polystyrene is used for consistency in manufacture and maximum clarity, with easy to read crisp black printed graduations enabling the pipettes to be used accurately to ±1%. Sterile by gamma irradiation. These Pipettes fit all Quick Release Pipette Fillers.

These pipettes are tested for pyrogenicity, and have pyrogen levels of less than 0.25 EU/ml.



Catalog #	70953-1	70953-2	70953-5	70953-10	70953-25	70953-50
Size, ml	1	2	5	10	25	50
Suction Adapter	No	No	Yes	No	Yes	Yes
Adapter Diameter, mm	4.8	5.0	8.0	7.4	7.9	7.5
Overall Length, mm	279 (10.9")	279 (10.9")	298 (11.7")	302 (11.9")	349 (13.7")	341 (13.6")
Graduation, ml	0.01	0.01	0.1	0.1	0.2	1.0
Type	Standard	Standard	Standard	Standard	Standard	Standard
Packaging	Single Wrap	Single Wrap	Single Wrap	Single Wrap	Single Wrap	Single Wrap
Quantity	100	100	50	50	25	50

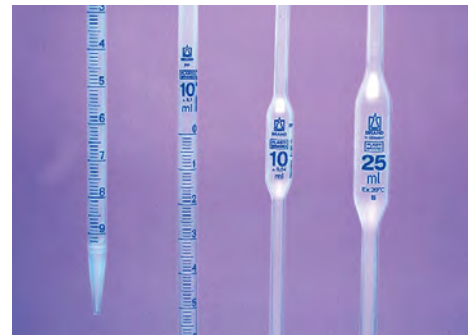
Catalog #	70954-1	70954-2	70954-5	70954-5S	70954-10	70954-10S
Size, ml	1	2	5	5	10	10
Suction Adapter	No	No	Yes	No	Yes	No
Adapter Diameter, mm	4.8	4.8	8.0	7.4	7.4	8.0
Overall Length, mm	279 (10.9")	279 (10.9")	298 (11.7")	226 (8.9")	302 (11.9")	232 (9.1")
Graduation, ml	0.01	0.01	0.1	0.1	0.1	.02
Type	Standard	Standard	Standard	Sortie	Standard	Sortie
Packaging	Bulk	Bulk	Bulk	Single Wrap	Bulk	Single Wrap
Quantity	25	50	25	50	25	50

► Graduated Measuring and Volumetric Pipettes

Made from translucent polypropylene. Resistant to breakage. Blue graduations, ring mark and inscriptions. Ideal for fluoro and silicate chemistry used. Recommended cleaning with mild alkaline detergent up to 60°C.

NOTE: Exposure to temperatures above 60°C may cause volume changes.

Cat. #	Capacity	Sub Divisions	Quantity
GRADUATED PIPETTES			
70951-01	1 ml	0.1 ml	6
70951-02	2 ml	0.1 ml	6
70951-05	5 ml	0.1 ml	6
70951-10	10 ml	0.1 ml	6
VOLUMETRIC PIPETTES			
70952-01	1 ml	0.1 ml	6
70952-02	2 ml	0.1 ml	6
70952-05	5 ml	0.1 ml	3
70952-10	10 ml	0.1 ml	3
70952-25	25 ml	---	3
70952-50	50 ml	---	3



► Repetitive Syringe Dispenser

Syringe dispenser offers a fast and accurate way of dispensing multiple doses of a set volume. The volume delivered is determined by the volume-selector-dial and the size of the syringe chosen. A chart comes with the unit to help you to choose the size of syringe, volume, and the number of dispenses. The set dispenses 21 different volumes up to 58 times without refilling, with an accuracy of +/- 1.5% or better depending on the size of the syringe. All syringes are autoclavable, except 60ml size.

Technical Data: These tests (below) are based on water at a temperature of 25°C.

Syringes	Volume	Accuracy	Reproducibility
0.6 ml	10-50µl	+/-1.5%	<1.5% - <1.0%
1.5 ml	25-125µl	+/-1.2%	<1.0% - <0.8%
6.0 ml	100-500µl	+/-0.8%	<0.8% - <0.4%
15.0 ml	250-1250µl	+/-0.6%	<0.6% - <0.3%
60.0 ml	1000-5000µl	+/-1.0%	<1.0% - <0.5%

Dispensing Volumes:

Volume Adj't Number	Syringe Size			Max Number of Dispenses
	0.6ml	1.5ml	6.0ml	
1	10µl	25µl	100µl	58
2	20µl	50µl	200µl	28
3	30µl	75µl	300µl	18
4	40µl	100µl	400µl	13
5	50µl	125µl	500µl	10



Ordering Information:

72480	A set of one Dispenser and one each of 0.6ml, 1.5ml and 6.0ml Syringes	each
72482	Repetitive Syringe Dispenser Set	each
72483	0.6ml Syringe with tips	100/bx
72483	1.5ml Syringe with tips	100/bx
72484	6.0ml Syringe with tips	100/bx
72485	15ml Syringe with tips	50/bx
72486	60ml Syringe with adapter	50/bx
72487	Syringe Adapter, 60ml	each
72488	Syringe with Spacer for use with Microtiter Plates, 1.5ml	100/pk
72489	Syringe Assortment Pack, 20 each of 0.6, 1.5, 6.0, 15 and 60ml	100/pk

► Rubber Bulbs; Natural Rubber

For use with #70950 series of glass pipettes, 30mm length, 1ml capacity.



70980 Rubber Bulb 24/pk

► Safety Bulb

Rubber pipette filler. Natural rubber bulb allows safe, manual control of filling or discharging toxic liquids through a pipette by finger pressure (thus avoiding mouth contact). Guaranteed to be consistently flexible.



70982 Safety Bulb each
70984 Safety Bulb 4/lot

► Rota-Filler 3000™

The ideal pipette filler.

Adjustable – Patent-pending, five position adjustable nozzle for maximum pipetting control. Adjust nozzle to 0, 5, 10, 15 or 20°

Ergonomic – Curved, ergonomic grip for all-day comfort

Versatile – Use the adjustable speed dial or gravity mode

LCD Display – Easy to read, displays speed settings, mode and battery level

70955-01 RotaFiller 3000 each
70955-02 RF3000 Replacement Filters 5/pk



► **Pipetter Guide – Sliding Guide**

- Easily align a Pipetter with microplate wells using our Sliding Guide
- The Sliding Guide is clearly marked with row letters for fast and easy orientation
- Reduce eyestrain
- Adjust the guide height to accommodate flat or v-bottom microplate or PCR plates
- Compatible with multi-channel or single-channel pipettors

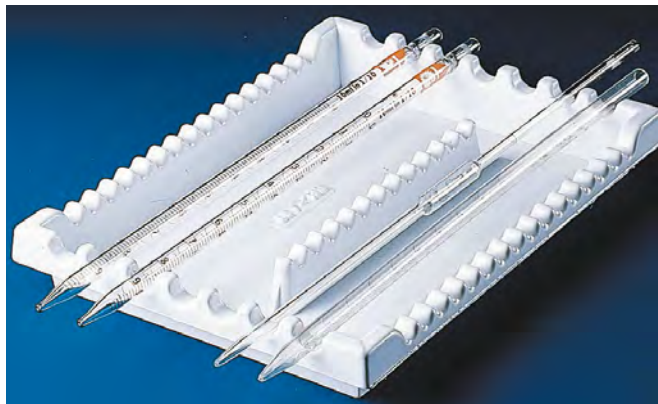


(70494-30 shown) with a 96-Well Color. Orienter (70491-11) for added pipetting ease

Cat. #	Description	Dimension	Qty.
70494-30	Single Place Sliding Guide	7 1/4" x 4" x 2"	Each
70494-40	Double Wide Sliding Guide	13 1/4" x 4" x 2"	Each

► **Pipette Support, Polystyrene**

This support is an efficient pipette rest and has an off-center support for short pipettes, syringes, etc. Measurement: 280mm(L) x 215mm(W) x 38mm(H).



70988 Pipette Support each

► **Angled Bottle Rest**

Compatibility – Ideal for use with a variety of pipets and pipettors, both manual and electronic.

Comfort – Reduces arm and wrist strain allowing pipetting at a comfortable 45° angle.

Ideally Sized – Unique design accommodates 200ml, 500ml and 1L square and round bottles.



70989-01 Angled Bottle Rest each

Electron Microscopy Sciences Announces their State of the Art
Scientific Equipment Repair Center



No equipment is too small or impossible to either
Repair, Refurbish, or Upgrade!

Our facility is equipped to handle the following Manufacturers:

- Balzers/Baltech
- Denton
- Edwards
- Emitech
- Emscope
- Bio-Rad
- Leica
- Reichert-Jung
- LKB
- RMC-Boeckeler
- And Many More...

Our unique service allows us to come to you, or you send the equipment to us, depending on the level of Repair/Refurbishment needed.

Equipment such as:

- Vacuum Systems
- Microtomes
- Ultramicrotomes
- Tissue Slicers
- Vibratomes
- Ovens
- Baths
- Shakers
- Tissue Processors
- Lynx
- Freeze Fracture Instruments
- High Pressure Freezers/Slammers/Propane Jet Freezers
- And Much More...

For more information on any of our services, a comprehensive quote, please call, write, or e-mail us today.

► Dissecting Tools and Instruments

► The Meyco Diamond Dissecting Scalpel Blade

**EMS
EXCLUSIVE**

We are aware that in order to achieve the finest results in your work, you continually have to search for the highest quality instruments. The quality that will allow you to meet the high demands of your respected field.

Here at **ELECTRON MICROSCOPY SCIENCES** we are dedicated to these needs. With this dedication in mind we have entered into an exclusive arrangement with our sister company, DIATOME Ltd., that enables us to offer you their experience in diamond instrument manufacturing. For many years DIATOME has been the leading manufacturer—"The Innovators" in diamond instruments for a variety of applications including, but not limited to; ULTRAMICROTOMY, FIBER OPTICS, AND EYE SURGERY.

DIATOME has now begun to manufacture for us diamond knives for microsurgery, dissection, and its related applications. The knives are of the same quality that DIATOME customers have become accustomed.

Distinctive designs combined with DIATOME'S expertise in diamond technology and manufacturing assures you the best quality knife and being able to use it for many years.

► Freehand Diamond Knife

Characteristics and Specifications:

- Our ultra-sharp blade cuts with minimum pressure, without tearing or damaging the specimen and reduces the risk of specimen distortion.
- Our UNIQUE PRESSURE MECHANISM allows blade actuation with one hand
- The handle is made of titanium and is coated by high vacuum with titanium nitride to harden the surface.
- The knife is corrosion free and is completely resistant to saline solutions.
- It can be sterilized in an autoclave up to 200°C.
- Special tray for sterilization is available
- If your diamond is damaged or broken, we can resharpen it or replace it and guarantee that the repaired knife will be of the same standards of perfection as the original.

The following cutting forms are available:

1) Type M; angled; .50mm thickness

72024 Diamond Dissecting Knife, Type M each

72024-R Resharpening, Type M each

72024-L Replacement Blade, Type M each

2) Type M-M; mini-angled; .20 thickness

For extremely fine work.

72025 Diamond Dissecting Knife, Type M-M each

72025-R Resharpening, Type M-M each

72025-L Replacement Blade, Type M-M each

3) Type L; lancet; .50 thickness

72026 Diamond Dissecting Knife, Type L each

72026-R Resharpening, Type L each

72026-L Replacement Blade, Type L each

4) Type M-L; mini-lancet; .20 thickness

For extremely fine work

72027 Diamond Dissecting Knife, Type M-L each

72027-R Resharpening, Type M-L each

72027-L Replacement Blade, Type M-L each

5) Type DL; double-lancet; .50mm thickness

72028 Diamond Dissecting Knife, Type DL each

72028-R Resharpening, Type DL each

72028-L Replacement Blade, Type DL each

6) Type M-DL; mini-double-lancet; .20 thickness

72029 Diamond Dissecting Knife, Type M-DL each

72029-R Resharpening, Type M-DL each

72029-L Replacement Blade, Type M-DL each

7) Type DS; tri-facet; .50mm thickness

72030 Diamond Dissecting Blade, Type DS each

72030-R Resharpening, Type DS each

72030-L Replacement Blade, Type DS each

8) Type M-DS; mini-tri-facet; .20mm thickness

72031 Diamond Dissecting Blade, Type M-DS each

72031-R Resharpening, Type M-DS each

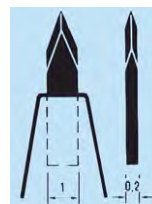
72031-L Replacement Blade, Type M-DS each

9) Type R; round; .30mm thickness

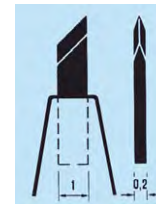
72032 Diamond Dissecting Blade, Type-R each

10) Type HR-S; half-round; .20mm thickness

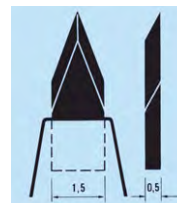
72033 Diamond Dissecting Blade, Type HR-S each



M / Angled



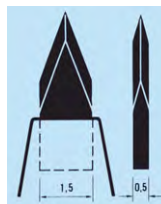
M-M / Mini Angled



L / Lancet



M-L / Mini Lancet



DL / Double-Lancet



M-DL / Mini Double Lancet



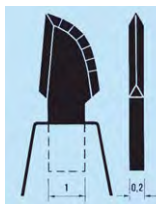
DS / Tri-Facet



M-DS / Mini-Tri-Facet



R / Round



HR-S / Half Round

► **Dissecting Kit, 8 pieces, Stainless Steel**

Kit includes:

- | | | |
|--|---|---|
| 1 4½" Dissecting forceps with curved and serrated tips | 1 4½" Dissecting forceps straight and serrated tips | 1 4½" Dissecting scissors, sharp, straight points |
| 1 Curved dissecting needle | 1 Dissecting scalpel, 6" long, 1½" cutting edge. | 1 Plastic ruler 6", ¼" div., millimeter and centimeter. |
| 1 Glass pipette with rubber bulb | | |

72950 Dissecting Kit set



► **Large Dissecting Kit**

Kit includes:

- | | | |
|--------------------------------------|---|--|
| 12 Scalpel Blades #11 with #3 Handle | 4½" Iris Scissors | Jaws Forceps |
| 6" (15mm) Clear Ruler | 5½" Dissecting Scissors | 5½" Straight Blunt tip Serrated Jaws Forceps |
| 6" long Light Small Probe, Blunt | Suture Hook | 2 mm Diameter Stainless Steel Punch |
| 5½" Kelly Hemostat, Straight | Set of Dissecting Needle, one Straight and one Bent | Large Wood Handle Spatula |
| 6¼" Kelly Hemostat, Straight | 4½" Straight Fine Point Serrated | |

72951-15 Large Dissecting Kit set



► **Dissecting Kit for Botany**

Kit includes:

- | | | |
|---|--|--|
| Dissecting teasing needle angular with metal chuck brass-chromed | Dissecting forceps 4.5" curved fine point with guide-pin | Glass dropper |
| Dissecting teasing needle straight with metal chuck brass-chromed | Dissecting forceps medium point 4.5" with guide-pin | Replacement dissecting needle straight, 6/pk |
| Ruler 6" | Dissecting Iris scissors 4.5" | Replacement dissecting needle angular, 6/pk |
| | Dissecting scalpel handle #3 | Vinyl storage, zippered case with liner. |
| | No. 10 scalpel blade, 10 pcs | |

72951-20 Dissecting Kit for Botany set



► **Anatomy Dissecting Kit 1**

Kit includes:

- | | | |
|--|--|---|
| Cartilage knife 2" blade | Iris dissecting scissors, 4.5" | Dissecting mall probe chrome, 6" |
| Dissecting scalpel 1.5"L blade | Dissecting scissor, 4.5", sharp/blunt points | Ruler 6" plastic, metric/English markings |
| Narrow blade scalpel 1.5"L blade | Dissecting teasing needle, straight, metal chuck | Dissecting chain & hook chrome |
| Dissecting forceps 4.5" with guide pin, medium points | Dissecting teasing needle, angular, metal chuck | Dissecting blow pipe, 6" |
| Dissecting forceps 4.5" with guide pin, curved, fine points. | | Double folded, vinyl storage case |

72951-25 Anatomy Dissecting Kit set



► **Anatomy Dissecting Kit 2**

Kit includes:

- | | | |
|--|--|---|
| Cartilage knife 2" blade | Iris dissecting scissors, 4.5" | Probe and hook, chrome |
| Dissecting scalpel handle #4 | Dissecting teasing needle, straight, metal chuck | Ruler 6" plastic, metric/English markings |
| Dissecting scalpel handle #3 | Dissecting teasing needle, angular, metal chuck | Dissecting chain & hook chrome |
| Scalpel blade #10, 1 piece | Dissecting forceps 4.5" with guide pin, fine points. | Dissecting blow pipe, 6" |
| Scalpel blade #24, 1 piece | Dissecting forceps 5" | Double folded, vinyl storage case |
| Dissecting scissor, 5.5", sharp/blunt points | | |

72951-30 Anatomy Dissecting Kit 2 set



► **Biology Dissecting Kit**

Kit includes:

- | | | |
|--|--|--|
| Dissecting mall probe, chrome, 6" | Dissecting forceps, 4.5", chrome plated | |
| Dissecting teasing needle, straight with metal chuck | Glass dropper | |
| Dissecting teasing needle, angular with metal chuck | Ruler 6", plastic, metric/English markings | |
| Dissecting scissors, 4.5" | Single folded vinyl storage case | |
| Dissecting scalpel | | |

72951-35 Biology Dissecting Kit set



► Razor Blades:

All types of razor blades are used extensively in the laboratory. We offer the widest assortment of blades at the lowest possible prices!



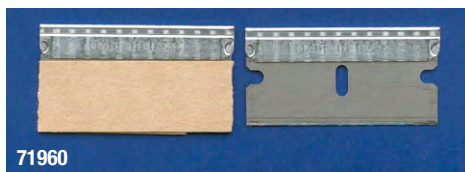
71940



71990



71950



71960



71974



► A. Injector Type

For Vibratome sectioning. Bulk packed or in a handy dispenser.

Uncoated Carbon Steel, 0.13" thick, 1½" long, ⅝" wide.

71940	Injector Type	500/bx
-------	---------------	--------

■ Same as #71940, but Stainless Steel PTFE Coated, .010" thick, packed 20 blades in a dispenser.

71990	Injector Blade in a Dispenser	box
71991	Injector Blade in a Dispenser	10/lot

► B. Single Edge, Gem Scientific

Carbon Steel, .009" thick, 1½" x ¾" size, packed 10 blades in a dispenser.

71950	Single Edge, GEM, Dispenser	box
71951	Single Edge, GEM, Dispenser	12/lot

► C. Single Edge, Carbon Steel, Regular Type, .009" thick

1½" x ¾" size, packed 100 blades in a drawer box.

71960	Single Edge Carbon Steel	box
71961	Single Edge Carbon Steel	10/lot

NEW: These blades come in a washed version (unwrapped) in a clamshell which reduces the amount of foreign material on the blade. Clean room classified.

71960-WA	Single Edge Carbon Steel, Washed Version, in Clamshell	115/pk
71961-WA	Single Edge Carbon Steel, Washed Version, in Clamshell	115/pk

■ Same as #71960, but PAL Extra-Keen Carbon Steel Blue blade offering long-lasting edge.

71974	Single Edge, PAL Extra Keen	100/pk
71975	Single Edge, PAL Extra Keen	10/lot

■ Same as #71960, but GEM Extra Keen type, Carbon Steel, packed 100 blades in a drawer box.

71962	Single Edge, GEM Extra Keen	box
71963	Single Edge, GEM Extra Keen	10/lot

NEW: These blades come in a washed version (unwrapped) in a clamshell which reduces the amount of foreign material on the blade. Bulk Packed.

71962-WA	Single Edge, PAL Extra Keen, Washed Version, Bulk	240/pk
71963-WA	Single Edge, PAL Extra Keen, Washed Version, Bulk	240/pk

■ Same as #71960, but heavy duty blade, .012" thick, Carbon Steel, packed 100 blades in a drawer box.

71964	Single Edge, Heavy Duty	box
71965	Single Edge, Heavy Duty	10/lot

► D. Single Edge, Gem PTFE Coated

■ Stainless Steel, Extra Keen, measures same as #71960. Packed 100 blades in a drawer box.

71970	Single Edge, GEM PTFE Coated	box
71971	Single Edge, GEM PTFE Coated	10/lot

NEW: These blades come in a washed version (unwrapped) in a clamshell which reduces the amount of foreign material on the blade. Clean room classified.

71970-WA	Single Edge, GEM PTFE Coated, Washed Version, in Clamshell	115/pk
71971-WA	Single Edge, GEM PTFE Coated, Washed Version, in Clamshell	115/pk

■ Same as #71970, GEM Uncoated. Stainless Steel, Extra Keen. Packed 100 blades in a drawer box.

71972	Single Edge, GEM Uncoated	box
71973	Single Edge, GEM Uncoated	10/lot

► E. Single Edge, Extra Long

- Sharp edge with better handling.
- Stainless Steel, .009" thick, 2¼"x½" size, packed 250 blades in a removable slide box.

71980	Single Edge Extra Long	box
71981	Single Edge Extra Long	5/lot

- Same as #71980, but super strong and super sharp. Made by SOLINGEN Carbon Steel, highest quality of stainless steel available. Packed 100 blades in a box.

71930	Solingen Long Blades	box
71931	Solingen Long Blades	5/lot



► F. Double Edge, Personna

Stainless steel; PTFE coated. PERSONNA brand .004" thick, wrapped individually, 250 blades in a box.

72000	Double Edge Coated Blade	box
72001	Double Edge Coated Blade	10/lot

NEW: These blades come in a washed version (unwrapped) in a clamshell which reduces the amount of foreign material on the blade. Clean room classified.

72000-WA	Double Edge Coated Blade, Washed Version	250/pk
72001-WA	Double Edge Coated Blade, Washed Version	250/pk
71998	Double Edge Non-Coated Blade	box



► G. Double Edge Razor Blades

FEATHER® Brand

Made from carbon steel. Feather® blades are well known to have super sharp edges. Easily breaks in half for use with any tissue slicing machine, or break smaller portions for use as a micro-scalpel with our Blade Breaker & Holder. (Catalog numbers 72005-20, 72005-24). Blades are available in packages of 10 blades per box or 500 blades per box.

Measurements: Width: 21.95mm (0.865") x Length: 42.96mm (1.69")

Thickness: 0.10mm (0.004")

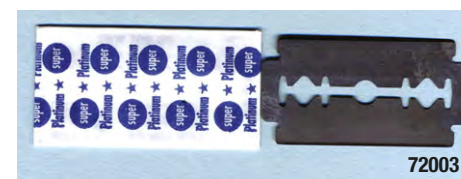
72002-01	Feather Double Edge Blade	10/bx
72002-10	Feather Double Edge Blade	500/bx



► H. Double Edge Razor Blade Platinum Coated

Made from stainless steel, coated with Platinum. Super-sharp-edges. Measures: 42.96 mm (1.69") L x 21.95 mm (0.865") W x 0.10 mm (0.004") Thickness.

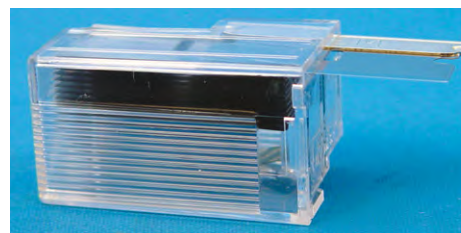
72003-01	Platinum Coated Double Edge Blade	100/bx
72003-10	Platinum Coated Double Edge Blade	10 bxs/lot



► I. Single Edge Razor Blade for Clean Rooms

These blades (and dispenser springs) are degreased in order to minimize particulates and residual grinding oils on the blades. The blades are made from surgical stainless steel (significantly more durable than carbon steel) with a steel back that produces less particulate than the aluminum back type. Packed 10 blades per dispenser, 200 dispensers per case. The blade (including steel back) measures 39 mm x 19 mm x 0.23 mm thick (1½" x ¾" x 0.009").

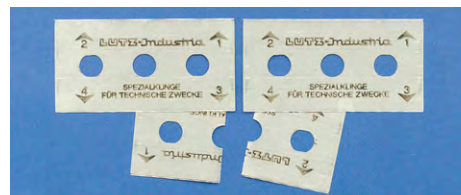
71952-01	Blade for Clean Rm., 10/Disp.	each
71952-10	Blade for Clean Rm., 10/Disp.	10/pk



► J. Breakable Double Edge Razor Blades

Breakable double edge razor blades made from carbon steel. The blades break easily and cleanly. Rectangular shape, square ends. Measures 43mm(L) x 22.2mm (W) x 0.10mm (T). Packaged 100 blades in a box.

72004	Breakable Double Edge Blades	box
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► K. WecPrep Blades

Single edge, carbon steel razor blades which are long and very stable. Used for mincing and all other specimen preparation work.

Blade Width: 2.25" (57.15mm); Blade Thickness: .011" (.279mm)

71933-50	WecPrep Blades	50/pk
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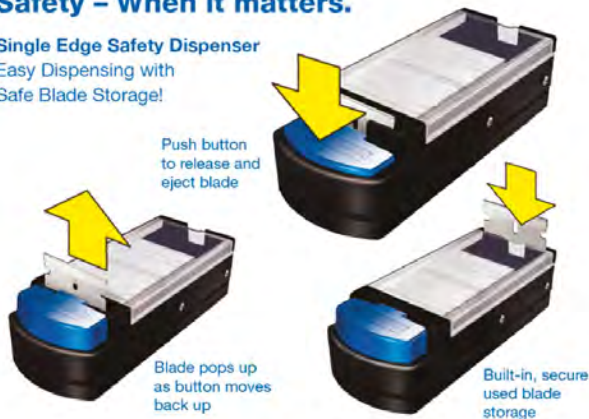


► L. Gem 3 Facet Aluminum Back SE Safety Dispenser

Sharp edge with better handling. Stainless Steel, .009" thick, 2¼"x½" size, packed 100 blades in a Dispenser. These blades offer precision, sharpness and safety and come in a dispenser which offers you safety

Safety – When it matters.

Single Edge Safety Dispenser
Easy Dispensing with
Safe Blade Storage!



Dispenser Options

- Gem Scientific Blade
- 3 Facet Blade
- Aluminum Back
- Uncoated
- Safety Dispenser pushes blades out backing first for safety
- On board used blade storage

71967	Gem 3 Facet Aluminum Back SE Safety Dispenser	each
71967-CS	Gem 3 Facet Aluminum Back SE Safety Dispenser	5/lot

► M. Razor Blade in Dispenser and Used Blade Storage Box in One

These GEM single edge carbon steel razor blades (0.009" thick) are in a compact, safe, pop-up blade dispenser and used blade storage all in one unit.



- Safe, easy to remove blade when needed
- Secure used blade storage in rear of unit
- Clear see through cover reveals remaining blades
- Push button dispenses blades
- 100 blades in dispenser

71955-01	Razor Blade in Dispenser/Used Storage Box in One	each
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► Feather™ Scalpel Blades Selection

► 1. Scalpel Handle with Blade; Disposable

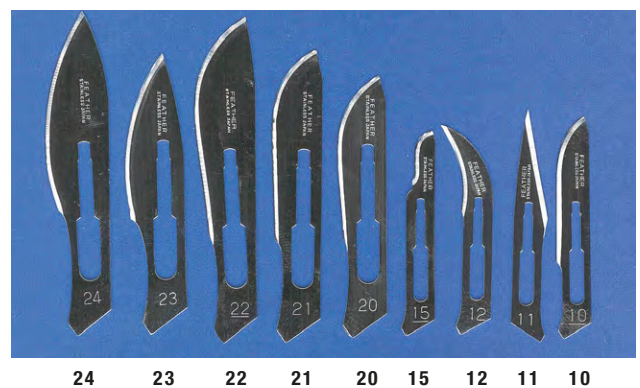
Made by Feather. Sterile, stainless steel disposable scalpels with a handle. They are packed in aluminum foil, and are available in a variety of sizes.



Cat.#	Description	Qty/Box
72042-10	Disposable Scalpel Set #10	20/bx
72042-11	Disposable Scalpel Set #11	20/bx
72042-12	Disposable Scalpel Set #12	20/bx
72042-15	Disposable Scalpel Set #15	20/bx
72042-20	Disposable Scalpel Set #20	20/bx
72042-21	Disposable Scalpel Set #21	20/bx
72042-22	Disposable Scalpel Set #22	20/bx
72042-23	Disposable Scalpel Set #23	20/bx
72042-24	Disposable Scalpel Set #24	20/bx

► 2. Scalpel Blades/Feather

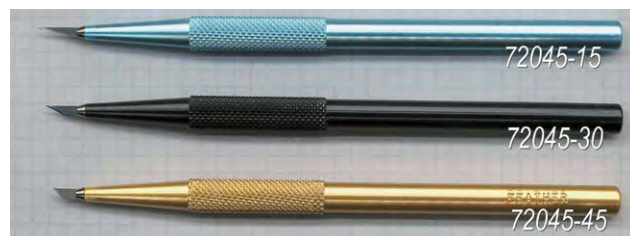
Sterile, stainless steel surgical scalpel blades, wrapped individually.



Cat.#	Description	Qty/Box
72044-10	Sterile Scalpel Blades #10	100/bx
72044-11	Sterile Scalpel Blades #11	100/bx
72044-12	Sterile Scalpel Blades #12	100/bx
72044-15	Sterile Scalpel Blades #15	100/bx
72044-20	Sterile Scalpel Blades #20	100/bx
72044-21	Sterile Scalpel Blades #21	100/bx
72044-22	Sterile Scalpel Blades #22	100/bx
72044-23	Sterile Scalpel Blades #23	100/bx
72044-24	Sterile Scalpel Blades #24	100/bx

➤ 3. Feather; Sterile MicroScalpels; Stainless Steel

- Micro precision, ultra sharp, points.
- Sure-grip aluminum or plastic handle-color coded for easy angle identification.
- Sterilized by gamma irradiation.
- Disposable.
- Available in 3 angle styles: 15, 30 and 45°.
- Comes in a carbonate plastic case.



Cat.#	Description	Blade Thickness	Qty
72045-15	Feather Micro Scalpel, 15°, Al Handle	0.1mm	5/bx
72045-30	Feather Micro Scalpel, 30°, Al Handle	0.1mm	5/bx
72045-45	Feather Micro Scalpel, 45°, Al Handle	0.1mm	5/bx
72046-15	Feather Micro Scalpel, 15°, Plastic Handle	0.1mm	5/bx
72046-30	Feather Micro Scalpel, 30°, Plastic Handle	0.1mm	5/bx
72046-45	Feather Micro Scalpel, 45°, Plastic Handle	0.1mm	5/bx

➤ 4. Scalpel Handles/Feather

- Handle #3; 100mm long, flat with corrugated grip. For use with scalpel blades #10, #11, #12 and #15.
- Handle #4; 105mm long, flat with corrugated grip. For use with scalpel blades #20, #21, #22, #23, and #24.
- Handle #7; 140mm long, slender, contoured with corrugations. For use with scalpel blades #10, #11, #12, and #15



Cat. #	Description	Qty.
72040-03	Scalpel Handle #3	each
72040-04	Scalpel Handle #4	each
72040-07	Scalpel Handle #7	each

➤ 5. Microsurgical Knife - Premier Edge™

Made from tool steel wire. Sharpened to microsurgical quality. The knife-edges are available in three different configurations: 45, 30 and 15 degrees angle. The handle is plastic and they come sterile and in a blister pack individually, 6 blister packs to a box.



Cat.#	Description	Blade Thickness	Qty
72047-15	Microsurgical Knife, 15°	0.11–0.19mm	6/bx
72047-30	Microsurgical Knife, 30°	0.11–0.19mm	6/bx
72047-45	Microsurgical Knife, 45°	0.11–0.19mm	6/bx

➤ Disposable Mini Scalpel - Sterile

Feather® Disposable Mini Scalpels are made from heat-treated stainless steel. The blades are smaller than standard blades, come with chemical resistant, slender plastic handle. Handle is 5¾" (145mm) long. Available in three popular styles: #11, #14 and #15, and packaged in a sterile pouch, 20 per box. ISO 14001 compliant, ISO 9001 certified and ISO13485 certified.



Cat. #	Description	Qty.
72041-11	Disposable Scalpel, Mini, #11	20/pk.
72041-14	Disposable Scalpel, Mini, #14	20/pk.
72041-15	Disposable Scalpel, Mini, #15	20/pk.

➤ Feather® Safeshield™

Disposable Scalpel – Sterile

Made from heat-treated stainless steel, these scalpels are excellent for delicate precise procedures. They fit the hand comfortably and are designed with safety in mind. They reduce injury and transmitted disease from contaminated blades. They feature a clear protective, retractable shield and have a color coded button on the protective shield which assists with blade size identification.

Individually packaged, 10 per box.



Cat. #	Description	Qty.
72043-10	Feather® Safeshield™ Blade #10	10/pk.
72043-11	Feather® Safeshield™ Blade #11	10/pk.
72043-14	Feather® Safeshield™ Blade #14	10/pk.
72043-15	Feather® Safeshield™ Blade #15	10/pk.
72043-15C	Feather® Safeshield™ Blade #15C	10/pk.
72043-20	Feather® Safeshield™ Blade #20	10/pk.
72043-21	Feather® Safeshield™ Blade #21	10/pk.
72043-22	Feather® Safeshield™ Blade #22	10/pk.
72043-23	Feather® Safeshield™ Blade #23	10/pk.
72043-24	Feather® Safeshield™ Blade #24	10/pk.
72043-25	Feather® Safeshield™ Blade #25	10/pk.

► BD* Carbon Steel Scalpel Blade 60

Made from surgical carbon steel, size 60 with convex cutting edge. The most useful in histology labs.



These scalpel blades are 2 1/8" (6cm) long and ribbed for extra rigidity. They are non-sterile and are wrapped individually. Bard-Parker brand.

72050-10 #60 Scalpel Blade (BD #371340) 150/cs

► BD* Disposable Blade Knife Handles



These strong, molded plastic handles provide a secure palm-fitting grip for postmortem work, trimming light plaster casts, and similar forceful cutting. Handle size #6 and #8 Bard-Parker* brand. Handles are sold separately from the interchangeable listed above.

Use blade sizes 10, 11, 12, 15 for handle size 5. Use blade sizes 20, 21, 22, 23 for handle size 6. Use blade size 60 for handle size 8

Cat.#	Size/Length	Pack
72040-05	#5/ 4 1/8" (12.4cm)	each
72040-06	#6/ 5 1/8" (13.1cm)	each
72040-08	#8/ 5 3/8" (13.4cm)	each

► Graduated Scalpel Handle #3



This #3 scalpel handle comes with metric graduations.

72040-30 #3 Graduated Scalpel Handle each

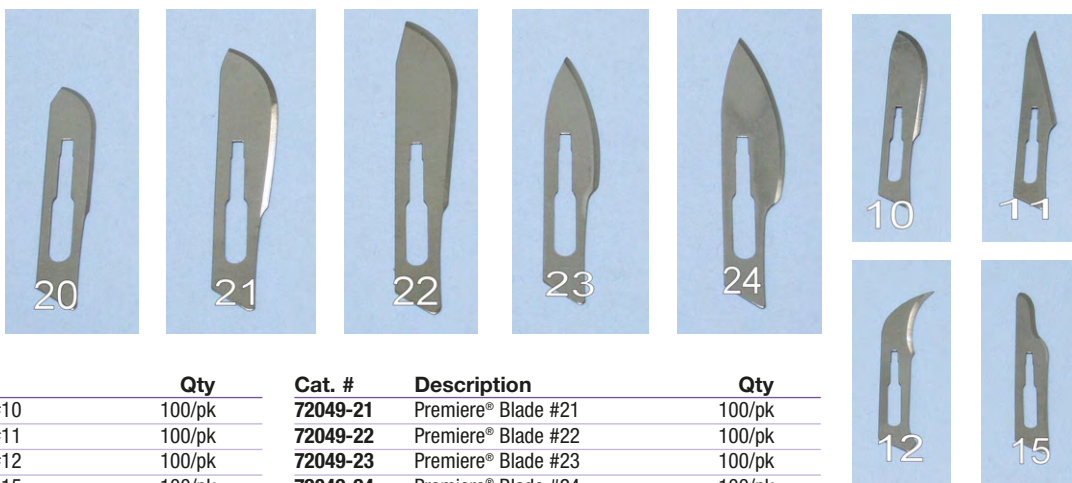
► Scalpel Handles

Made from carbon steel for the blades below.

Cat. #	Description	Qty
72051-3	Scalpel Handle #3	1/pk
72051-4	Scalpel Handle #4	1/pk

► Scalpel Blades

Premiere® Blades are made from carbon steel, individually foil wrapped and gamma radiation sterilized. They are exceptionally strong and relatively uniformity sharp, ideal for routine laboratory dissecting, tissue mincing and where you do not need high cost blades.



Cat. #	Description	Qty	Cat. #	Description	Qty
72049-10	Premiere® Blade #10	100/pk	72049-21	Premiere® Blade #21	100/pk
72049-11	Premiere® Blade #11	100/pk	72049-22	Premiere® Blade #22	100/pk
72049-12	Premiere® Blade #12	100/pk	72049-23	Premiere® Blade #23	100/pk
72049-15	Premiere® Blade #15	100/pk	72049-24	Premiere® Blade #24	100/pk
72049-20	Premiere® Blade #20	100/pk	72049-25	Premiere® Blade #25	100/pk

► Disposable Scalpel Sets

High quality carbon steel is mounted on plastic handle, individually foil wrapped and sterilized by gamma irradiation. Packed 10 each /box. They are exceptionally strong and relatively uniformity sharp, ideal for routine laboratory dissecting, tissue mincing and where you do not need high cost blades

Cat. #	Description	Qty
72052-10	Scalpel Handle Set #10	10/pk
72052-11	Scalpel Handle Set #11	10/pk
72052-15	Scalpel Handle Set #15	10/pk
72052-20	Scalpel Handle Set #20	10/pk
72052-22	Scalpel Handle Set #22	10/pk

► The EMS Hobby Blade and Handle

Hobby blades are used in a wide range of applications

due to the simple but precise cutting tip. These 0.021" carbon steel blades fit most standard handles. They are precision ground for sharpness and durability.

The Handles are made from aluminum Construction for durability and they have a 4 jaw check which holds the blade securely

Blades are packaged 100 per box, 10 boxes per case.

Cat. #	Description	Qty
71982	Hobby Time Blades	100/Box
71982-CS	Hobby Time Blades	10 Bx/Case
71982-HD	Hobby Time Handle	each

► Scalpel Blade Remover

This device is designed for safe and easy removal of used disposable blades from any size or type of scalpel handle. It improves safety and hygiene by the elimination of direct hand-blade contact. Depending on the size, it can store 150-300 used blades.



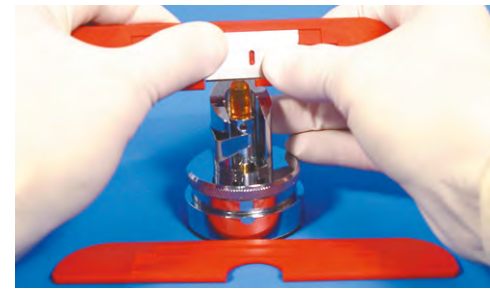
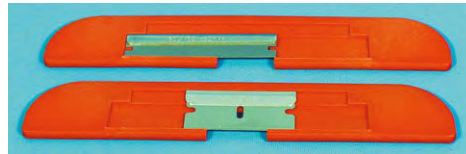
72070	Scalpel Blade Remover	each
72071	Scalpel Blade Remover	5/pk

► Trimaide; Safety Aid

**EMS
EXCLUSIVE**

A razor blade holder for trimming blocks. Holds all types of razors.

It gives you a better hold on the blade while you trim your blocks. The blade slides sideways in the holder allowing use of the entire edge. **IT PROTECTS FINGERS!!!**



72550	each
72560	1 dozen

► Sapphire Knife

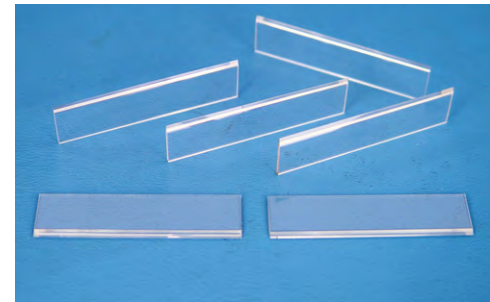
A unique high-precision knife for use with all Vibratomes and Tissue Sectioners, as well as our Oscillating Tissue Slicers, EMS 4000 and EMS 5000.

Our Sapphire Knife offers smooth, consistent and thinner sections than are usually obtainable with stainless steel blades. The blade allows for sectioning as thin as 10 microns. Offering many years of cutting surface, the durability of our sapphire knife far outlasts other comparable blades on the market.

Specifications:

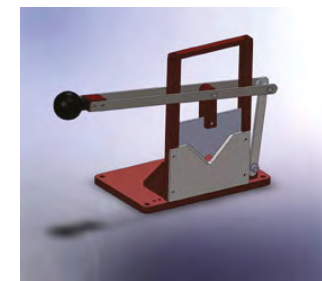
Material: Synthetic Single Crystal Sapphire Size: 1.5" x 0.4" x .03"

93060	Sapphire Blade/Knife	each
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► Classic Guillotine

- Hand-honed stainless steel blades decapitate rats, mice and other small animals instantly, with one stroke.
- Can be completely washed without disassembly.
- Reversible handle allows for right- or left-handed operation.
- Opening is 1.75" along each side.
- Base can be mounted to a bench or board.

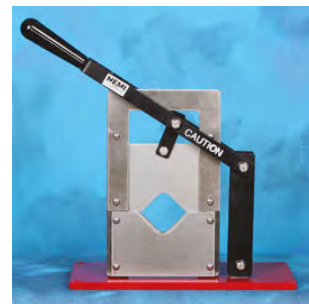


Cat. No.	Description	Qty.
93251	Classic Guillotine	each

► Nemi Guillotine

- Manufactured with the highest-quality materials
- Replacement blades available for all models
- Can be used with optional mounting plates
- Cost effective

Cat. No.	Description	Qty.
93252	Rats & Mice, 2" opening along side	each
93253	Rats & Mice, 4" opening along side	each
93254	Larger Subjects, 6" opening along side	each
93255	Replacement Blade only, 6" opening along side	each
93256	Replacement Blade only, 2" opening along side	each
93257	Replacement Blade only, 4" opening along side	each



For Rats & Mice

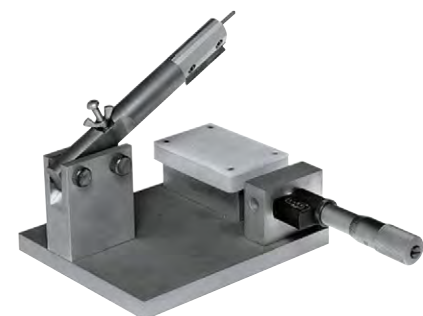


For Larger Subjects

► The EMS Tissue Chopper

The TC-1 Tissue Chopper is designed to facilitate the cutting of 100-1000 micron thick brain tissue slices for use in recording experiments. The chopper includes a guillotine arm with adjustments to assure blade alignment. The brain sample is moved in respect to the arm with a stage whose position can be read with 2 to 3 micron precision on a digital micrometer scale. The stage is made with a removable "PTFE" surface plate to facilitate cleaning.

93100	TC-1 Tissue Chopper	each
93102	TC-1 Tissue Chopper with electronic digital micrometer	each
93110	Replacement "PTFE" Plate	each



► Saw; Jewelers

Swiss-made; A fully adjustable frame with a depth of 2¼" (57mm) that permits the tightening of the blade as well as using broken blades. Comes with 12 blades, size 3/0

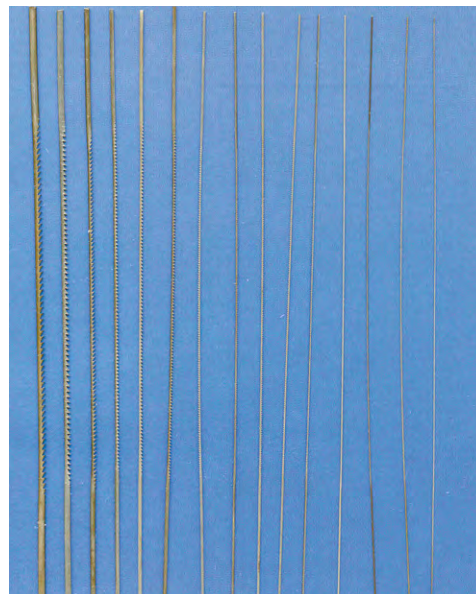
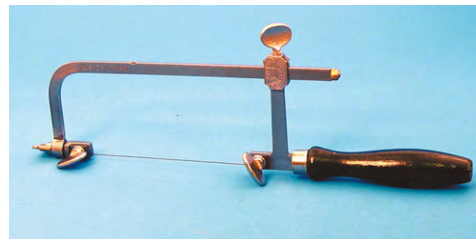
72010 Jewelers Saw Frame with 12 Blades each

For your reference, the following is the Chart of Sizes of the jewelers saw blades. Each blade has an overall length of 5¼" (133mm)

Size	Thickness		Width		Teeth per	
	inch	mm	inch	mm	inch	cm
8/0	.006	0.15	.013	0.33	84	33
7/0	.007	0.18	.014	0.36	84	33
6/0	.007	0.18	.014	0.36	76	30
5/0	.008	0.20	.016	0.41	66	26
4/0	.009	0.23	.017	0.43	64	25
3/0	.010	0.25	.019	0.48	57	22
2/0	.010	0.25	.021	0.53	53	21
1/0	.011	0.28	.023	0.58	51	20
1	.012	0.30	.025	0.64	47	19
2	.013	0.33	.027	0.69	44	17
3	.014	0.36	.029	0.74	40	16
4	.015	0.38	.031	0.79	37	15
5	.016	0.41	.033	0.84	35	14
6	.017	0.43	.037	0.94	33	13
8	.020	0.51	.045	1.14	28	11
10	.024	0.61	.053	1.35	24	10
12	.024	0.61	.065	1.65	20	8

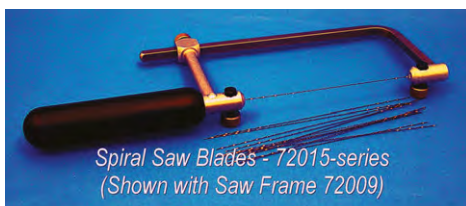
72020-04	Saw blades, size 4/0	1 dz
72020-03	Saw blades, size 3/0	1 dz
72020-02	Saw blades, size 2/0	1 dz
72020-01	Saw blades, size 1/0	1 dz
72020-10	Saw blades, size 1	1 dz

All other sizes listed above are available upon request.



12 10 8 6 5 4 1 1/0 2/0 3/0 4/0 5/0 6/0 7/0 8/0

Slicers; Oscillating Tissue See Equipment section, pages 990-997 >>>>



► Spiral Saw Blades

Swiss made saw blades. Cuts in any direction. Used for cutting rubber, plastics, wax, plaster, and similar materials.

Cat. #	Size	Diameter		Quantity
		(in)	(mm)	
72015-02	2/0	.0204	.52	12/pk
72015-01	1/0	.0220	.56	12/pk
72015-10	1	.0240	.61	12/pk
72015-20	2	.0276	.70	12/pk

► Diamond Wire

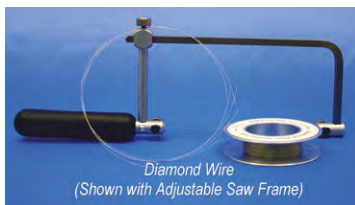
SuperLok™ Diamond Wire starts with tensile core wire. This wire is specially drawn to Diamond Wire Technology specifications. It is heat-treated, stretched, and has a

tensile strength in excess of 400,000 pounds. The diamond wire has an added electro copper sheath in which the diamonds, from 20 to 120 microns in size are impregnated. An additional overstrike is applied to provide greater bonding to the core. Diamond wire technology uses electronic measuring equipment to guarantee consistency in diamond impregnation. The wire has an average diameter of 0.008" (0.20mm).

The wire is cut to 6" (150mm) in length.

This diamond wire may be used with the Saw Frame #72009 shown above.

Cat. #	Description	Quantity
72009-10	Diamond Wire	10/pk

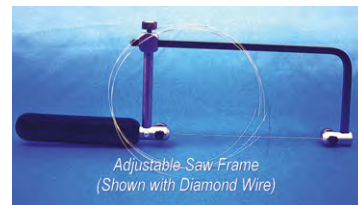


► Adjustable Saw Frame

A Swiss made saw frame lightweight and perfectly balanced. Its ergonomic wooden handle reduces fatigue and provides greater dexterity. Patented blade-lock design eases blade insertion and maintains perfect alignment which eliminates wobble and reduces blade loss during use. It measures 2¼" (70mm) deep and accepts saw blades up to 1.2mm diameter and 130mm long.

This Saw Frame may be used ideally with the Diamond Wire and Spiral Saw Blades shown below.

Cat. #	Description	Quantity
72009	Deluxe Saw Frame	each



► Matrices

► Tissue Matrices; (TM)

The Tissue Matrix is designed to aid the basic research scientist in the free-hand dissection of a wide variety of different tissues and repeatedly slice fresh tissue at intervals as small as 1mm. The TM's are constructed from high grade aluminum to allow for rapid temperature equilibration, ease of cleaning or sterilization and withstand the rigors of daily use.

Features:

- Channels at 1mm intervals
- Channel width is .3mm
- Removable end caps
- Available in 3 basic configurations

Applications:

Biochemical Pharmacology: The reproducible removal of small regions for biochemical analysis, such as the determination of drug and metabolite concentrations. Individual tissues may be either dissected or micropunched from slices formed.

Anatomy: Precise blocking of tissue prior to microtome sectioning.

Physiology: Reproducible blocking prior to vibratome sectioning enzymatic dispersion.

Overall Measurements: 90mm(L) x 36mm(W) x 37mm(H)

Cat. #	Cavity Size,	Tissue Shape
69010	TM 10mmx10mm	Rectangular
69011	TM 15mmx15mm	Rectangular
69012	TM 20mmx20mm	Rectangular
69013	TM 25mmx25mm	Rectangular
69014	TM 10mm Diameter	V-Shaped Block
69015	TM 4mm diameter	Spherical
69016	TM 6mm diameter	Spherical

► Rodent Brain Matrices; (RBM)

RBM are designed for similar purposes as the above TM but only for rodent brains. It allows the investigator to slice either coronal (perpendicular to center line) or sagittal (parallel to center line) sections through the brain at intervals as small as 1mm. All RBM's are identical and durable to insure reproducible sections in the day-to-day, year-to-year, or on a between laboratory basis.

Applications:

Biochemical Pharmacology: The reproducible removal of small brain regions (i.e. discrete terminal fields or nuclei) for biochemical analysis, such as the determination of neurotransmitter and metabolite concentrations. Individual brain areas may be either dissected or micropunched from the slices formed.

Anatomy: Precise blocking of the brain prior to microtome sectioning.

Neurophysiology: Reproducible blocking of the brain prior to vibratome sectioning.

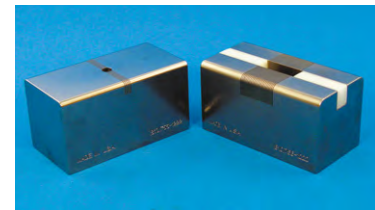
Technical Data:

The RBM's are constructed from high grade zinc to allow for rapid temperature equilibration, easy cleaning, and sterilization. The matrices are designed to accommodate the brains of rodents placed ventral side up. The channels are precisely cut at 1mm intervals and 0.3mm wide.

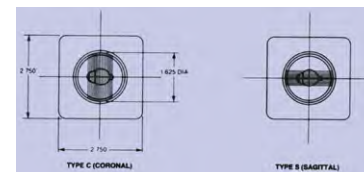
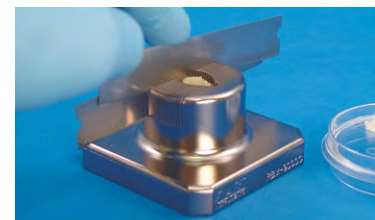
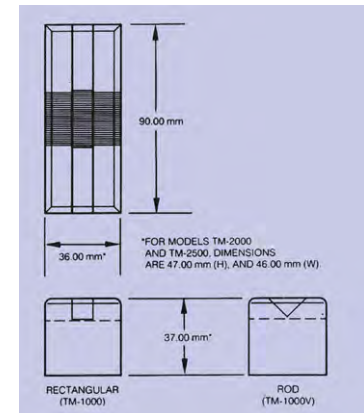
Overall Measurements: 2.75"x2.75"x1.5"H

Cat. #	Description*	Cat. #	Description*		
69020	RBM, Gerbil, 70g, Coronal	each	69040-C	RBM Adult Rabbit, Coronal	each
69021	RBM, Gerbil, 70g, Sagittal	each	69040-S	RBM Adult Rabbit, Sagittal	each
69022	RBM, Mouse, 30g, Coronal	each	69041-C	RBM Rat Pup, 30g, Coronal	each
69023	RBM, Mouse, 30g, Sagittal	each	69041-S	RBM Rat Pup, 30g, Sagittal	each
69024	RBM, Rat, 125g-185g, Coronal	each	69042-C	RBM Hamster, 100g, Coronal	each
69025	RBM, Rat, 125g-185g, Sagittal	each	69042-S	RBM Hamster, 100g, Sagittal	each
69026	RBM, Rat, 200g-400g, Dorsal-Ventral	each	69046-C	RBM Monkey, Adult Rhesus, Coronal (40 Slots @ 2mm)	each
69026-C	RBM Adult Rat, 200g-400g, Coronal	each	69047-C	RBM Adult Dog, Coronal (40 Slots @ 2mm)	each
69026-S	RBM Adult Rat, 200g-400g, Sagittal	each	69048-C	RBM Adult Cat, Coronal (35 Slots @ 2mm)	each
69027-C	RBM Adult Guinea Pig, 350g, Coronal	each	69049	RBM Cat Heart Matrix, Adult, 2mm Slices	each
69027-S	RBM Adult Guinea Pig, 350g, Sagittal	each	69050-C	RBM Rat Heart Matrix, Adult, 1mm Slices	each
69029-C	RBM Adult Ferret, Coronal	each	69051-C	RBM Rabbit Heart Matrix, Adult, 2mm Slices	each
69029-S	RBM Adult Ferret, Sagittal	each			

*Common animal name, animal weight, slice orientation



Tissue & Rodent Matrices



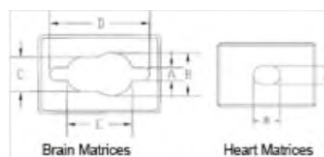
Optional Sizes: Tissue dissection matrices are available in any type or size on request (i.e. heart, kidney, lung, liver, eye...). Please inquire for further information and pricing.

Optional matrices available: Turkey Brain Matrix, Chicken Brain Matrix, Canary Brain matrix, Rabbit Heart Matrix, Rat Heart Matrix.

► Stainless Steel Brain & Heart Matrices with 0.5mm Thick Slices

When your rodent brain, heart, and other similar organs need to be sliced as thin as possible, these new stainless steel matrices with 0.5mm channel, you can manually achieved these slices - coronal or sagittal - with ease.

- Made of high-quality stainless steel
- Accurate sectioning
- They can repeatedly use, cleaning, autoclave and frozen
- Easy cleaning and easy handling.
- Produce fine slices

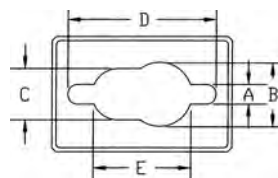


Cat. #	Product	Dimensions (mm)					Cavity Depth
		A	B	C	D	E	
69090-C	Mouse Coronal (40-75g)	3.18	11.1	8.73	19.1	12.2	7.4
69090-S	Mouse Sagittal (40 - 75g)	3.18	11.1	8.73	19.1	12.2	7.4
69091-C	Small Rat Coronal (175 - 300g)	4.76	15.9	12.7	36.6	23.8	7.61
69091-S	Small Rat Sagittal (175 - 300g)	4.76	15.9	12.7	36.6	23.8	7.61
69092-C	Large Rat Coronal (300 - 600g)	4.76	19.8	14.7	36.6	24.7	10.91
69092-S	Large Rat Sagittal (300 - 600g)	4.76	19.8	14.7	36.6	24.7	10.91
69095-H	Mouse Heart	8.3	12.1	—	—	—	4.8
69096-H	Rat Heart	12.7	19.8	—	—	—	9.6

► Acrylic Matrices

- Highly polished
- Precision machined
- Precise blocking of the brain
- Reproducible 1 mm segments
- Cost saving

Low cost acrylic matrices are precisely machined and highly polished to ensure reproducible results. These matrices allow the investigator to slice either coronal (perpendicular to center line) or sagittal (parallel to center line) sections through the brain at 1 mm intervals.

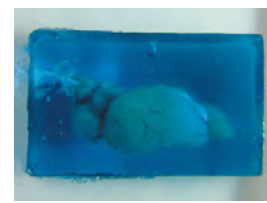
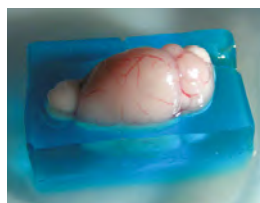


Cat. #	Product	Dimensions (mm)					Cavity Depth
		A	B	C	D	E	
69080-C	Mouse Coronal (40-75g)	3.18	11.1	8.73	19.1	12.2	7.4
69080-S	Mouse Sagittal (40 - 75g)	3.18	11.1	8.73	19.1	12.2	7.4
69081-C	Small Rat Coronal (175 - 300g)	4.76	15.9	12.7	36.6	23.8	7.61
69081-S	Small Rat Sagittal (175 - 300g)	4.76	15.9	12.7	36.6	23.8	7.61
69083-C	Large Rat Coronal (300 - 600g)	4.76	19.8	14.7	36.6	24.7	10.91
69083-S	Large Rat Sagittal (300 - 600g)	4.76	19.8	14.7	36.6	24.7	10.91

► Brain Blocker One™

A Perfect Cryosectioning Method — Brain Blocker One™ with these features:

- Easily reproducible alignment in atlas planes
- Section one or multiple brains with each knife pass
- Time saving in Tissue sectioning
- Time saving in Microscope analysis



Brain Blocker One is a set of gel blocks, left and right half, with an internal cavity cast originally an actual mouse brain. Drop a fresh or fixed brain in to displace the liquid in the one half cavity, add another half on top and the brain is now fully encased, as if it had been embedded. The brain cavity is in stereotaxic orientation, top surface of the gel parallel to skull flat. The gel expands slowly with hydration, and the cavity accommodates different brain sizes simply by the length of the presoak time, 1 to 4 hours for fresh adult brain, less for fixed or young brain, more for aged brain.

The entire block can be frozen and sectioned. The cryostat pedestal need never be readjusted from parallel to the blade plane of motion, and every brain will come out sectioned in the same plane as the atlas.

Multi-blocks can be frozen and mounted on the same pedestal together. Each pass of the cryostat knife, produces the same thickness sections, same orientation from every brain are mounted on that pedestal. Up to 24 brains can be sectioned with each pass of the knife using the whole body cryostat and Macro Tape Transfer system.

Gels will come in packages of 12 pairs, slightly dehydrated. Soak in water, saline, or buffer to fit the brains.

69100	Brain Blocker One™ Mouse Brain	12/pk
69102	Brain Blocker One™ Rat Brain	12/pk

Brain Blocker One™ is trade mark of McCormick

► Brain Matrix Razor Blades:

These razor blades are specifically made to work and fit all of our Brain Matrices. They measure 118mmx19mmx.2286mm(4.65x.75x.0089"). They are packed 25 blades in a box.

70933-70	Brain Matrix Blades	25/pk
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► Sampling Tools – Harris Micro-Punch™ and Harris Uni-Cores™

The Harris Micro-Punch™ and Uni-Cores are designed to serve research scientists with a dissection tool for small pre-defined regions of the tissue or the specimen.

Applications

- **Forensic** — Punch cut, retrieve, store and preferentially eject cored samples from source materials such as paper, gels, cloth, leaves, paint chip, films, etc.
- **Electrophysiology** — Punch dissection of discrete regions prior to acute dissociation for patch recording
- **Biomedical Pharmacology** — Punch removal of discrete brain regions for analysis of neurotransmitters and metabolite changes in response to different pharmacological agents.
- **Anatomy** — Punch out small brain regions for analysis of neurotransmitter concentrations of mRNA levels or for subsequent use in electron microscopy.
- **Others** — Positioning samples inside the quartz pyrolysis gel tubes, or on FTIR diamond cell sample stages.



Operating

For most forensic samples, position source of materials (i.e. blood cards, paint chips, paper, leaves, gels, etc.) on the self-healing cutting mat. Remove the protective cover cap from the punch. Firmly grip the punch. The tip is then positioned at a right angle above the target area – DO NOT DEPRESS THE PLUNGER. The tip is pushed downward into the source material until it makes contact with the cutting mat. Lift the Harris Micro-Punch™ away from the source material with the cored sample stored in the cutting tip.

For most biology samples – Typically tissue to be punched is first sliced into 1-2mm thick sections. (Our Tissue and Brain Matrices are specially designed for this purpose,) The section to be punched is then placed on a saline-soaked filter paper disc (EMS #70662 – Petri dish with absorbent paper) on an ice-cold dissection plate (EMS #62536-01 – Cold Plate) Then follow the above procedure.

Sample Storage And Ejection

After coring, the sample is temporarily stored in the hollow cutting tip ready for the preferred ejection. The Harris MicroPunch™ can be rested on its side without loss of sample from the hollow tip. To eject sample, position tip over target area and depress plunger.

Cleaning

Clean the tip between each sample extraction by coring blank filter paper, rinsing with ethanol or spraying with compressed air to remove dried artifacts. Rinse mat with ethanol after each sample extraction.

► A. Harris Micro-Punch

The tips and plungers are made from high-grade 440c stainless steel. Tips are heat-treated to a Rockwell hardness of Rc-58 and then individually sharpened to a razor edge for a long cutting life. Tips are replaceable and available in sizes 0.50, 1.0, 1.20, 2.0, and 3.0 mm. The barrel and knob screw assembly are constructed from injected molded, high-tech, lubricated plastic to eliminate sticking. Length: 140mm (5 1/2"). Sterilization temperature up to 180°C (360°F)

Ordering:

Cat. #	Description	Qty
69034-05	Harris Micro-Punch, 0.5mm	each
69034-10	Harris Micro-Punch, 1.0mm	each
69034-12	Harris Micro-Punch, 1.2mm	each
69034-20	Harris Micro-Punch, 2.0mm	each
69034-30	Harris Micro-Punch, 3.0mm	each

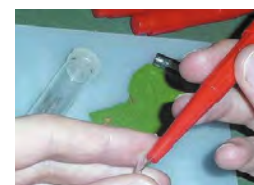
Cat. #	Description	Qty
69035-05	Replacement Tip, 0.5mm	each
69035-10	Replacement Tip, 1.0mm	each
69035-12	Replacement Tip, 1.2mm	each
69035-20	Replacement Tip, 2.0mm	each
69035-30	Replacement Tip, 3.0mm	each
69035-06	Replacement 0.5mm Plunger	each
69035-07	Replacement 1.0mm Plunger	each
69035-08S	Replacement 1.2mm Plunger	each
69035-08	Replacement 2.0mm Plunger	each
69035-09	Replacement 3.0mm Plunger	each



Using 2.0mm Uni-core to punch out ink sample



1.25 Uni-Core placing sample in pyrolysis gas chromatography tube



Using Uni-Core to position sample inside quartz pyrolysis tube



Using Uni-Core 2.0mm sampling blood card



Using Uni-Core 2.0 ejecting dried blood sample into vial



1.25 Uni-Core ejecting sample on diamond cell sample stage

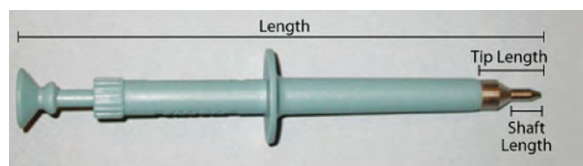


Uni-Core 2.0mm ejecting blood card sample

► Sampling Tools – Harris Micro-Punch™ and Harris Uni-Cores™ (continued)

Specifications And Ordering Info

Tip for Plastic Harris Micro-Punch®



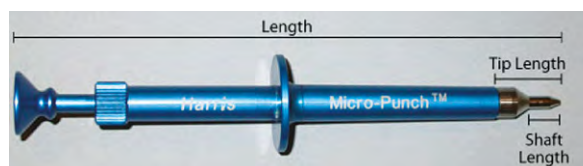
Cat #	Size mm +/- 0.06	HMP Length mm/in.	I.D. mm/in. +/- 0.060 /0.0024	Shaft O.D. mm/in.	Tip Length mm/in.	Shaft Length mm/in.	Shaft Wall mm/in.	Edge Wall mm/in.	Lumen Length mm/in.	Lumen (Void) Vol. ml/c.i.	Edge Angle	Qty.
69034-05	0.50	142.04 /5.93	0.500/ 0.020	3.20/ 0.128	16.8/ 0.672	5.50/ 0.22	1.30/ 0.052	0.0010/ .00004	5.400/ 0.216	1.060/ 0.00007	15°	each
69034-10	1.00	142.04 /5.93	1.000/ 0.040	3.20/ 0.128	16.8/ 0.672	5.50/ 0.22	1.10/ 0.044	0.0010/ .00004	6.680/ 0.267	5.243/ 0.00034	19°	each
69034-12	1.20	142.04 /5.93	1.200/ 0.048	3.20/ 0.128	16.8/ 0.672	5.50/ 0.22	1.05/ 0.042	0.0010/ .00004	5.740/ 0.230	6.488/ 0.00042	23°	each
69034-20	2.00	142.04 /5.93	2.000/ 0.080	3.20/ 0.128	16.8/ 0.672	5.50/ 0.22	0.65/ 0.026	0.0010/ .00004	5.880/ 0.235	1846/ 0.00118	14°	each
69034-30	3.00	142.04 /5.93	3.000/ 0.120	3.20/ 0.128	16.8/ 0.672	5.50/ 0.22	0.62/ 0.024	0.0010/ .00004	7.090/ 0.284	50.09/ 0.00321	11°	each

► B. Deluxe Aluminium Harris Micro-Punch®

Aluminum barrel is Swiss-style machined from high grade 6061 light weight, seamless, aluminium tubing and anodized to form a protective, chemically resistant long lasting surface for easy handling.

Specifications And Ordering Info

Tip for Aluminium Harris Micro-Punch®



Cat #	Size mm +/- 0.06	HMP Length mm/in.	I.D. mm/in. +/- 0.060 /0.0024	Shaft O.D. mm/in.	Tip Length mm/in.	Shaft Length mm/in.	Shaft Wall mm/in.	Edge Wall mm/in.	Lumen Length mm/in.	Lumen (Void) Vol. ml/c.i.	Edge Angle	Qty.
69033-05	0.50	141.63 /5.573	0.500/ 0.020	3.20/ 0.128	16.8/ 0.672	5.50/ 0.22	1.30/ 0.052	0.0010/ .00004	4.760/ 0.191	0.934/ 0.00006	15°	each
69033-10	1.00	141.63 /5.573	1.000/ 0.040	3.20/ 0.128	16.8/ 0.672	5.50/ 0.22	1.10/ 0.044	0.0010/ .00004	5.740/ 0.230	4.506/ 0.00028	19°	each
69033-12	1.20	141.63 /5.573	1.200/ 0.048	3.20/ 0.128	16.8/ 0.672	5.50/ 0.22	1.05/ 0.042	0.0010/ .00004	5.210/ 0.208	5.889/ 0.00038	23°	each
69033-20	2.00	141.63 /5.573	2.000/ 0.080	3.20/ 0.128	16.8/ 0.672	5.50/ 0.22	0.65/ 0.026	0.0010/ .00004	4.830/ 0.193	15.16/ 0.00097	14°	each
69033-30	3.00	141.63 /5.573	3.000/ 0.120	3.20/ 0.128	16.8/ 0.672	5.50/ 0.22	0.62/ 0.024	0.0010/ .00004	5.930/ 0.237	41.89/ 0.00268	11°	each

► C. Harris Uni-Cores

See Miltex Punches for possible replacement of Harris Uni-Cores

The Harris Uni-Core™ is a disposable multi-purpose sampling tool for soft substrates. They are made from polypropylene, including a hollow body with built-in tool steel razor sharp cutting tip, with a plunger for the expelling of the punched sample. Uni-Core comes individually wrapped and sterilized by ethylene oxide. Uni-Core can also be reusable by rinsing the tip with ethanol after each use and autoclaving for 20 minutes at 250°F/15 psi.



Ordering:

Cat. #	Description	Qty	Cat. #	Description	Qty	Cat. #	Description	Qty
69036-035	Harris Uni-Core™, Size 0.35mm	each	69036-25	Harris Uni-Core™, Size 2.5mm	each	69036-80	Harris Uni-Core™, Size 8.0mm	each
69036-05	Harris Uni-Core™, Size 0.5mm	each	69036-30	Harris Uni-Core™, Size 3.0mm	each	69036-90	Harris Uni-Core™, Size 9.0mm	each
69036-07	Harris Uni-Core™, Size 0.75mm	each	69036-35	Harris Uni-Core™, Size 3.5mm	each	69036-100	Harris Uni-Core™, Size 10.0mm	each
69036-10	Harris Uni-Core™, Size 1.0mm	each	69036-40	Harris Uni-Core™, Size 4.0mm	each	69036-110	Harris Uni-Core™, Size 11.0mm	each
69036-12	Harris Uni-Core™, Size 1.2mm	each	69036-50	Harris Uni-Core™, Size 5.0mm	each	69036-120	Harris Uni-Core™, Size 12.0mm	each
69036-15	Harris Uni-Core™, Size 1.5mm	each	69036-60	Harris Uni-Core™, Size 6.0mm	each			
69036-20	Harris Uni-Core™, Size 2.0mm	each	69036-70	Harris Uni-Core™, Size 7.0mm	each			

► Sampling Tools – Harris Micro-Punch™ and Harris Uni-Cores™ (continued)

► D. Cutting Mats

These cutting mats are inert, self-healing and can be sterilized with ethanol. Available sizes 6 x 8" and 2½ x 3"



Cat. #	Description	Qty
69037	Cutting Mat, Size 6 x 8"	each
69037-23	Cutting Mat, Size 2½ x 3"	each

► E. Harris e-Core™

Cuts, retrieves and stores cored samples in one operation



The Harris e-Core is an electric coring device created to bridge the gap between the lower cost, manual Harris Micro-Punch and Harris Uni-Core and the automated bench top punching platforms. The ergonomic "joy stick" grip and the e-Core's simple operation provide comfort and efficiency, integrating smoothly into all levels of laboratory sample throughput. The user has complete management of the disc recovery process, the coring speed and disc delivery.

The Harris e-Core, like the Harris Micro-Punch and Harris Uni-Core, continues to offer the same unique combination of patented simultaneous sampling features: coring, retrieving and storing in a single operation, but with dramatically increased processing times.

The Harris e-Core has been designed to utilize dedicated replaceable Harris Micro-Punch Tips which thread to the Harris e-Core drive shaft.

The e-Core kits contain:

1. One Harris e-Core with tip and cover cap in place.
2. Two extra Harris Micro-Punch tips of same size.
3. Optional cord wrist strap.
4. Multi-plug set includes Europe (EU), United Kingdom (UK), Australia (AUST) and North America (NA) adapters.
5. Power supply.
6. 6 x 8" Harris Cutting Mat.
7. Harris e-Core Carrying Case.
8. User Guide.



69039-12	Harris e-Core kit, 1.2mm Tip, 0.8mm Plunger (O.D.)	each
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► Accu-Punch

The only disposable punch made in the USA!

Sterile, Disposable Skin Biopsy Punches.

Available in 14 different sizes as well as assortment packs.



- Always Sharp, Always Sterile
- Ergonomic Design
- Ribbed for Maximum Control
- Available in Dispenser boxes of 25 or 50 pieces

Cat. #	Description	Qty.
69038-01	Accu-Punch 1 mm	25/Pack
69038-01-50	Accu-Punch 1mm	50/Pack
69038-15	Accu-Punch 1.5 mm	25/Pack
69038-15-50	Accu-Punch 1.5mm	50/Pack
69038-02	Accu-Punch 2.0mm	25/Pack
69038-02-50	Accu-Punch 2.0mm	50/Pack
69038-25	Accu-Punch 2.5mm	25/Pack
69038-25-50	Accu-Punch 2.5mm	50/Pack
69038-03	Accu-Punch 3.0mm	25/Pack
69038-03-50	Accu-Punch 3.0mm	50/Pack
69038-35	Accu-Punch 3.5mm	25/Pack
69038-35-50	Accu-Punch 3.5mm	50/Pack
69038-04	Accu-Punch 4.0mm	25/Pack
69038-04-50	Accu-Punch 4.0mm	50/Pack
69038-45	Accu-Punch 4.5mm	25/Pack
69038-45-50	Accu-Punch 4.5mm	50/Pack
69038-05	Accu-Punch 5.0mm	25/Pack
69038-05-50	Accu-Punch 5.0mm	50/Pack
69038-06	Accu-Punch 6.0mm	25/Pack
69038-06-50	Accu-Punch 6.0mm	50/Pack
69038-07	Accu-Punch 7.0mm	25/Pack
69038-07-50	Accu-Punch 7.0mm	50/Pack
69038-08	Accu-Punch 8.0mm	25/Pack
69038-08-50	Accu-Punch 8.0mm	50/Pack
69038-10	Accu-Punch 10.0mm	25/Pack
69038-10-50	Accu-Punch 10.0mm	50/Pack
69038-12	Accu-Punch 12.0mm	25/Pack
69038-12-50	Accu-Punch 12.0mm	50/Pack
69038-AS	Assorted Pack one of each size	14/Pack

Paper Cutter, See Print Trimmer, Photography Section, page 728-729 >>>>

Cryo Gloves, See Cryo Supplies Section, page 679 >>>>

Grids: See Grid Collection, pages 104-133 >>>>

EMS Domino Rack, See Grid Section, page 145 >>>>

Grid Mats, See Grid Section, page 145 >>>>

Grid Storage Boxes, See Grid Section, pages 142-144 >>>>

Grease; Vacuum Grease, See Apiezon Grease, Microscope Accessories, pages 186-188 >>>>

Immunofluorescence Chamber, See page 268 >>>>

Permanox Chamber Slides, See pages 275-278 >>>>

Immersion Oils, See Chemicals, page 49 >>>>

Low Lint Wipes; Tissues, See Cleaning section, page 950-951 >>>>

Kimwipes, See Cleaning section, page 950 >>>>

Lint Free Cloth, See Cleaning section, page 950 >>>>

► Brain Punch Kit

For Microdissection of Frozen Brain Sections

The kit is available in 2 different sets: Complete with either 3 punches or 5 come complete with spring loaded nylon expellers, and a convenient handle, facilitates the "Palkovits Punch" technique of dissecting out specific brain nuclei for neurochemistry.

The nuclei are punched from frozen brain sections on glass slides, and expelled into the reagents. The spring-loaded expellers avoid risk of contamination that might be caused by expelling with breath.

Each punch has an electro polished sharp end for smooth cuts and minimal tissue adhesion. Punch sizes are 0.25, 0.50, 0.75, 1.0, 1.25, 1.50, 1.75 and 2.00 ($\pm 5\%$, slight variation due to electro polish etching to sharpen). The smaller tubes are reinforced by an outer layer of concentric tubing except at the tip.

Replacement punches available individually.

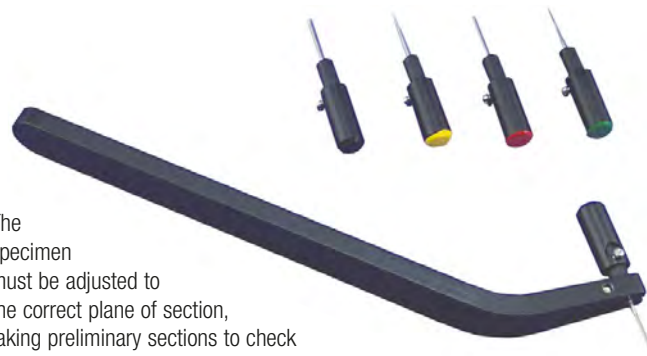
Applications:

The Brain Punch Kit is a set of electropolished and sharpened punches for the Palkovits' punch technique. Note that the smaller punches are reinforced, as these can tend to bend under the force of the punching action. The set includes a handle and 5 sizes of punches. Sizes are shown in the table below. Each punch consists of the stainless steel punch column, the holder body, and a button which operates a spring loaded expeller to force the micro dot of tissue from the punch.

Select the punch to be used and install it in the handle so that the black body holder on the punch is flush with the lower surface of the handle. Tighten the locking screw. If the punch body holder extends below the handles bottom surface, the action of the expeller may be blocked. Check that the expeller end can be seen when the button is pressed, and then proceed.

Method:

To prevent deterioration of the proteins, the tissue must be kept frozen as much as possible. The brain or other tissue to be punched is dissected from the anesthetized animal and dropped into liquid nitrogen. The frozen specimen is mounted on a sectioning pedestal, placed in a cryostat, and allowed to equilibrate to the cryostat temperature. At this time, glass slides for collection of the sections are also placed in the cryostat to equilibrate to the temperature.

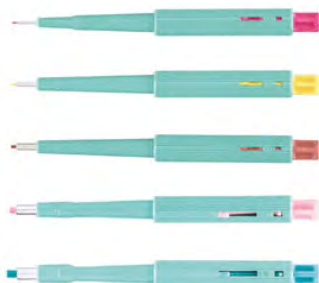


The specimen must be adjusted to the correct plane of section, taking preliminary sections to check the angle, and then the critical sections from the desired region are collected.

Thick (~200 micron) are taken and placed on the prechilled glass slides. The frozen slices will lie on the frozen glass without adhering, so care must be taken not to spill them. When the slide is full, press a finger against the bottom of the slide to cause the tissue to partially thaw into contact with the slide, and refreeze promptly in the cryostat.

Remove the slides from the cryostat and place on a cold plate or petri dish chilled with dry ice. Select the punch needed, position the tip over the area to be removed, and press down. The dot of tissue, whose volume can be calculated, will pull away from glass slide and stay in the punch. Press the spring loaded button on top of each punch to expel the tissue into the collection media.

Cat. #	Description	Qty.
57401	Brain Punch Set, 0.25 to 1.25mm	5/set
57402	Brain Punch Set, 1.50 to 2.00mm	3/set
57391	Punch, 0.25 mm	each
57393	Punch, 0.50 mm	each
57395	Punch, 0.75 mm	each
57397	Punch, 1.00 mm	each
57399	Punch, 1.25 mm	each
57403	Punch, 1.50mm	each
57404	Punch, 1.75mm	each
57405	Punch, 2.00mm	each
57400	Handle Only	each



► Sterile Disposable Biopsy Punch

A possible replacement for the Harris Uni-Cores™. The Miltex® Biopsy Punch with Plunger is a single-use, disposable multi-purpose sampling tool for soft substrates. The plastic exterior is ribbed for comfort and control. The stainless steel cutting tip is seamless and razor sharp to avoid tearing or pulling of the sample. The plunger easily expels the specimen from the barrel. These sterilized punches come in color-coded blister packs with a 5-year shelf life. In addition to the color-coding, the size is also clearly marked on each punch.

These tools are perfect for tissue processing or forensic applications. For applications where contamination is not an issue, the Miltex® Biopsy Punch with Plunger is reusable after cleaning. To clean the cutting edge, rinse with ethanol or spray with compressed air to remove any contaminants.

Cat. #	Description	Qty.
69031-01	Miltex® Biopsy Punch w/ Plunger, 1.0mm, Fuchsia	each
69031-15		25/pk
69031-02	Miltex® Biopsy Punch w/Plunger, 1.5mm, Yellow	each
69031-25		25/pk
69031-03	Miltex® Biopsy Punch w/ Plunger, 2.0mm, Brown	each
69031-35		25/pk

Cat. #	Description	Qty.
69031-04	Miltex® Biopsy Punch w/Plunger, 3.0mm, Pink	each
69031-45		25/pk
69031-05	Miltex® Biopsy Punch w/ Plunger, 4.0mm, Blue	each
69031-55		25/pk

► Aqua-Hold Pap Pen

The Aqua-Hold Pap Pen draws a liquid repellent barrier around a section of tissue. Used like a paint pen, you just draw a well on a slide. The barrier creates the proper surface tension to hold aqueous solutions such as costly antibody and other valuable specimens. After application, the barrier material is insoluble in alcohol and acetone but can be removed after staining with xylene. Each pen holds 13ml of long-lasting material, making hundreds of wells. Red tint distinguishes the well drawing on the slide to easily view.



71311 Aqua-Hold Pen each

► Liquid Blocker-Super PAP PEN The Newest Staining Guard Pen



New and improved... The Super PAP PEN outperforms the original PAP Pen. The Super PAP PEN may be used at temperatures as high as 120°F. (The old style PAP PEN worked only up to 90°F). With this high temperature feature, one can now use the Super PAP PEN to per-form the peroxidase method, ABC method, and Fluorescent antibodies method with satisfactory results.

71310 Super PAP PEN, Large each
71312 Super PAP PEN, Small each

► Para-Marker

A wide tipped pen, designed for use with paraffin sections. The pen provides a sticky membrane to the glass slide which not only prevents paraffin sections from falling off but also keeps the sections flat on the slide.



71313-20 Para-Marker each

► Tissue Capture Pen



With one swift application of the EMS Tissue Capture Pen, you are able to change your plain glass slide into a coated one.

The EMS Tissue Capture Pen is a coating pen with a wide point (18mm) for fixing various tissue sections (paraffin embedded, frozen and formalin sections, etc.) The unique pen is unaffected by heat up to 120°C so it offers secure and firm adhesion of the tissue section. It may be used in Microwave staining, immunostaining, in situ etc....

One application is all that is needed, and after it is applied, allow to dry for 1-2 minutes. The EMS Tissue Capture may be used in conjunction with our Pap-Pen (71310) and will allow for easy placement of adherent as well as non-adherent cells on a glass slide. Immunostaining/ISH can be performed by applying a few drops of tissue suspension or liquid media onto the glass slide which is circled by the Pap-Pen, and then your section can be placed.

71314-10 EMS Tissue Capture Pen each

► Fro-Marker

A wide tipped pen designed for use with frozen sections. The pen provides a sticky membrane which when applied to the slide and onto which the section is placed it eliminates the section from falling off,

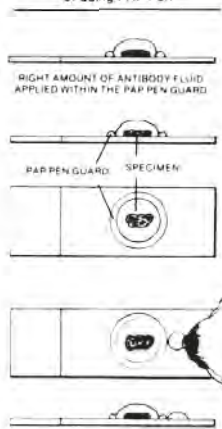


moving, or wrinkling on the slide during immunostaining procedures. The membrane is stable up to 110°C and is suitable for vigorous applications such as in-situ hybridization.

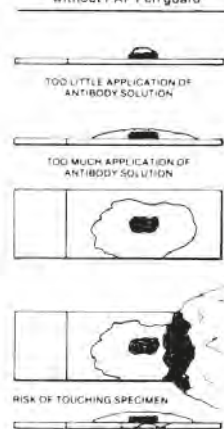
71313-10 Fro-Marker each

TECHNICAL TIP

BENEFITS of using PAP Pen



DISADVANTAGES without PAP Pen guard



► Solvent-Resistant Pens & Teeny Writers

Solvent Resistant Pens feature an ultra-permanent ink.

- Resistant to xylene, alcohol, acetone and formalin
- Ideal for histology and cytology
- Markings will not run on embedding cassettes or frosted/painted slides and labware, even after repeated washes and solution treatments
- Remove markings with acetic acid, an ethanol/xylene mixture or paraffin. Testing advised before use

Teeny Writers are perfect general use lab markers.

- The Twin-Tip Teeny Writer has a fine tip and an ultra fine tip
- The original Teeny Writer has an extra fine tip
- Both are ideal for writing on Tough-Tags and Tough-Spots
- Use for labeling samples stored at room temperature and not exposed to chemicals and/or caustic agents

The Twin-Tip Too laboratory marking pen provides a new option for all writing needs. It is the best of both worlds. It is resistant to most mild laboratory chemicals and gives the flexibility of a twin tip pen for fine tip writing on small tubes and labels. Keep it close by utilizing the included handy pocket clip.

Testing is recommended.

Cat. #	Description	Color	Tip (Millimeters)	Qty.
62053-B	Solvent Resistant	Black	Extra Fine (0.6)	each
62053-R	Solvent Resistant	Red	Extra Fine (0.6)	each
62054-B	Twin-Tip	Black	Fine/Ultra Fine (0.7/0.3)	each
62052-B	Teeny Writer	Black	Extra Fine (0.4)	each



Twin-Tip
Teeny Writer

► Manomark™ Pen



Writes on all plastic, glass, metal, wool, paper and cloth, including PTFE, fluoropolymer resins. With its precision seal valve the pens life is preserved and as well it allows for a smooth flow of ink even if it's left uncapped. Once dry, the solvent base ink is temperature resistant from 0°C to 155°C (32°F – 310°F) > Markings are insoluble in water or hydrocarbons, resist many solvents, and are easily removed with alcohol.

72127-AS	Manomark Pen Assorted (4 black, 2 red, 2 green, 2 blue, 2 orange)	12/pk
72127-B1	Manomark, Black only	each
72127-B12	Manomark, Black only	12/pk

► Wet Surface Pen



This unusual pen will write clearly on wet surfaces, such as marking slots on wet Southern, Northern, and Western blots Use it for marking alignment dots on blotting filters placed over agar plates containing bacterial colonies or phage plaques. Mark lanes on wet plots prior to cutting the filter into strips to be incubated separately with different antisera or probes. It can be used to correct or write on wet labels that were kept in a water bath, in liquid nitrogen or in a freezer at 0 degrees. The Wet Surface Pen is extremely useful for marking filters during processing under water-based buffers. The pen can, of course, also can be used to write on dry paper as a standard ball pen.

72128	Wet Surface Pen, Black	each
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Mounting Medium: BioMeda, see pages 11, 513 >>>>

BioMount, see pages 11, 512 >>>>

Cytoseal, see page 515 >>>>

Depex, see pages 18, 515 >>>>

DPX, see pages 18, 515 >>>>

Eukitt, see pages 18, 515 >>>>

Entellan, see pages 18, 515 >>>>

Fluoromount-G, see pages 18 >>>>

PermOUNT, see pages 21, 516 >>>>

Quickbond; see page 9 >>>>

ShurMount, see page 517 >>>>

UV Mount, see page 21, 517 >>>>

Mount Quick, water base, see pages 21, 516 >>>>

Mount Quick, solvent base; see pages 21, 516 >>>>

Mini Centrifuge, See Equipment Section page 107 >>>>

Micro Sample Tubes, See Equipment Section page 1073 >>>>

**Micro Sample Tube Holder, racks
See Equipment Section pages 1074 >>>>**

**Mixer Vortex - Genie,
See Equipment Section pages 1086-1093 >>>>**

**Stirrer/Hot Plate Combination,
See Equipment Section pages 1074-1080 >>>>**

► WRITE-ON™ Marker Pens

These pens are made from specially formulated ink and are to be used on anterior surfaces as well as sides of histology cassettes. The ink will dry almost instantly and withstands temperatures up to 195°C and is resistant to solvents.

72106-01	Write-On™ Marker Pen, Red	each
72106-10	Write-On™ Marker Pen, Red	10/pk

► Marker Pen; Markal Sharpie

Smear resistant, water-resistant, fast-drying no. 15 fine line. Usable on glass, porcelain, metals, and plastics.

72110	Black Felt Tip	each
72120	Black Felt Tip	box/12
72130	Red Felt Tip	each
72140	Red Felt Tip	box/12

► Slide Markers - SHUR/Mark™

A perfect marker designed to mark glass slides and cassettes with priming action; comes with a replaceable felt tip.

- Quick drying; will not smudge or smear.
- Consistent ink flow with effortless writing.
- Chemically resistant; especially to alcohol, xylene and many other solvents.
- Replaceable priming tip, which eliminates clogged and/or worn out tips.

TO USE: Simply depress the tip until the tip is saturated with ink.

72100-01	Shur/Mark Black	each
72100-12	Shur/Mark Black	12/pk
72102-01	Shur/Mark Red	each
72102-12	Shur/Mark Red	12/pk
72104-12	Shur/Mark Replacement Tips	12/pk

► High Opacity – Paint Markers

Constructed aluminum barrel, actuating ball and hard felt tips, these markers permanently cover nearly any surface. Weatherproof. Resistant to alcohol and acetone. Contain xylene.

Markers are available in black, red and white with bullet tips. Except model 130, it writes like a pen with white ink for marking on dark surfaces, including carbon tabs, which is use in SEM specimen mounting purpose.

Cat. #	Description	Pack
72167-R1	Small Marker, Red	each
72167-R2	Large Marker, Red	each
72168-W1	Pen-like Marker, White	each
72168-W2	Large Marker, White	each
72168-B1	Small Marker, Black	each
72169-B2	Large Marker, Black	each

► StatMark Pen

Permanent ink in an ultrafine tip is ideal for labeling microscope slides and cassettes. StatMark Pens are made of rigid nylon that allow for precise hand marking on glass slides as well as on most tissue embedding cassettes. This quick drying ink is highly resistant to aqueous based stains, alcohols, xylene and xylene substitutes. StatMark Pens do not dry out easily and last twice as long as many of the leading 'laboratory' pens.

Cat. #	Description	Pack
72109-01	StatMark Pen	each
72109-12	StatMark Pen	12/box



**For our complete line of Light Boxes,
See Photography section, pages 742-743**



► Tissue-Tek® SmartWrite Color Slide Printer

On-Demand Color Slide Printing is what you get with this unit

Features and Benefits

- High resolution color printing - reduces need for managing multiple color slide inventory, lowering costs
- On-demand slide printing - streamlines workflow and reduces specimen identification errors
- Small footprint - fits perfectly on a microtome work station or next to a cytology slide processor
- Prints directly onto slides - eliminates errors from hand writing and label application
- Scannable 2D and 1D bar code, alphanumeric and graphic printing capabilities — optimizes flexibility for now and in the future
- Optional SmartWrite™ Software - provides configurable label design and is interfaceable to LIS systems
- Print resistant to Xylene, alcohol, histology reagents, stains, heat, and chemicals*. Ensures reliable identification of slides now and in the future

Applications

- On demand slide printing - color or black labels printed directly onto slides



Specifications

Electrical	
Power	AC100–240VAC, 50/60 Hz, 60 watts
Environmental	
Operational Ambient Temp.	10 - 40 degrees C (50 - 105 F)
Operational Relative Humidity	30 - 85% (non-condensing)
Storage Ambient Temp.	-10 - 60 degrees C (14 - 140 F)
Storage Relative Humidity	10 - 85% (non-condensing)
Physical	
Height	8.6" (218.4mm)
Width	7.08" (179.8mm)
Depth	12.58" (319.5mm)
Weight	16.8 lbs. (7.62 kg)
User Interface	
Power Button	One power switch with LED indicator, located on the upper right side of the control panel on the front of the instrument
Slide Feed Button	One button with LED indicator located on the upper right side of the control panel on the front of the instrument beneath the power button
Lid Open Button	One button located on the upper left side of the instrument
Blue Slide	Illuminates blue slide holder indicating

Holder Light	Proper loading
Diagnostic Function	Self diagnosis, error messages and codes
Functional Printing Technology	Thermal transfer
Print Speed	Up to 9 slides/minute (monochrome) Up to 5 slides/minute (solid colors) Up to 4 slides/minute (blended colors)
Print Resolution	300 dpi
Ink Type	Resin thermal transfer
Ribbon Types	CMYK: 1000 prints; Black: 5000 prints
Printable Colors	Multiple solid colors; others available via software
Slide Types	3" x 1" standard or positive charged, smooth surface white frosted end, clipped corners
Slide Capacity	100 slides - Blue Slide Holder
Output Tray Capacity	15 slides
Construction	Steel frame with powder-coated steel and plastic covers
Data Interface	USB 2.0
Printer Drivers	Windows™ XP/Vista/7
Warranty	One year parts and labor

Applications
On demand slide printing — color or black labels printed directly onto slides

Standard Accessories

- One Operating Manual
- One Quickstart Guide
- One Printer Driver
- One Blue Slide Holder
- One Black Print Cartridge
- One Color Print Cartridge
- One Print Head Cleaning Pen
- One USB Cable
- One Power Cord
- One Power Converter

Optional Accessories

- 2D Bar Code Scanner with Stand
- Tissue-Tek® SmartWrite™ Software
- Touch Screen PC
- Blue Slide Holder one
- Black Print Cartridge 6/case
- Color Print Cartridge 6/case

Ordering Information

Cat. #	Description	Qty.
65455	Slide Printer	each
65456	Scanner With Stand	each
65457	SmartWrite Software	each
65458	PC with touchstone, mouse and keyboard	each
65459	Slide Holder, Blue	each
65455-BL	Print Cartridge, Black	6/case
65455-CO	Print Cartridge, Color	6/case

* CAUTION: Contact with the Tissue-Tek® SmartWrite™ color printed label while wet with organic solvents will result in loss of printed information

► **Optional Accessories for Tissue Tek SmartWrite™**

Shuttle® Computer X50V2 PLUS Touch Screen PC

Specifications

RAM	1GB PC3-10600 1333MHZ DDR3 SODIMM NON-ECC	Power	40W Power Adapter. Input: 100- 240V AC
Hard Drive	250GB SATA 5400 RPM 8MB 2.5"	LCD Panel	15.6" 16:9 Wide Panel, 1366 x 768 pixels
OS Windows®	7 Home Premium 32 BIT. Includes: Windows®7 Home Premium 32 BIT Recovery DVD	Touch Screen	Single Touch
Form Factor	All-in-one PC	Web Cam	1.3M Pixel
Net Weight	3.6kg	MIC	Electret Condenser Microphone
Dimension	(W) 15.4" x (H) 12.8" x (D) 1.4"	Left Side	Power-on button, Stylus pen port, USB port x 2, DC-input for power supply
Processor	Intel® Atom™ D510 Dual Core CPU (1,66 GHz). CPU on board	Right Side	4 in 1 Card reader, USB port x 2, Headphone, Mic, LAN port
Memory	2 Slot (Supports up to 4 GB DDRII, Max 2 x 2GB)	Back Panel	D-sub port x 1, Serial port x 2 (optional), Parallel port x 1 (optional), Kensington lock
Chipset	NM10	Audio	IDT92HD81 2 Channel High, 2W x 2 Stereo speaker
VGA	Intel® GMA 3150 with a powerful 400MHz core. Dynamic Video Memory Technology (DVMT) 4.0. Intel® ClearVideo Technology	Accessories	Quick Guide x 1, 65W Power Adapter x 1, power cord x 1, Driver CD x 1
Ethernet	JMC261 IEEE 802.3u 100Base-T specification compliant. 10MB/s,100MB/s. Support Wake-On-LAN function	Wireless LAN	IEEE 802.11b/g/n
Storage Interface Support	2.5" Hard Drive	Card Reader	4 in 1 Card Reader (support SD/MMC/MS/MS-pro)
		Software	Shuttle Control AP

DataLogic® Gryphon™ GD4430-HCK1 2D Barcode Scanner

Specifications

Decoding Capabilities

1D	Linear Codes Autodiscriminates all standard 1D codes including GS1, DataBar™ linear codes
2D	Aztec Code; China Han Xin Code; Data Matrix; MaxiCode; QR Code

Electrical Current

Operating (Typical) 160 mA @ 5 VDC; Standby/Idle (Typical): 65 mA @ 5 VDC

Input Voltage Reading Ranges Typical Depth of Field

Minimum distance determined by symbol length and scan angle. Printing resolution, contrast, and ambient light dependent.

Code 39	5 mils: 4.0 to 19.0 cm / 1.6 to 7.5 in
Code 39	10 mils: 1.0 to 30.0 cm / 0.4 to 11.8 in
Data Matrix	10 mils: 2.0 to 16.0 cm / 0.8 to 6.3 in
Data Matrix	15 mils: 0 to 23.6 cm / 0 to 9.3 in
EAN-13	13 mils: 1.5 to 40.0 cm / 0.6 to 15.7 in
PDF417	10 mils: 0.5 to 22.0 cm / 0.2 to 8.6 in
QR Code	10 mils: 3.0 to 12.5 cm / 1.2 to 4.9 in

Reading Performance

Image Capture	Graphic Formats: BMP, JPEG, TIFF; Greyscale: 256, 16, 2
Image Sensor	Wide VGA: 752 x 480 pixels
Light Source Aiming	650 nm VLD
Motion Tolerance	25 IPS
Print Contrast	25% Ratio (Min.)
Reading Angle Pitch	+/- 40°; Roll (Tilt): 180°; Skew (Yaw): +/- 40°
Reading Indicators	Beeper (Adjustable Tone); Datalogic 'Green Spot' Good Read Feedback; Good Read LED
Resolution (Max.)	1D Linear: 0.102 mm/4 mils; Data Matrix: 0.178 mm/7 mils; PDF417: 0.102 mm/4 mils

Special

Disinfectant-Ready enclosures treated with anti-microbial additives; Highly visible 4-Dot aimer with center cross for targeted scanning

Electron Microscopy Sciences Announces their State of the Art
Scientific Equipment Repair Center



No equipment is too small or impossible to either
Repair, Refurbish, or Upgrade!

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- Leica**
- Denton**
- Reichert-Jung**
- Edwards**
- LKB**
- Emitech**
- RMC-Boeckeler**
- Emscope**
- And Many More...**
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Our unique service allows us to come to you, or you send the equipment to us, depending on the level of Repair/Refurbishment needed.

Equipment such as:

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- Tissue Slicers**
- Vibratomes**
- Ovens**
- Baths**
- Shakers**
- Tissue Processors**
- And Much More...**

For more information on any of our services, a comprehensive quote, please call, write, or e-mail us today.

► Microscope Glass Slides -Esco

Our microscope glass slides are manufactured by Esco - Erie Scientific Co, where reliability and quality are recognized to be the best.

- Made from the highest quality glass sheets; white glass.
- The dimensions of the slides have been standardized to millimeters according to the U.S. Government Specifications.
- They are packed with care to assure cleanliness.
- The glass is fully annealed to minimize chipping.

Our microscope glass slides are precleaned and are made from clear-white glass. They are individually inspected and free from moisture, dirt, and film. All of our slides are flat, uniform and durable. They are packed 72 slides/bx and cellophane wrapped.



Microscope Slide Specifications: Soda Lime Glass

Chemical Makeup	Green (%)	White (%)
Silicon Dioxide	72.2	72.15
Sodium Oxide	14.5	14.25
Calcium Oxide	6.5	6.25
Magnesium Oxide	4.4	4.1
Aluminum Oxide	1.5	1.12
Potassium Oxide	0.3	1.15
Sulfur Trioxide	0.3	0.3
Iron Oxide	0.1	0.3
Titanium Oxide	0.05	0.05

Physical Properties:

Glass Density:	2.4024g/cm ³
Softening Point:	724°C
Annealing Point:	545°C
Strain Point:	511°C
Dispersion Value (Nu Value):	.64
Dimensional Variance:	±1.5000
Thermal Expansion:	(0 -300°C) 8.36x10 ⁻⁶ /°C
Dielectric Constant:	@20°C (68°F) (1MHz):ET =6.7
Young's Modulus:	E = 10,000,000 lbs/sq"
Torsion Modulus:	G = 4,000,000 lbs/sq"
Poisson's Ratio:	μ = 0.2
Luminous Transmittance:	@ 0.040: 91.8%
Refractive Index:	1.517 @ 546.07 nm wavelengths

► 1. Microscope Slide, Plain End

Cat.#	Thickness	Size,mm	Pack
71880-01	1.2 mm	25x75	Gross
71880-10	1.2 mm	25x75	10 Gross
71880-20	1.2 mm	25x75	20 Gross

► 2. Microscope Slide, Frosted End

These slides have 3/4" sandblasted frosting on one end which allows for easy marking.

Cat.#	Thickness	Size,mm	Pack
71870-01	1.2 mm	25x75	Gross
71870-10	1.2 mm	25x75	10 Gross
71870-20	1.2 mm	25x75	20 Gross

► 3. Microscope Slide, SUPERFROST® End

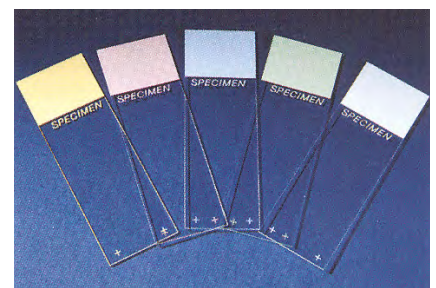
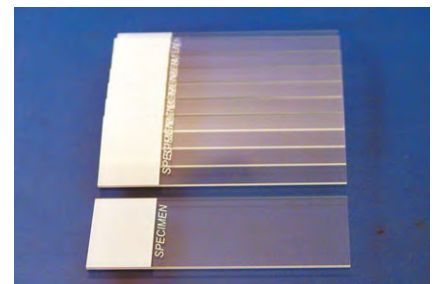
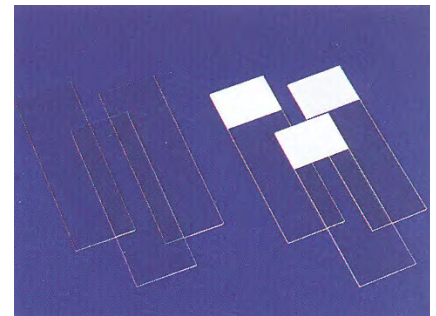
With a superfrosted end. These slides have one side which is frosted with a brilliant white opaque coating that will take and retain all pen markings. They offer superior readability and they are permanent.

Cat.#	Thickness	Size,mm	Pack
71867-01	1 mm	25x75	Gross
71867-10	1 mm	25x75	10 Gross
71868-01	1.2 mm	25x75	Gross
71868-10	1.2 mm	25x75	10 Gross

► 4. Microscope Slide, SUPERFROST® PLUS - Adhesion Slide

These Superfrost Plus(+) glass slides are made by a new process offering the following features:

- They place a permanent positive charge in the microscope slide.
- They electrostatically attract frozen tissue sections and cytology preparations, binding them to the slide.
- They form a bridge so that covalent bonds develop between formalin fixed sections and the glass.
- Tissue sections and cytological preparations adhere better to the Plus glass slides without the need for special adhesives or protein coatings.



continued >>>

➤ Microscope Glass Slides -Esco (continued)

➤ 4. Microscope Slide, SUPERFROST® PLUS - Adhesion Slide (continued)

BENEFITS:

- Plus glass puts an end to background staining.
- It eliminates blue or red background staining which is often encountered in hematoxylin and eosin staining of tissue sections mounted on albuminized glass.
- No brown background staining occurs when immuno-peroxidase or in situ DNA procedures are performed on our Plus glass. A higher degree of enzyme digestion can be performed on plus glass without the loss of tissue sections.
- Cytological preparations placed on Plus glass resist cell loss during enzyme digestion, DNA denaturation and RNA hybridization.
- Plus glass improves tissue adherence in microwave staining.
- Chromic acid washes are redundant for molecular hybridization because the slides are RNase-free.
- Plus slides are Color coded to help keep track of specimens during processing as well as filing.

The slides measure: 25x75 mm, 1 mm thick.



71869-10	Superfrost Plus Slide, White	1 gross	71869-31	Superfrost Plus Slide, Green	10 gross
71869-11	Superfrost Plus Slide, White	10 gross	71869-40	Superfrost Plus Slide, Pink	1 gross
71869-20	Superfrost Plus Slide, Blue	1 gross	71869-41	Superfrost Plus Slide, Pink	10 gross
71869-21	Superfrost Plus Slide, Blue	10 gross	71869-50	Superfrost Plus Slide, Yellow	1 gross
71869-30	Superfrost Plus Slide, Green	1 gross	71869-51	Superfrost Plus Slide, Yellow	10 gross

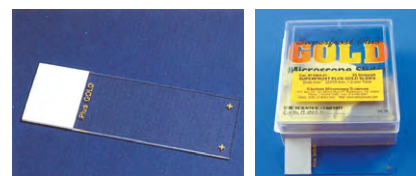
➤ 5. Superfrost® Plus Gold Slides

These slides are specially designed for the application of fresh or formalin fixed frozen tissue. They are inherently tissue binding so there is no need to add sprays or adhesives to the slides.

FEATURES:

- Securely attach frozen breast, brain, skin and other normally difficult to bond tissue sections to the slide.
- Ideal when special stains, immunocytochemical and in situ DNA hybridization techniques are applied on fresh and fixed frozen tissue.
- Assist tissue adherence during immunocytochemical analysis of estrogen and progesterone receptors in fresh frozen breast tissue.
- They are compatible with both toluidine blue and hematoxylin and eosin rapid frozen section stains.

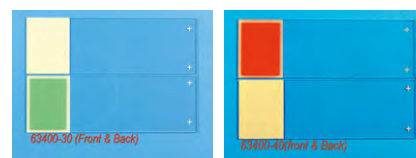
71864-01	Superfrost Plus Gold Slide	25 bx
71864-10	Superfrost Plus Gold Slide	10 cs



➤ 6. Colormark™ Plus Glass Slide

Specimen Slide identification is VITAL. Automated etched slide labeling instruments ensure specimen slide integrity but are difficult to read on ordinary slides. To clearly read diamond scribed slide labels against any surface, you need the only slide designed to be used with your automated slide labeling instrument. You need COLORMARK slides. These brightly printed slides greatly improve etched labeling visibility and offer all the advantages of Superfrost® slides. A bright contrasting color has been printed on the back of the Superfrost end so that patient or specimen information etched through the painted end on the front is clearly visible. Colormark Plus slides are adhesive coated therefore ensuring the adhesion of the section to the slide during staining procedures.

63400-10	White Frosted End Front, Black frosted End Back	1 gross
63400-11	White Frosted End Front, Black frosted End Back	10 gross
63400-20	Blue Frosted End Front, Blue Frosted End Back	1 gross
63400-21	Blue Frosted End Front, Blue Frosted End Back	10 gross
63400-30	Green Frosted End Front, Green Frosted End Back	1 gross
63400-31	Green Frosted End Front, Green Frosted End Back	10 gross
63400-40	Pink Frosted End Front, Red Frosted End Back	1 gross
63400-41	Pink Frosted End Front, Red Frosted End Back	10 gross
63400-50	Yellow Frosted End Front, Red Frosted End Back	1 gross
63400-51	Yellow Frosted End Front, Red Frosted End Back	10 gross
63400-60	Lavender Frosted End Front, Black Frosted End Back	1 gross
63400-61	Lavender Frosted End Front, Black Frosted End Back	10 gross



continued >>>

► Microscope Glass Slides -Esco (continued)

► 7. Control Slides

Use our Histology Control Slides and you will always know for sure which specimen is the Patients and which is the Control.

- Patient and Control tissue samples on the same slide.
- Positive identification of control and patient samples.
- Utmost adhesion of samples to slide throughout staining procedure.
- Proof of correct staining procedures.
- Easy and permanent identification of slides.

Available in two configurations: Style #329+ with 3/4 inch of frosted area; style 334+ with 1 inch frosted area.

63448-10	Control Slide 329+	144/pk
63448-20	Control Slide 334+	144/pk



► 8. Special Glass Slides:

► A. Cytology Slide: 1x3" (25x75mm), 1mm Thick

- Superfrost letters VCE and lines on the same side as the Superfrost end.

71874-01	Cyto-Slide Letters VCE & Lines	1 gross
71874-10	Cyto-Slide Letters VCE & Lines	10 gross

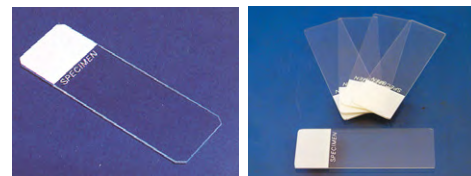
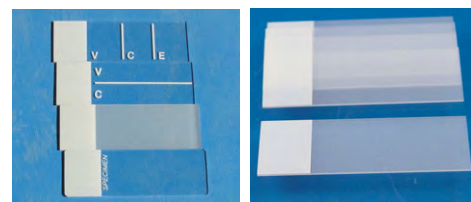
- Superfrost letters VC and lines on the same side as the Superfrost end.

71875-01	Cyto-Slide Letters VC & Lines	1 gross
71875-10	Cyto-Slide Letters VC & Lines	10 gross

- Dakin - A fully frosted sandblasted surface on the same side as the Superfrosted end.

71876-01	Dakin - Fully Frosted Slide	1 gross
71876-10	Dakin - Fully Frosted Slide	10 gross

- B. Round Corner Microslides: This item is discontinued. Please see SuperFrost™ Clipped Corner Slide, #s 71882-01 and 71882-10 below.

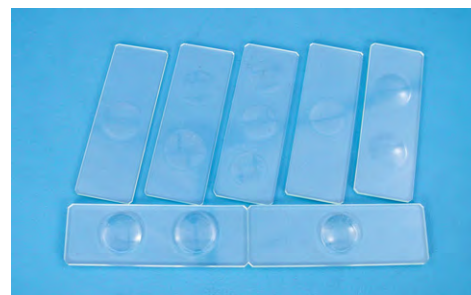


- C. Concavity Slides Polished spherical depression. Useful for tissue cultures.

Measurements:

Glass Slide Size:26mm x 76mm
 Concavity Diameter:15 - 18 mm
 Depth of Well:0.5 - 0.8 mm

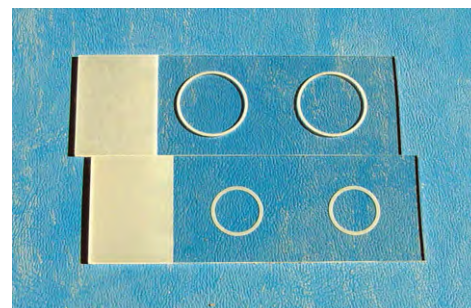
Cat.#	Thickness	No. Wells	Pack
71878-01	1.4-1.6mm	1	12/pk
71878-03	1.4-1.6mm	2	12/pk
71878-04	1.4-1.6mm	3	12/pk
71878-05	1.95-2.35mm	1	12/pk
71878-06	1.95-2.35mm	2	12/pk
71878-07	3.12-3.22mm	1	12/pk
71878-08	3.12-3.22mm	2	12/pk



► D. Slides with Etched Rings

Useful for Fluorescent Antibody Examination. The size of the slide is 3"x1", approximately 1 mm thick, with an etched frosted end. Pre-cleaned. Packed 72/bx.

71879-10	Two Etched 10mm Circle Slide	1 gross
71879-11	Two Etched 10mm Circle Slide	10 gross
71879-15	Two Etched 15mm Circle Slide	1 gross
71879-16	Two Etched 15mm Circle Slide	10 gross



► 9. SuperFrost™ Clipped Corner Slide

Designed specially for the Sysmex SP-100 slide prep unit and recommended for the Diagnostics. The 45 degree clipped corner slide offers exceptional cleanliness and resistance to sticking. The tight tolerances for the length and width help to reduce accumulation of glass chips within the instrument. The pre-cleaned slide is 25 x 75mm and approximately 1 mm thick.

Ideal for technicians, who routinely prepare large number of slides.

Cat.#	Description	Qty
71882-01	SuperFrost™ Clipped Corner Slide	1 gross
71882-10	SuperFrost™ Clipped Corner Slide	10 gross



► Microscope Slide – Gold Seal®

In our line of slides we proudly introduce GOLD SEAL® microscope slides for your convenience. GOLDSEAL® slides are made from pure white glass (soda-lime) and at accurately cut sizes. To preserve the highest quality from manufacturer to ultimate user, all GOLD SEAL® slides are hermetically sealed in our Moisture-Barrier™ system, providing a dry-slide environments during shipment and storage.

UltraStick™ (adhesion coating: APTES, 3-Aminopropyl Triethoxysilane)– Adhesion coated micro slides- one of the best from GOLD SEAL®- are ideal for histological and cytological applications demanding superior specimen-to-slide adhesion. The enhanced silane coating eliminates tedious procedures and special additives to your water bath. Procedures such as immunoperoxidase, in situ DNA hybridization, enzyme digestion and frozen tissue processing will benefit from the amplified adhesion characteristics of this product. Overall cost savings and assured quality of your prepared specimen will be recognized with UltraStick™ from Gold Seal®



Cat.#	Gold Seal	Description	Pack
Plain Slides			
63710-05	3010	3 x 1", 1 mm Thick	1 gross
63710-25	3010	3 x 1", 1 mm Thick	25 gross
63711-05	3048	3 x 1", 1.2 mm Thick	1 gross
63711-25	3048	3 x 1", 1.2 mm Thick	25 gross
63712-05	3010-P	3 x 1", 1mm Thick – Cytogenetics processing	1 gross
63712-25	3010-P	3 x 1", 1mm Thick – Cytogenetics processing	25 gross
Patented Moistur-Barrier™ enclosing 5 gross inner packages			
63718-05	3054	25 x 75mm, 1mm Thick, Plain	5 gross
63718-25	3054	25 x 75mm, 1mm Thick, Plain	25 gross
63719-05	3055	25 x 75mm, 1mm Thick, White Rite-On™ Frost	5 gross
63719-25	3055	25 x 75mm, 1mm Thick, White Rite-On™ Frost	25 gross
Rite-On™ Frosted Slides with brilliant white epoxy ink			
63720-05	3051	3 x 1", 1mm Thick, Frosted One End, One Side	1 gross
63720-25	3051	3 x 1", 1mm Thick, Frosted One End, One Side	25 gross
63721-05	3050	25 x 75mm, 1mm Thick, Frosted One End, One Side	1 gross
63721-25	3050	25 x 75mm, 1mm Thick, Frosted One End, One Side	25 gross
63722-05	3050-P	25 x 75mm, 1mm Thick, Frosted End, One Side, Cytogenetics Processing	1 gross
63722-25	3050-P	25 x 75mm, 1mm Thick, Frosted End, One Side, Cytogenetics Processing	25 gross
63723-05	3049	3 x 1", 1.2mm Thick, Frosted One End, One Side	1 gross
63723-25	3049	3 x 1", 1.2mm Thick, Frosted One End, One Side	25 gross
UltraFrost™ Frosted Slides, white epoxy ink frosted one end, one side			
63728-05	3063	25 x 75mm, 1mm Thick, Frosted one End with Gold Seal Logo	1 gross
63728-25	3063	25 x 75mm, 1mm Thick, Frosted one End with Gold Seal Logo	25 gross
63729-05	3064	25 x 75mm, 1mm Thick, Frosted one End with Pre-Print Patient Information Label and Gold Seal® Logo	1 gross
63729-25	3064	25 x 75mm, 1mm Thick, Frosted one End with Pre-Print Patient Information Label and Gold Seal® Logo	25 gross
Fluorescent Antibody Slides			
63732-05	3032	3 x 1", 1.2mm Thick with Two 10mm diameter circles, Frosted one Side, one End with White Epoxy Ink, including Circles	1 gross
63732-02	3032	3 x 1", 1.2mm Thick with Two 10mm diameter circles, Frosted one Side, one End with White Epoxy Ink, including Circles	25 gross
UltraStick™/UltraFrost™ Adhesion Slides on frosted one end, one side with epoxy ink			
63734-01	3039	25 x 75mm, 1mm Thick, Surface Coated with APTES for Adhesion	1 gross
63734-10	3039	25 x 75mm, 1mm Thick, Surface Coated with APTES for Adhesion	10 gross

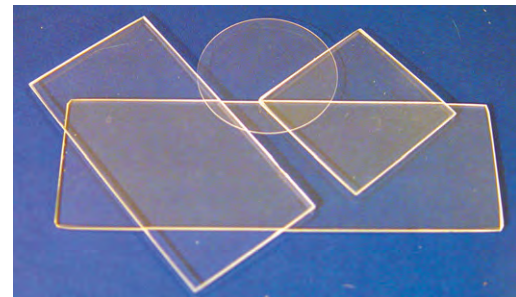
► Large Glass Slides



In addition to our comprehensive collection of glass slides manufactured by ESCO we now carry large glass slides which are available in 75x38mm and 75x51mm. These slides are precleaned, individually selected and are suitable for large specimen sections such as, brain tissue.

71860-01 75x38mm Glass Slide, 1mm Thick 1 gross/pk
71862-01 75x51mm Glass Slide, 1.2mm Thick 1 gross/pk

► Quartz Microscope Slides



There are many applications that require slides that have absolute UV transparency and high temperature properties. EMS now is introducing the highest quality, clear fused quartz microscope slides to meet all of these requirements.

- The window of highest transparency to UV is between 0.15µ to 5µ.
- Typical flatness measured 2" to 4" bands per inch.
- Soften point is about 1250°C (2282°F).
- Standard microscope slide thickness is 1mm.

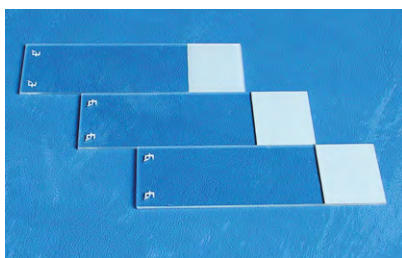
Cat.#	Description	Pack
72250-01	Slide, 1" x 1" (25 x 25 mm)	each
72250-02	Slide, 2" x 1" (50 x 25 mm)	each
72250-03	Slide, 3" x 1" (75 x 25 mm)	each
72250-04	Slide, 2" x 3" (50 x 76 mm)	each
72250-05	Slide, 10mm x 10 mm	each

These slides have all of the same properties of the ones above with the only difference is these are 0.5mm thick:

72250-06	1" x 1" (25x25mm)	each
72250-07	1" x 2" (25 x 50mm)	each
72250-08	1" x 3" (25x76mm)	each

For Quartz Coverslips, see page 325 >>>

► Excell™ Adhesion Slides



The Excell slide was developed with superior adhesion and wettability properties, and has been shown to perform very well in most applications.

■ **Excell™ Adhesion Surface for Heat Induced Epitope Retrieval** – Excell™ was developed for use in the HIER methods that require high pH antigen retrieval solutions, including EDTA. Formalin fixed paraffin embedded tissue demonstrated more consistent attachment when performing these procedures on the Excell™ surface.

■ **Automated Staining** – Excell™ has a uniform hydrophilic surface that works extremely well with automated staining equipment.

■ **Cell Culture** – Excell™ surface technology conditions the surface to enhance the attachment of anchorage dependent cell lines, including many fastidious lines, such as primary neuronal cells. Attachment and proliferation is increased so cells achieve a confluent monolayer sooner

■ **Plastic** – Excell™ works well for both Epon and Methyl Methacrylate sections. Its uniformly hydrophilic surface allows the sections to spread well during initial attachment. Section adherence is maintained throughout lengthy staining procedure.

■ **Laser Capture Microdissection** – Excell™ gives you the advantage of excellent tissue adherence of all tissue types, yet it easily releases those area of interest identified for Laser Capture Microdissection.

Cat.#	Description	Qty
64370-01	Excell™ Adhesion Slide	144/pk

► Retriever Tissue Slides

Retriever Tissue Slides are high adhesive glass microscope slides for paraffin-embedded tissue section, including tissue arrays. The slides were designed and optimized for the EMS Antigen Retriever (62700 series) to preserve the section attachment and tissue morphology during heat-induced epitope recovery in Retriever in pH6 (Low), pH9 (High), or Universal Retriever buffer.

Slides can also be successfully used in any other epitope-recovery technology (autoclave, microwave, proteolytic) and show superior performance over positively charged or polylysine-coated slides, especially in high pH buffers and recovery buffers containing EDTA.

Cat.#	Description	Qty
71880-50	Retriever Tissue Slides	72/pk

► Adhesion Slide – TruBond™

Adhesive slides with proven performance under high temperature and pH conditions

These adhesive, including the hydrophilic TruBond™ 360, slides work well with automatic IHC applications. EMS is confident that the quality of these slides will exceed your expectations. For problems with tissue loss try our TruBond™ 380.

Available colors: White, Blue, Green and Yellow.



	TruBond™ 380	TruBond™ 360	TruBond™ 200	TruView™ Fine
Glass Type	High Clarity, Low Fluorescence White	High Clarity, Low Fluorescence White	High Clarity, Low Fluorescence White	High Clarity, Low Fluorescence White
Surface Wettability	Hydrophilic	Hydrophilic	Hydrophobic	Hydrophilic
Adhesion	Very Strong	Strong	Strong	Good
Edge Treatment	Ground Corner	Ground Corner	Ground Corner	Ground Corner
For Manual IHC	Yes	Yes	Yes	No
For Automatic IHC	Yes	Yes	Yes	No
For Fluorescence	Yes	Yes	Yes	Yes
Recommended Applications	<ul style="list-style-type: none"> ■ HIER processes when tissue type require extra strong adhesion ■ Epitope enhancement & DNA probe procedures ■ Autopsy & brain sectioning 	<ul style="list-style-type: none"> ■ All IHC applications ■ HIER pH 6 & pH 9 protocols ■ Routine histology ■ Frozen section 	<ul style="list-style-type: none"> ■ All IHC applications ■ Routine histology 	<ul style="list-style-type: none"> ■ All standard procedures

TruBond™ is packaged 100 slides per box, 10 boxes to a case.

Cat#	Description	Color	Qty	Cat#	Description	Color	Qty
63700-W1	TruBond™ 380	White	10/bx	63702-W1	TruBond™ 200	White	10/bx
63700-W10			1000/cs	63702-W10			1000/cs
63700-B1	TruBond™ 380	Blue	10/bx	63702-B1	TruBond™ 200	Blue	10/bx
63700-B10			1000/cs	63702-B10			1000/cs
63700-G1	TruBond™ 380	Green	10/bx	63702-G1	TruBond™ 200	Green	10/bx
63700-G10			1000/cs	63702-G10			1000/cs
63700-Y1	TruBond™ 380	Yellow	10/bx	63702-Y1	TruBond™ 200	Yellow	10/bx
63700-Y10			1000/cs	63702-Y10			1000/cs
63701-W1	TruBond™ 360	White	10/bx	63703-W1	TruView™ Fine	White	10/bx
63701-W10			1000/cs	63703-W10			1000/cs
63701-B1	TruBond™ 360	Blue	10/bx	63703-B1	TruView™ Fine	Blue	10/bx
63701-B10			1000/cs	63703-B10			1000/cs
63701-G1	TruBond™ 360	Green	10/bx	63703-G1	TruView™ Fine	Green	10/bx
63701-G10			1000/cs	63703-G10			1000/cs
63701-Y1	TruBond™ 360	Yellow	10/bx	63703-Y1	TruView™ Fine	Yellow	10/bx
63701-Y10			1000/cs	63703-Y10			1000/cs

General Properties

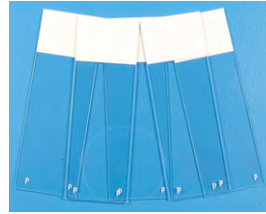
- Retriever Tissue Slides are made from soda lime glass
- Dimensions approximately 76 x 26mm, Thickness 1.0mm.
- 90° ground edges
- Colored or white marking area 20mm, at one end, on one side
- Pre-cleaned, ready for use

- Autoclavable
- Supplied in plastic boxes of 72 pieces (call for carton price, 20 boxes in a carton)
- Carry recommended best before date and batch number for comprehensive information and traceability

For more information on the Retriever, see pages 612-613 >>>>

► Poly-L-Lysine Coated and Silane Treated Microscope Slide

Our premium glass slides with a frosted end are now available pre-coated with either Poly-L-Lysine or Silane (aminoalkylsilane). These slides improve the adhesion of tissues to the slide.



63410-01	Poly-L-Lysine Coated Slides	72/bx
63410-02	Poly-L-Lysine Coated Slides	144/bx
63411-01	Silane Coated Slides	72/bx
63411-02	Silane Coated Slides	144/bx

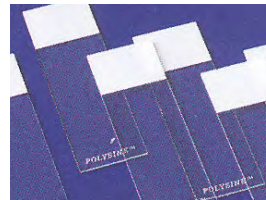
TECHNICAL TIP

Poly-L-Lysine Coating Of Slides

Poly-L-Lysine with a molecular weight greater than 150,000 (150,000-300,000) should be used. To make a stock solution: Take 0.1% Poly-L-Lysine in distilled water and store it in a dispensing vial and freeze it at -20°C. A drop (10-15ml) is dispersed at the end of a clean glass slide and smeared along its length with the end of another clean glass slide in the same way as blood film. Make sure that the film of Poly-L-Lysine is thin enough for interference colors to be seen as it is being smeared. The slide is ready to use within minutes of drying. If the Poly-L-Lysine is properly applied, it will not affect immunostaining, but it may cause precipitation in some silver impregnation methods. Therefore, it should be avoided if immunogold-silver methods are to be used.

► Polysine™ Microscope Adhesion Slide

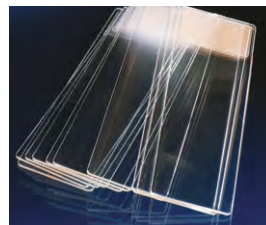
The permanent bio-adhesive material on our Polysine™ slide attracts frozen and paraffin embedded sections, centrifuge preparation and cytology smears.



Cat.#	Description	Qty
63412-01	Polysine™ Adhesion Slide	72/bx
63412-02	Polysine™ Adhesion Slide	2x72/bx

► Permanox™ and Polystyrene Microscope Slides

Permanox™ is a strong, biologically inert material resistant to non-chlorinated hydrocarbons, acetone, and other EM reagents. Permanox™ slides allow you to do cell fixation and staining on the slide; they can be cut with scissors. Permanox™ has not been shown to be autofluorescent. All of the microscope slides are 1" x 3".

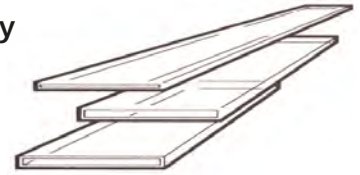


NOTE: Long exposure to solvents will cause the slide to warp. Xylene and Toluene based mounting media should be avoided. Glycerol, gelatin, and other aqueous based media are recommended.

71885	Permanox™ Microscope Slide	20/pk
71886	Permanox™ Microscope Slide	100/pk
71888	Polystyrene Microscope Slide	20/pk
71889	Polystyrene Microscope Slide	100/pk

► Borosilicate Capillary Micro Glass Slide

Made from Corning® 7740 borosilicate, low expansion, type I glass.



Micro glass slides are precision rectangular glass capillary tubes for use in microscopic viewing of liquid samples. Capillary action instantly collects the sample and the thin glass walls minimize evaporation. The design of these cells eliminates the needs for cover glass and the hanging drop method. These micro glass slides can withstand heat up to 500°C. Samples can be retained for future reference by sealing or cementing open ends. Micro glass slide are packaged in plastic vials.

I.D. tolerance ± 10%, Wall tolerance ± 20%

TECHNICAL – CORNING® GLASS 7740

Common Names – Borosilicate, Low Expansion, Type I Glass.

Standards – Type I, Glass A

Borosilicate conforming to federal specification DD-G-541b and ASTM E-438. Also meets the U.S. Pharmacopodia specs for Type I Borosilicate Glass.

Properties:

Coeff. Of Exp.32.5 x 10⁻⁷ cm/cm/°C
 Strain Point510 °C
 Anneal Point.....560 °C
 Soften Point821 °C
 Density.....2.23 g/cm³
 Youngs Mod6.4 x 10³ Kg/mm²
 Refract Index1.74 @ Sodium D Line
 Temp Limits490°C (Extreme service)
230°C (Normal Service)
 Max. Thermal Shock160 °C

Composition: % Approximate

SiO₂80.6
 B₂O₃10
 Na₂O4.0
 Al₂O₃2.3
 Misc. Traces0.1

Cat. #	Dimensions		Wall Thickness	Length mm	Qty.
	ID. mm	Path x Width			
Standard Micro Glass Slides					
63820-05	0.02 x 0.2		0.020	50	30/vial
63820-10	0.02 x 0.2		0.020	100	30/vial
63821-05	0.03 x 0.3		0.025	50	33/vial
63821-10	0.03 x 0.3		0.025	100	33/vial
63822-05	0.04 x 0.4		0.030	50	36/vial
63822-10	0.04 x 0.4		0.030	100	36/vial
63823-05	0.05 x 0.5		0.040	50	44/vial
63823-10	0.05 x 0.5		0.040	100	44/vial
63824-05	0.10 x 1.0		0.090	50	40/vial
63824-10	0.10 x 1.0		0.090	100	40/vial
63825-05	0.20 x 2.0		0.150	50	36/vial
63825-10	0.20 x 2.0		0.150	100	36/vial
63826-05	0.30 x 3.0		0.300	50	31/vial
63826-10	0.30 x 3.0		0.300	100	31/vial
63827-05	0.40 x 4.0		0.400	50	28/vial
63827-10	0.40 x 4.0		0.400	100	28/vial
63828-10	0.50 x 5.0		0.300	100	14/vial
63829-10	0.60 x 6.0		0.400	100	12/vial
63830-10	0.70 x 7.0		0.460	100	9/vial
63831-10	0.80 x 8.0		0.540	100	7/vial
63832-10	0.90 x 9.0		0.600	100	6/vial
63833-10	1.00 x 10.0		0.670	100	4/vial
63840-05	0.05 x 1.0		0.030	50	50/vial
63840-10	0.05 x 1.0		0.030	100	50/vial
63841-05	0.10 x 2.0		0.100	50	45/vial
63841-10	0.10 x 2.0		0.100	100	45/vial
63842-05	0.20 x 4.0		0.150	50	36/vial
63842-10	0.20 x 4.0		0.150	100	36/vial
63843-05	0.30 x 6.0		0.300	50	24/vial
63843-10	0.30 x 6.0		0.300	100	24/vial
63844-05	0.40 x 8.0		0.400	50	18/vial
63844-10	0.40 x 8.0		0.400	100	18/vial

EMS is proud to introduce...

► BrightSlide™ D and BrightSlide™ DB

Fluorescence Enhancing Slides and Versatile, (bio)-functionalized coatings for Glass, Metal Oxides and ITO

Fluorescence Enhancing Slide

Fluorescence systems (e.g. microscopes) are today widely used in the life science research. For many applications an increased sensitivity compared to existing glass slides is required. The BrightSlide™ technology uses a proprietary dielectric coating to significantly enhance the signal intensity of fluorescence molecules from the surface. It can be read out with all systems that illuminate and detect from the top. The technology makes use of purely optical principles and substitutes conventional glass substrates.

The BrightSlide™ D (Dielectric) provides a bare SiO₂ surface.

Benefits

- Better signal to noise ratio
- Less sample material can be used
- More genes can be detected
- Existing instrument platform can be used
- Purely optical amplification of fluorescence signal
- Dielectric, high quality SiO₂ surface ready to apply AziGrip4™ or customer bio-functional coating (use your own bio-functional coating, no change of chemical protocol required)

Applications

- Universal detection platform for fluorescence detection on planar surfaces, e.g. fluorescence detection of ultra thin samples
- Differential gene expression using Cy3 and Cy5 labels simultaneously
- Gene expression using Cy3 or Cy5 labels independently

The BrightSlide™ D (Dielectric) comes standard as a bare SiO₂ Surface. However you may also have the slide with the Biofunctional coating (AziGrip4™)

The following is the standard configurations of the slides

1. BrightSlide™ D

Specification

Fluorescence Enhancing Slide optimized for 488nm and 590nm excitation wavelengths (other wavelengths on request)

Both polarizations (s and p-polarization) can be used for excitation and emission

0° - 3° angle of incidence for excitation light

Ultralow fluorescence background

Durable and chemically resistant label with a unique serial number

Suitable for most of commercially available fluorescence microscopes with illumination and detection from the top

Substrate material

D263T eco (other materials on request)

Substrate format

75 ±0.05mm x 25 ±0.05mm x 1.1 ±0.1mm (other formats on request)



Active area

63mm x 22mm

Cosmetic

5/2x0.4; C2x0.4; E1.0 according to DIN ISO 10110

Chemical composition of the top surface

Clean, dielectric, SiO₂ surface (ITO and/or AziGrip4™ bio-functional coating on request)

Environmental stability

Stable against temperatures up to 200°C
All strongly oxidizing cleaning protocols can be used
All organic solvents can be used
Chemical reagents which etch SiO₂ (HF, NaOH, KOH) can destroy the enhancement effect of the BrightSlide™

Storage

Store in clean environment at room temperature

2. BrightSlide™ DB

Specification

Fluorescence Enhancing Slide with Bio-functional coating on the top

Suitable for most of commercially available fluorescence microscopes with illumination and detection from the top

Versatile, (bio)-functionalized coatings for Glass, Metal Oxides and ITO

The AziGrip4™-Bio-functional coating platform is a versatile tool for functionalizing surfaces for Life Science, Fluorescence and Medical Applications. Glass, metal oxides, ITO and plastics can be treated in order to bind different amounts of macromolecules, tune specific cell-adhesion, reduce non-specific binding background, provide better signal-to-noise ratios and patterned surfaces with multi-functionalities.



Benefits

- Provides amino or carboxy functionalized surfaces for high density binding of biomolecules through standard procedures (EDC/NHS)
- Enables direct linking of macromolecules without further functionalization
- Improves adhesion of cells by use of specific binding sequences
- Simplifies depositions of phospholipid by-layers
- Reduces unwanted, non-specific binding to improve signal-to-noise
- Provides patterned surfaces with multi-functionalities

Applications

- Diagnostics
- Bio-analytics
- Lab-on-a-chip
- Fluorescence microscopy
- Cell culture
- Support for lipidic membranes and other emerging application

► BrightSlide™ D and BrightSlide™ DB (continued)

Durable and chemically resistant label with a unique serial number

Optical coating

Optimized for 488nm and 590nm excitation wavelengths (other wavelengths on request)

Both polarizations (s and p-polarization) can be used for excitation and emission

0° - 3° angle of incidence for excitation light

Ultralow fluorescence background

Bio-functional coating

Full surface monolayer with integrated functionality (patterned coating on request)

1-2 nm dry coating thickness

Robust and chemically stable (increased stability in comparison to aminopropylpolysiloxane)

Substrate material

D263T eco (other materials on request)

Substrate format

75 ±0.05mm x 25 ±0.05mm x 1.1 ±0.1mm (other formats on request)

Active area

63mm x 22mm

Optical coating

5/2x0.4; C2x0.4; E1.0 according to DIN ISO 10110

Chemical composition of the top surface

Optical coating

Clean, dielectric, SiO₂ surface (ITO coating on request)

Bio-functional coating

AziGrip4™ with Amine functional group (other AziGrip4™ bio-functional coatings, e.g. brush-like hydrophilic, brush-like non-fouling, hydrogel-like,

with Carboxy, Epoxy, Biotin, NTA, NHS, Cholesterol, ss-DNA or Peptide bio-functionality on request)

Environmental stability (optical coating only)

Stable against temperatures up to 200°C

All strongly oxidizing cleaning protocols can be used

All organic solvents can be used

Chemical reagents which etch SiO₂ (HF, NaOH, KOH) can destroy the enhancement effect of the BrightSlide™

Storage

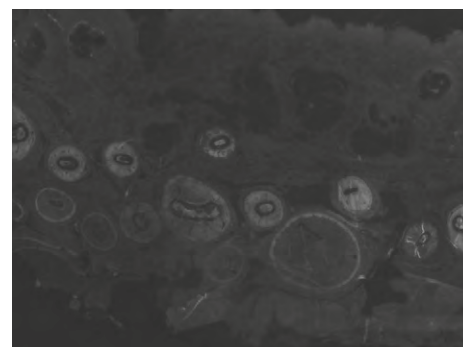
Store in clean environment at room temperature

Technical Data

- Substrate material D263T eco, other materials on request
- Substrate format 75mm x 25mm x 1.1mm, other formats on request
- Active area 63mm x 22mm
- Fluorescence enhancement optimized for one to three customer specific dyes on one slide
- Both polarizations (s and p-polarization) can be used for excitation and emission
- 0° - 3° angle of incidence for excitation light
- Ultralow fluorescence background
- Ultraclean SiO₂ surface
- Laser scribed, durable and chemically resistant label with a unique serial number
- Suitable for most of commercially available fluorescence microscopes with illumination and detection from the top
- Stringent batch to batch reproducibility
- Packed under clean-room (class 100) conditions



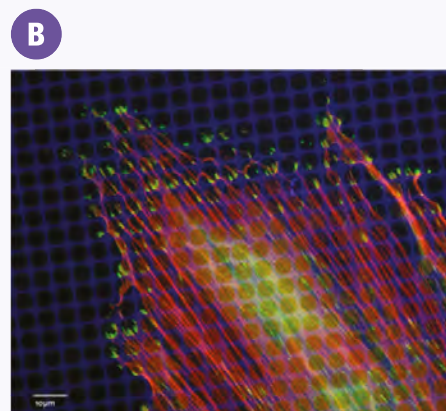
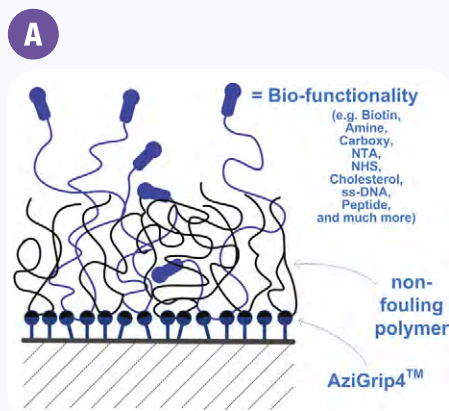
Enhancement of the fluorescence on BrightSlide™ Image of 150nm thick section of biological material using BrightSlide™



Fluorescence signal on standard, glass slide Image of 150nm thick section of biological material using standard, glass slide

Ordering Information

Cat. #	Description	Qty.
63426-D	BrightSlide™D	each
63426-D-10		10/pack
63426-D-100		100/pack
63426-DB	BrightSlide™DB	each
63426-DB-10		10/pack
63426-DB-100		100/pack



A. Sketch of the AziGrip4™ Bio-functional coating Two different polymers (non-fouling and bio-functionalized) are linked to the substrate via the AziGrip4 molecules and form a hydrophilic brush with an end bio-functionalization suitable for use as biosensor, or as specific adhesive site for cell surfaces

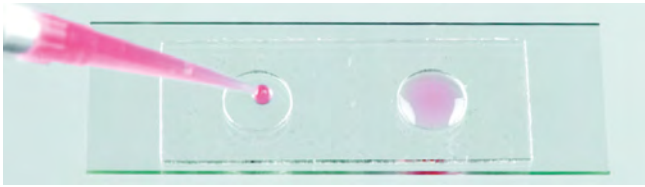
B. Application example: Adhesion sites of Fibroblast grown on 5 x 5 μm adhesive pattern separated by 1 μm Atto633-fluorescently labeled grid.

Courtesy of F. Anderegg, ETH Zurich

AziGrip4™ is a Trademark of SuSOS AG

► Microscope Slide-Wells

Disposable Liquid-Holding Wells



Convenient Pre-cut, twin adhesive well stickers (1cm diameter) firmly adhere to microscope slides. Examine specimens with or without cover slips. Available in depths of 0.25mm and 0.50mm.

Multiple Applications Examine or count tissue culture cells, yeast, bacteria and other microorganisms. Piggy-back with Microscope Slide-Grids to facilitate counting and sizing.

Versatile - Compatible with different styles of microscopes (conventional, inverted or dissecting).

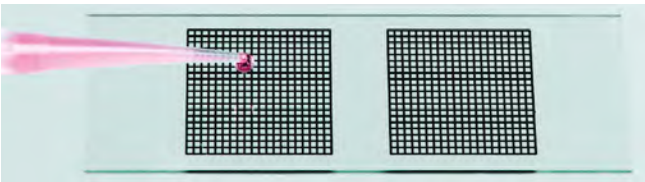
Chemically Inert - Made from polyester with an acrylic adhesive.

Microscope Slide-Wells are inert and stable under most laboratory conditions.

70366-12	Slide Wells, 0.25mm thick	25/pk
70366-13	Slide Wells, 0.50mm thick	25/pk

► Microscope Slide-Grids

Disposable Adhesive Grids



Convenient - Easy-to adhere stickers having side-by-side twin grids (20mm x 20mm each with 1mm line spacing) for microscope slides. Count or measure cells and estimate the size or length of microscopic or semi-micro objects

Versatile - Compatible with different styles of microscopes (conventional, inverted or dissecting). Virtually all cells and specimens placed on top of Slide-Grids can be counted and/or sized.

Dry Or Wet - Use with dry specimens or suspended specimens such as cells held in buffer under cover slips. Separate cover slips can be placed over each Slide-Grid.

Chemically Inert - Made from polyester with an acrylic adhesive. Slide-Grids are inert and stable under most laboratory conditions.

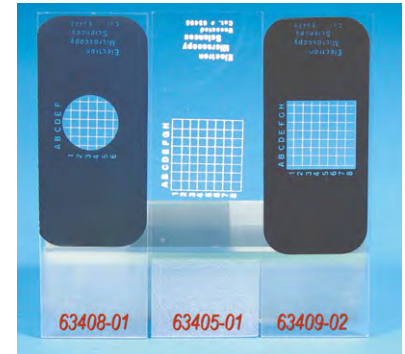
70366-14	Slide Grids, 20mm x 20mm	40/pk
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► Gridded Microscope Slides

These 3 x 1" slides have an indexed grid on the reverse side of the frosted end. The ink is resistant to stains and common laboratory solvents. Each square grid fills one low-powered-field (approximately 100X

magnification). These slides make it easy to locate an organism or cell every time. There are 64 squares in total. The slides are available with coatings of Poly-L-Lysine or Silane, or they can be purchased plain (uncoated). Packaged 72 slides/box.

The grid measures 2 mm square-16mm total. Numbers 1-8 and alpha A-H.



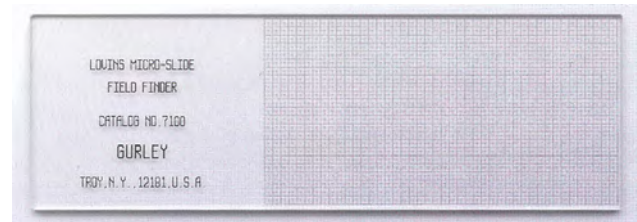
► 1. Gridded Microscope Slides without hydrophobic coating.

63405-01	Grid Slides, Uncoated	72/pk
63405-02	Grid Slides, Uncoated	144/pk
63406-01	Grid Slides, Poly-L-Lysine	72/pk
63406-02	Grid Slides, Poly-L-Lysine	144/pk
63407-01	Grid Slides, Silane	72/pk
63407-02	Grid Slides, Silane	144/pk

► 2. Gridded Microscope Slides with hydrophobic coating.

63408-01	Grid Slides, Round well	72/pk
63409-02	Grid Slides, Square well	72/pk

► Lovins Micro-Slide Field Finder



Marking a microscope slide to identify a particular field of interest for future reference has always been a difficult problem for many microscopists.

The Field Finder has a precision rectangular-coordinate grid pattern, which is accurately positioned on a special microscope slide. The slide has been carefully edge ground to provide straight edges and square corners to ensure repeatable results

Lovins Micros-Slide Field Finder helps you to index points of interest on a microscope slide the same way you find them on a road map. A standard 75 x 25mm glass slide has a photo etched grid pattern of 1mm squares, subdivided into 0.1 mm intervals. Each square is marked with a letter and a number. You center the detail in the field of the microscope, replace the specimen slide with the field finder, and read the coordinates. Note reading on slide, and you can find that detail immediately by reversing procedure.

The pattern is imaged in vacuum deposited chrome for durability.

Cat.#	Slide Size	Qty
72266-01	Micro-Slide Field Finder, 75 x 25 mm	each

► PTFE Printed Slides

PTFE Printed Slides, are extremely hydrophobic, acetone proof, chemical resistant and autoclavable. They are perfect for controlling cross-contamination in staining, immunolabeling and immunofluorescence tests. All printed slides are precleaned. The well surface is 100% wettable, which enhances cell attachment and increases its spreading capabilities within the well. These slides minimize the use of expensive purified antigens and antibodies. The slides measure 3x1" (76x26x1mm).

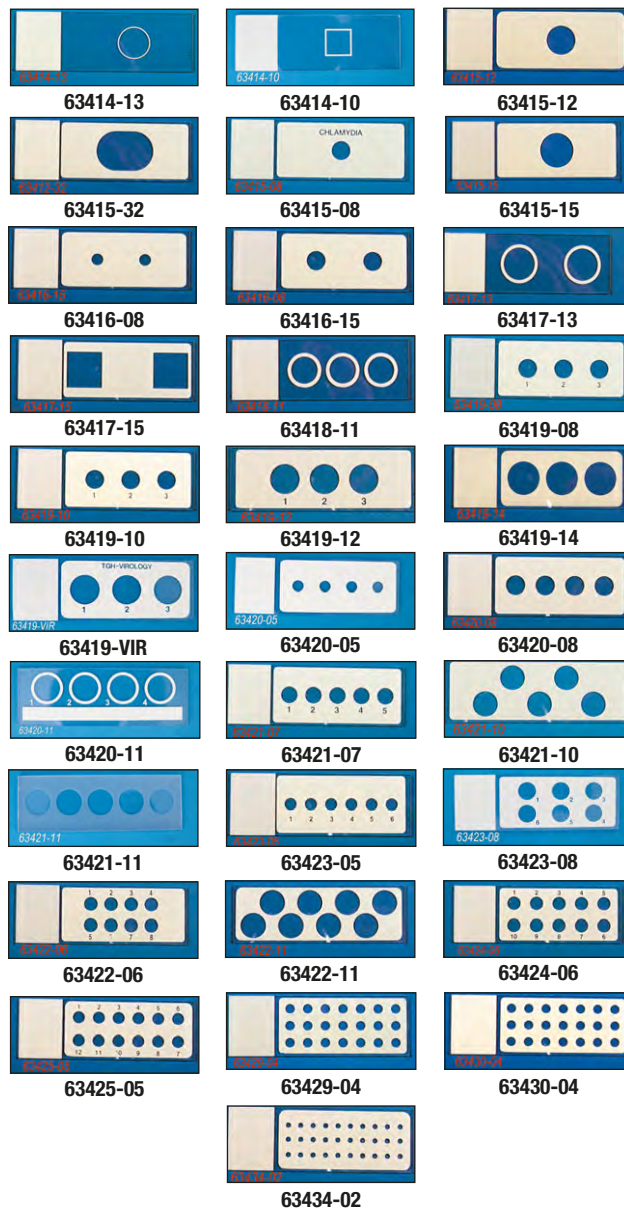
EMS Printed Slides are manufactured to order offering maximum shelf life. The shelf life of PTFE Printed Slides range from 18 months to two years. However, it is recommended that all glass slides (Printed or Un-printed) be used in a timely manner to avoid glass "weathering", (slides becoming cloudy or hazy even with proper storage. All of our Printed Slides are autoclavable and have a frosted end. They are intended for one time use only.

All EMS printed slides are printed with White PTFE other colors are available upon request.

FEATURES:

- Super Hydrophobic Mask
- Clean, Wettable Wells
- A Bioadhesive Surface Treatment to Enhance Cell and Tissue Attachment

Cat.#	Number of Well	Well Size	Pack
63414-13	1 Ring	13 mm Dia.	72/pk
63414-10	1 Square	10.7x10.7mm	72/pk
63415-12	1 Round	12 mm Dia.	72/pk
63415-32	1 Oval	24.4x16.7mm	72/pk
63415-08	1 Round	8 mm Dia.	72/pk
63415-15	1 Round	15 mm Dia.	72/pk
63416-08	2 Round	8 mm Dia.	72/pk
63416-15	2 Round	15 mm Dia.	72/pk
63417-13	2 Ring	13 mm Dia.	72/pk
63417-15	2 Square	15x15mm	72/pk
63418-11	3 Ring	11.28mm Dia.	72/pk
63419-08	3 Round	8 mm Dia.	72/pk
63419-10	3 Round	10 mm Dia.	72/pk
63419-12	3 Round	12 mm Dia.	72/pk
63419-14	3 Round	14 mm Dia.	72/pk
63419-VIR	3 Round TGH	VIROLOGY	72/pk
63420-05	4 Round	5 mm Dia.	72/pk
63420-08	4 Round	8 mm Dia.	72/pk
63420-11	4 Ring	11.43 mm Dia.	72/pk
63421-07	5 Round	7 mm Dia.	72/pk
63421-10	5 Round	10 mm Dia.	72/pk
63421-11	Etched 5 Round	11.43 mm Dia.	72/pk
63423-05	6 Round	5 mm Dia.	72/pk
63423-08	6 Round	8 mm Dia.	72/pk
63422-06	8 Round	6 mm Dia.	72/pk
63422-11	8 Round	11 mm Dia.	72/pk
63424-06	10 Round	6 mm Dia.	72/pk
63425-05	12 Round	5 mm Dia.	72/pk
63429-04	21 Round	4 mm Dia.	72/pk
63430-04	24 Round	4 mm Dia.	72/pk
63434-02	30 Round	2 mm Dia.	72/pk

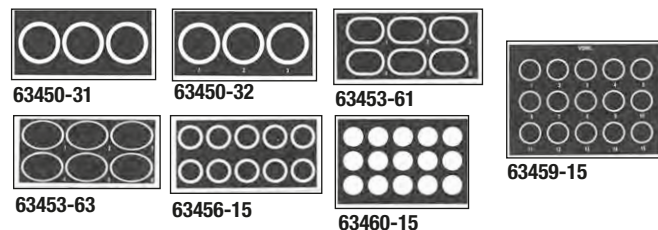


TECHNICAL TIP

Our PTFE Printed slides may be used for all types of Cell Culture work and they may be sterilized by UV light, Autoclave as well as EtOH. These unique slides can be coverslipped with the addition of a little more mounting media than a plain slide would use.

► Macro/Latex Agglutination

Cat.#	Glass Size	Configuration	Well/Ring Size	Pack
63450-31	4" x 3"	3 Ring, yellow	26.4 mm	25/pk
63450-32	4.25"x2"	3 Ring, white	26.4 mm	25/pk
63453-61	4.4"x2.1"	6, white oval	17.4mm x26mm	25/pk
63453-63	4.215"x2"	6 white oval	17.4mmx26mm	25/pk
63456-15	4.331"x2.165"	10 Ring white	15 mm	25/pk
63459-15	4.75"x3.5"	15 Ring white	15 mm	25/pk
63460-15	3"x2"x1.2mm	15 Well	11.28mm (Etched)	25/pk



Specimen Preparation and Embedding Supplies

► Cover Glass – GOLD SEAL®

GOLD SEAL® cover glass is made from pre-selected, pre-cleaned silicate glass. It is available in various shapes and thicknesses and is packaged with desiccants in a lint free box. Both cover glass cases and slide boxes convert to convenient slide storage files.

Cat.#	GoldSeal	Standard Sizes	Thickness	Pcs/oz	Pack
No. 0 Thickness					
63750-01	3206	22x22 mm	#0 (.085-.12 mm)	208	1 oz.
63750-10	3206	22x22 mm	#0 (.085-.12 mm)	208	10x1oz.
63751-01	3223	24 x 60mm	#0 (.085-.12 mm)	78	1 oz.
63751-10	3223	24 x 60mm	#0 (.085-.12 mm)	78	10x1oz.

No. 1 Thickness

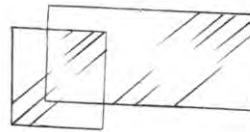
63756-01	3305	18 x 18mm	#1 (.13-.17 mm)	233	1 oz.
63756-10	3305	18 x 18mm	#1 (.13-.17 mm)	233	10x1oz.
63757-01	3306	22 x 22mm	#1 (.13-.17 mm)	156	1 oz.
63757-10	3306	22 x 22mm	#1 (.13-.17 mm)	156	10x1oz.
63758-01	3307	25 x 25mm	#1 (.13-.17 mm)	124	1 oz.
63758-10	3307	25 x 25mm	#1 (.13-.17 mm)	124	10x1oz.
63760-01	3312	12 x 24mm	#1 (.13-.17 mm)	256	1 oz.
63760-10	3312	12 x 24mm	#1 (.13-.17 mm)	256	10x1oz.
63762-01	3315	22 x 35mm	#1 (.13-.17 mm)	100	1 oz.
63762-10	3315	22 x 35mm	#1 (.13-.17 mm)	100	10x1oz.
63765-01	3318	22 x 60mm	#1 (.13-.17 mm)	58	1 oz.
63765-10	3318	22 x 60mm	#1 (.13-.17 mm)	58	10x1oz.
63766-01	3319	24 x 30mm	#1 (.13-.17 mm)	108	1 oz.
63766-10	3319	24x 30mm	#1 (.13-.17 mm)	108	10x1oz.
63768-01	3321	24 x 40mm	#1 (.13-.17 mm)	80	1 oz.
63768-10	3321	24 x 40mm	#1 (.13-.17 mm)	80	10x1oz.
63769-01	3322	24 x 50mm	#1 (.13-.17 mm)	67	1 oz.
63769-10	3322	24 x 50mm	#1 (.13-.17 mm)	67	10x1oz.
63770-01	3323	24 x 60mm	#1 (.13-.17 mm)	54	1 oz.
63770-10	3323	24 x 60mm	#1 (.13-.17 mm)	54	10x1oz.
63771-01	3327	35 x 50mm	#1 (.13-.17 mm)	41	1 oz.
63771-10	3327	35 x 50mm	#1 (.13-.17 mm)	41	10x1oz.
63772-01	3328	35 x 60mm	#1 (.13-.17 mm)	37	1 oz.
63772-10	3328	35 x 60mm	#1 (.13-.17 mm)	37	10x1oz.
63773-01	3329	43 x 50mm	#1 (.13-.17 mm)	35	1 oz.
63773-10	3329	43 x 50mm	#1 (.13-.17 mm)	35	10x1oz.
63774-01	3334	48 x 60mm	#1 (.13-.17 mm)	26	1 oz.
63774-10	3334	48 x 60mm	#1 (.13-.17 mm)	26	10x1oz.
63780-01	3350	13mm Dia.	#1 (.13-.17 mm)	575	1 oz.
63780-10	3350	13mm Dia.	#1 (.13-.17 mm)	575	10x1oz.
63781-01	3351	16mm Dia.	#1 (.13-.17 mm)	376	1 oz.
63781-10	3351	16mm Dia.	#1 (.13-.17 mm)	376	10x1oz.
63782-01	3346	19mm Dia.	#1 (.13-.17 mm)	276	1 oz.
63782-10	3346	19mm Dia.	#1 (.13-.17 mm)	276	10x1oz.
No. 1½ Thickness					
63786-01	3400	22 x 22mm	#1½ (.16-.19 mm)	138	1 oz.
63786-10	3400	22 x 22mm	#1½ (.16-.19 mm)	138	10x1oz.
63787-01	3405	18 x 18mm	#1½ (.16-.19 mm)	202	1 oz.
63787-10	3405	18 x 18mm	#1½ (.16-.19 mm)	202	10x1oz.
63790-01	3419	24 x 30mm	#1½ (.16-.19 mm)	94	1 oz.
63790-10	3419	24 x 30mm	#1½ (.16-.19 mm)	94	10x1oz.
63791-01	3421	24 x 40mm	#1½ (.16-.19 mm)	70	1 oz.
63791-10	3421	24 x 40mm	#1½ (.16-.19 mm)	70	10x1oz.
63792-01	3422	24 x 50mm	#1½ (.16-.19 mm)	58	1 oz.
63792-10	3422	24 x 50mm	#1½ (.16-.19 mm)	58	10x1oz.
63793-01	3423	24 x 60mm	#1½ (.16-.19 mm)	47	1 oz.
63793-10	3423	24 x 60mm	#1½ (.16-.19 mm)	47	10x1oz.

Slide warmer, see pages 604-605 >>>

For the handling of glass slides, see pen vac; grid section page 150 >>>

► Micro Cover Glasses

Manufactured from clear white, borosilicate glass. They offer super clarity, are perfectly flat, and corrosion resistant. All cover glasses are uniform in size and thickness.



Square Cover Glasses

Cat. #	Standard Sizes	Thickness	Pieces/oz	Pack
No. 0 Thickness — Squares				
72198-10	22x22 mm	#0 (.08-.13 mm)	208	1 oz.
72198-11	22x22 mm	#0 (.08-.13 mm)	208	10 oz.
72198-20	22x40 mm	#0 (.08-.13 mm)	116	1 oz.
72198-21	22x40 mm	#0 (.08-.13 mm)	116	10 oz.
No. 1 Thickness — Squares				
72200-10	22x22 mm	#1 (.13-.17 mm)	156	1 oz.
72200-11	22x22 mm	#1 (.13-.17 mm)	156	10 oz.
72200-20	22x30 mm	#1 (.13-.17 mm)	116	1 oz.
72200-21	22x30 mm	#1 (.13-.17 mm)	116	10 oz.
72200-30	22x40 mm	#1 (.13-.17 mm)	87	1 oz.
72200-31	22x40 mm	#1 (.13-.17 mm)	87	10 oz.
72200-40	22x50 mm	#1 (.13-.17 mm)	70	1 oz.
72200-41	22x50 mm	#1 (.13-.17 mm)	70	10 oz.
No. 1½ Thickness — Squares				
72204-01	22x22 mm	#1½ (.16-.19 mm)	138	1 oz.
72204-10	22x22 mm	#1½ (.16-.19 mm)	138	10 oz.
72204-02	22x30 mm	#1½ (.16-.19 mm)	102	1 oz.
72204-20	22x30 mm	#1½ (.16-.19 mm)	102	10 oz.
72204-03	22x40 mm	#1½ (.16-.19 mm)	76	1 oz.
72204-30	22x40 mm	#1½ (.16-.19 mm)	76	10 oz.
72204-04	22x50 mm	#1½ (.16-.19 mm)	61	1 oz.
72204-40	22x50 mm	#1½ (.16-.19 mm)	61	10 oz.
No. 2 Thickness — Squares				
72210-10	22x22 mm	#2 (.17-.25 mm)	116	1 oz.
72210-11	22x22 mm	#2 (.17-.25 mm)	116	10 oz.
72210-20	22x40 mm	#2 (.17-.25 mm)	64	1 oz.
72210-21	22x40 mm	#2 (.17-.25 mm)	64	10 oz.

► Square and Rectangular Cover Glass

■ #1 thickness (0.13 to 0.16mm)

■ Packed one ounce (28 g) per case

■ Clear white borosilicate glass.

Cat. #	Size	Thickness	Pieces/oz	Pack
72190-09*	9x9 mm	#1 (.13-.17 mm)	765	1 oz.
72190-22*	9x22 mm	#1 (.13-.17 mm)	435	1 oz.
72190-35*	9x35 mm	#1 (.13-.17 mm)	260	1 oz.
72190-50*	9x50 mm	#1 (.13-.17 mm)	175	1 oz.
72191-22*	10.5x22 mm	#1 (.13-.17 mm)	335	1 oz.
72191-35*	10.5x35 mm	#1 (.13-.17 mm)	215	1 oz.
72191-50*	10.5x50 mm	#1 (.13-.17 mm)	150	1 oz.
72192-54*	13x54 mm	#1 (.13-.17 mm)	120	1 oz.
72192-50	24x50 mm	#1 (.13-.17 mm)	65	1 oz.
72192-75*	25x75 mm	#1 (.13-.17 mm)	40	1 oz.

* For use with Bellco Leighton Tissue Culture Tubes.

► Circular Cover Glass

Cat. #	Diameter	Thickness	Pieces/oz	Pack
No. 1 Thickness				
72231-01	12 mm	#1 (.13-.17 mm)	692	1 oz.
72231-10	12 mm	#1 (.13-.17 mm)	692	10 oz.
72228-01	15 mm	#1 (.13-.17 mm)	443	1 oz.
72228-10	15 mm	#1 (.13-.17 mm)	443	10 oz.
72229-01	18 mm	#1 (.13-.17 mm)	308	1 oz.
72229-10	18 mm	#1 (.13-.17 mm)	308	10 oz.
72221-01	22 mm	#1 (.13-.17 mm)	206	1 oz.
72221-10	22 mm	#1 (.13-.17 mm)	206	10 oz.
72223-01	25 mm	#1 (.13-.17 mm)	159	1 oz.
72223-10	25 mm	#1 (.13-.17 mm)	159	10oz.

No. 1½ Thickness

72230-01	12 mm	#1½ (.16-.19 mm)	597	1 oz.
72230-10	12 mm	#1½ (.16-.19 mm)	597	10 oz.
72222-01	18 mm	#1½ (.16-.19 mm)	266	1 oz.
72222-10	18 mm	#1½ (.16-.19 mm)	266	10 oz.
72224-01	22 mm	#1½ (.16-.19 mm)	178	1 oz.
72224-10	22 mm	#1½ (.16-.19 mm)	178	10 oz.
72225-01	25 mm	#1½ (.16-.19 mm)	137	1 oz.
72225-10	25 mm	#1½ (.16-.19 mm)	137	10 oz.

No. 2 Thickness

72226-01	12mm	#2 (.17-.25 mm)	502	1 oz.
72226-10	12mm	#2 (.17-.25 mm)	502	10 oz.
72227-01	15mm	#2 (.17-.25 mm)	321	1 oz.
72227-10	15mm	#2 (.17-.25 mm)	321	10 oz.

► Round Cover Slips (Bellco Brand)

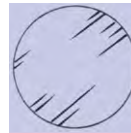
- #1 Thickness (0.13 to 0.16mm)
- Packed 1 oz (28g) per case



Cat. #	Diameter	Thickness	Pieces/oz	Pack
72195-05	5 mm	#1 (.13 - .16 mm)	1100	1 oz
72195-12	12 mm	#1 (.13 - .16 mm)	650	1 oz
72195-15	15 mm	#1 (.13 - .16 mm)	378	1 oz
72195-25	25 mm	#1 (.13 - .16 mm)	160	1 oz

► Round Cover Slips, German Glass

- For neural cell cultures
- Shown to be more effective with hard to attach cells
- #1 thickness (0.13 to 0.16mm)
- Packed 1 oz (28g) per case.



Cat. #	Diameter	Thickness	Pieces/oz	Pack
72196-12	12 mm	#1 (0.13 to 0.16mm)	650	1 oz
72196-15	15 mm	#1 (0.13 to 0.16mm)	378	1 oz
72196-25	25 mm	#1 (0.13 to 0.16mm)	160	1 oz

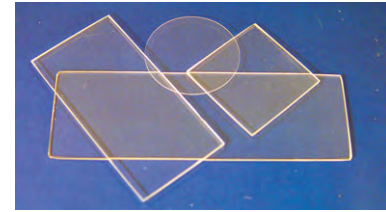
► Round Cover Slips – German Glass

These coverglass which are made from German glass can be used for growing and culturing cells that normally have poor adhesion to plastic or regular glass surfaces. The 5mm size will fit inside the 96 well plates and still have enough room to pick up from the bottom of the well with forceps. The 8 mm size fits inside the 24 well plates. Available with #1.5 (0.16 – 0.19 mm) thickness. Packaged in convenience size: 100 per box

Cat.#	Description	Qty
72296-05	5 mm Round Coverglass, #1.5 Thickness	100/bx
72296-08	8 mm Round Coverglass, #1.5 Thickness	100/bx

► Quartz Microscope Slides and Coverslips

There are many applications that require slides and coverslips that have absolute UV transparency, and high temperature properties. EMS now is introducing the highest quality, clear fused quartz microscope slides and coverslips to meet all of these requirements.



- The window of highest transparency to UV is between 0.15µ to 5µ.
- Typical flatness measured 2 to 4" bands per inch.
- Soften point is about 1250°C (2282°F).
- Standard microscope slide thickness is 1 mm.
- Standard coverslip thickness is 0.2 mm.

Quartz Microscope Slides

Cat.#	Description	Pack
72250-01	Slide, 1" x 1" (25 x 25 mm)	each
72250-02	Slide, 2" x 1" (50 x 25 mm)	each
72250-03	Slide, 3" x 1" (75 x 25 mm)	each
72250-04	Slide, 2" x 3" (50 x 76 mm)	each
72250-05	Slide, 10mm x 10 mm	each

These slides have all of the same properties of the ones above with the only difference is these are 0.5mm thick:

72250-06	1" x 1" (25x25mm)	each
72250-07	1" x 2" (25 x 50mm)	each
72250-08	1" x 3" (25x76mm)	each

Quartz Coverslips

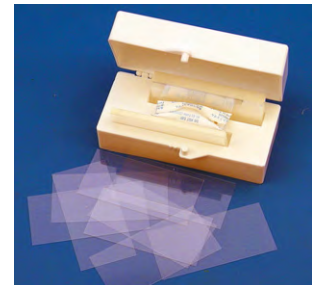
Cat.#	Description	Pack
72255-02	Round 1" (25 mm) dia.	each
72256-02	Square 1" x 1" (25 x 25 mm)	each
72256-03	Round, 18mm (0.71") x 0.2mm Thick (#2)	each
72256-04	Round, 25.4mm (1") x 0.2mm Thick (#2)	each
72256-05	Round, 33.02mm (13.0") x 0.2mm thick (#2)	each
72256-06	Round, 25mm (0.984") x 0.15-0.18mm thick (#1)	each
72256-07	Square, 25.4mm (1") x 0.2mm thick (#2) thick	each
72256-08	Square, 25.4mm (1") x 0.15-0.18mm thick (#1)	each
72256-09	Square, 25mm (0.984") x 0.075-0.125mm thick (#0)	each

► Superslip® Micro Glasses

Finally, your automated coverslipper has the right coverslip to allow it to run smoothly.

These "Superslip®" coverslips are designed to work in automatic coverslip machines and humid environments without sticking or jamming up in the middle of a run.

These new superslips combine specialized production procedures with our unique moisture-resistant packaging which brings you superior coverslips.



72236-40	Superslip, 24x40mm, #1	1 oz
72236-41	Superslip, 24x40mm, #1	10x1 oz
72236-51	Superslip, 24x50mm, #1	1 oz
72236-51	Superslip, 24x50mm, #1	10x1 oz
72236-60	Superslip, 24x60mm, #1	1 oz
72236-61	Superslip, 24x60mm, #1	10x1 oz

► Cover Slips; Thermanox®; TMX Coverslips

NUNC™ Brand Thermanox®, or TMX coverslips are made from a polymer (in the polyolefin family) that is highly resistant to most chemicals. Thermanox® plastic is resistant to alcohols, aldehydes, hydrocarbons, dilute acids (<10%) and dilute

alkalis (<2%). TMX has limited resistance to chlorinated hydro-carbons, however, it is not resistant to concentrated acids or bases. Thermanox® plastic is a flexible, trans-parent polymer that can be sectioned using a microtome and is able to withstand high temperatures (temperature range -70°C to +150°C). Thermanox® Coverslips are culture treated on one side for enhanced cell attachment and growth. The treated side is packaged face up toward the label.

FEATURES:

- Flat and remain flat
- 0.2mm (No. 2) thickness
- Resistant to commonly used solvents
- Safe and easy to handle
- Auto fluorescent in the range 380 to 545 nm
- Thermanox® cover slips can be autoclaved at 20 minutes steam, 20 minutes dry at 120°C

Cat. #	Description	NNI #	Pack
72274-01	Size 10.5x22 mm	174934	100/pk
72274-05	Size 10.5x22 mm	174934	500/pk
72270	Size 22x60 mm	174942	100/pk
72271	Size 22x60 mm	174942	500/pk
72272	Size 24x30 mm	150067	100/pk
72273	Size 24x30 mm	150067	500/pk
72280	13 mm Round	174950	100/pk
72281	13 mm Round	174950	500/pk
72275-01	15mm Round	174969	100/pk
72275-05	15 mm Round	174969	500/pk
72282	22 mm Round	174977	100/pk
72283	22 mm Round	174977	500/pk
72285	25 mm Round	174985	100/pk
72286	25 mm Round	174985	500/pk

Thermanox® is Nalge/Nunc product.

► Disposable Rinzl Plastic Micro Slides

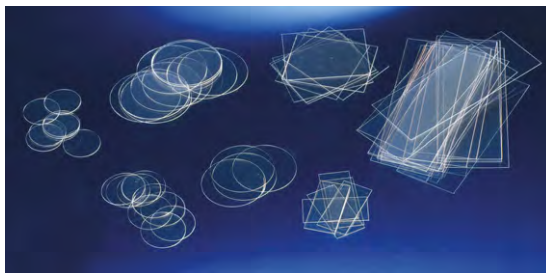
- Made from optical clear vinyl with a refractive index of glass.
- Ideal for wet mount, urines, etc.
- Economical, they can be used and discarded.
- Available standard size 3 x 1" and packaged 144 per box.
- Will not break, scratch or cut fingers.
- Not auto-fluorescent.
- Thickness 0.0180 to 0.022" or 0.46 to 0.56mm.

71890-12	Rinzl Plastic Micro Slides (A)	12/bx
71890-01	Rinzl Plastic Micro Slides (B)	144/bx
71890-10	Rinzl Plastic Micro Slides (B)	10x144/bx

► Rinzl Plastic Coverslips

- Made from clear vinyl plastic.
- Unbreakable, will not scratch or cut fingers.
- Used in Biological and Medical labs, etc.
- Thickness 0.01" or 0.28mm.
- Refractive index of glass.
- Economical and half the price of glass.
- Not autofluorescent.

Cat.#	Description	Pack
72261-18	Rinzl Plastic Coverslips, Size 18 x 18mm	100/pk
72261-19	Rinzl Plastic Coverslips, Size 18 x 18mm	1000/pk
72261-22	Rinzl Plastic Coverslips, Size 22 x 22mm	100/pk
72261-23	Rinzl Plastic Coverslips, Size 22 x 22mm	1000/pk
72261-40	Rinzl Plastic Coverslips, Size 22 x 40mm	1000/pk
72261-50	Rinzl Plastic Coverslips, Size 24 x 50mm	1000/pk
72261-60	Rinzl Plastic Coverslips, Size 24 x 60mm	1000/pk
72261-100	Rinzl Plastic Coverslips, Size 24 x 100mm	1000/pk



TECHNICAL TIP

Permanox plastic is nonfluorescent and may be used with most fluorescent labels. Permanox has better chemical resistance to fixation and staining solvents than polystyrene. An aqueous based mounting medium must be used when cover slipping to prevent warping.

TECHNICAL TIP

A simple method to determine which side of the coverslip is treated is the "droplet" test. A drop of water or culture medium will spread on the hydrophilic, treated side. - If the droplet forms a bead, then the side of the coverslip is not treated. - If the droplet spreads evenly over the coverslip, the side is treated.



► Plastic Cover Slips

Unbreakable .007" (1.57mm) flexible cellulose acetate, square 22x22mm. Trusal, L., Baker C., & Guzman, A., Stain. Tech., 54,2 pg. 77.

72260 Plastic Cover Slip 100/bx



► Photoetched Coverslips

These coverslips are made from pure white glass and photo etched on the surface for a permanent gridded pattern.

- Using No. 2 (.17 -.24mm) thickness cover slips.
- Grid contains 520 alphanumeric coded squares, each square 600 x 600µm (0.6mm x 0.6mm). Numbered 1–200.
- Used to facilitate mounting of micromanipulated cells or chromosome spreads.

Reference: Lin, Lin-Fang and Frank H. Riddle, 1981.

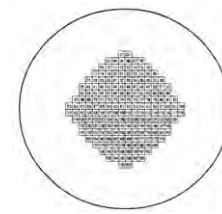
Photoengraving of Cover Slips and Slides to Facilitate Mounting of Micromanipulated Cells or Chromosome Spreads, Exp. Res. 134:485-488



72264-18



72264-23



72265-25

Cat.#	Coverslip Size	Pack	Cat.#	Coverslip Size	Pack
72264-18	18 x 18 mm	25/pk	72265-25	25 mm Diameter	25/pk
72264-23	23 x 23 mm	25/pk	72265-50	25 mm Photo-Etched	
72265-12	12 mm Diameter	25/pk	German Glass		25/pk

► Correlative Microscopy Coverslips®

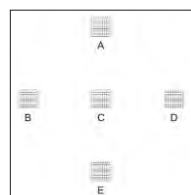
EMS introduces a simple coverslip with a grid image that allows cells to grow and later be analyzed under brightfield or fluorescence microscopy before being further processed and sectioned for EM or other analysis. These unique coverslips do all that.

Applications

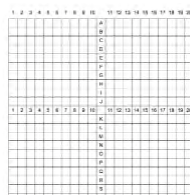
Light Microscopy, Fluorescence, Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), High-Pressure Cryofixation

Features

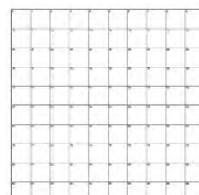
- Reticle film has been thoroughly tested with cell culture
- Good growth of cell culture (equivalent to conventional media)
- Good adhesion to the substrate without cell polylysine
- Resistant to normal chemicals used in electron microscopy
- No oxygen retention, compatible resin LR White
- Good optical quality in bright-field & UV fluorescence
- Excellent transparency
- Does not deform at temperatures (positive 100C and negative liquid N₂)
- Rigid, does not float in the middle of culture
- Easy to handle and cut with a knife or micro-punch
- Simple sterilisation using alcohol or UV
- Detaches easily from resin after polymerisation
- Low cost



66108-01 10x10 grids of 0.1mm squares at 5 positions. Indexed 1-10 along top, A-J down side



66108-02 20x20 grid of 0.5mm squares. Indexed 1-20 along top, A-T down side and centre cross



66108-03 10x10 grids of 1mm squares. Each square individually indexed 0-99

Specifications

Cat. #	Squares	Surface	square unit size	Avg. cells/sq. unit*
66108-01	100	5x1mm	0.01mm ²	2-3
66108-02	200	100mm	0.5mm ²	20-25
66108-03	100	100mm	1mm ²	40-50

* (eg HeLa Cell)

All of the coverslips are produced on a polyester based film, 0.18mm thick, 22 x 22mm, 25/box. All other grid sizes and film sizes are available upon special order.

Ordering Information

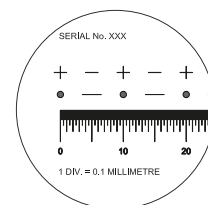
66108-01	10x10 grid of 0.1mm squares at 5 positions	25/pk
66108-02	20x20 grid of 0.5mm squares	25/pk
66108-03	10x10 grid of 1mm squares	25/pk

► Calibration Scale Sets

All of the PS-XO series of Calibration Slides is Green Float Glass, Bright Chrome Image

1. PS300-XO

High definition 300mm scale in 0.1mm divisions with extended 0.5mm, 1.0mm and 5.0mm lines to allow calibrations in those increments too. Series of dots and crosses, at 10mm intervals, included for calibrations where these shapes are preferred. Supplied in polished wooden case.

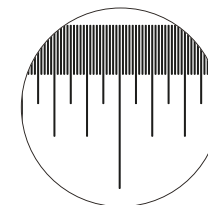


Features

300mm high definition scale in 0.1mm divisions with additional dot and cross series at 10mm centers

2. PS150-XO

High definition 150mm scale in 0.1mm divisions with extended 0.5mm, 1.0mm and 5.0mm lines to allow calibrations in those increments too. Series of dots and crosses, at 10mm intervals, included for calibrations where these shapes are preferred. Supplied in polished wooden case



Features

150mm high definition scale in 0.1mm divisions with additional dot and cross series at 10mm centers

3. PS100-XO

High definition 100mm scale in 0.1mm divisions with extended 0.5mm, 1.0mm and 5.0mm lines to allow calibrations in those increments too. Series of dots and crosses, at 10mm intervals, included for calibrations where these shapes are preferred. Supplied in polished wooden case.

Features

100mm high definition scale in 0.1mm divisions with additional dot and cross series at 10mm centers

Ordering Information

68073-PS300	PS300-XO Combination Scale	330x30x6mm	each
68073-PS300-UK	Same as above with UKAS Certification of Calibration, 10 Points measured on Scale		each
68073-PS150	PS150-XO Combination Scale	180x30x6mm	each
68073-PS150-UK	Same as above with UKAS Certification of Calibration, 10 Points measured on Scale		each
68073-PS100	PS100-XO Combination Scale	130x30x6mm	each
68073-PS100-UK	Same as above with UKAS Certification of Calibration, 10 Points measured on Scale		each

► Microscope Slide Dispenser

Molded from attractive gray ABA plastic. This dispenser provides a method of releasing clean, dust free 1"x3" slides, one at a time. Comes with a clear molded plastic cover to allow for visual checking of unused slides. Measurements: 4 $\frac{3}{8}$ "x4 $\frac{7}{8}$ "x5 $\frac{1}{2}$ ". Holds approximately 72 slides.



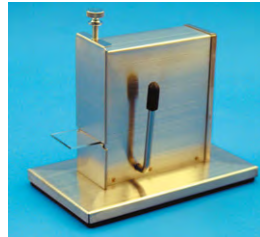
71300 Glass Slide Dispenser

each

► Levered Micro Slide Dispenser

- Holds a full box of 72 slides.
- Get a clean, fingerprint-free slide every time
- Avoid breakage
- Loading is simple
- Made from stainless steel and has suction cup feet to keep the unit in place.

Measures 3"(L)x5"(W)x4"(H) (8x13x10cm)

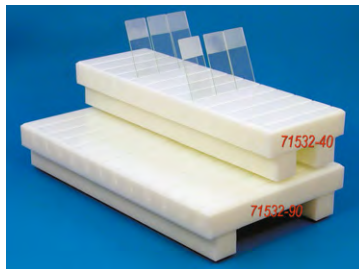


71298-01 Levered Slide Dispenser

each

► Slide Holder Block

Made from solid high density polypropylene blocks with 13 slanted channels (on a 10° angle), $\frac{7}{16}$ "(1.5mm) (W) x $\frac{3}{8}$ " (9mm) (D). It is made to hold 3x1" (75x25mm) slides during cleaning, draining excess immersion oil, and even drying. They are white in color and are chemically resistant. Available in 40 or 90 capacity (vertically held).



71532-40 40-Slide Holder Block, 4"(W)x12"(L)(10x30.5cm) each

71532-90 90-Slide Holder Block, 7"(W)x12"(L)(18x30.5cm) each

► View-Pack™ Microscope Slide Holder With 3-Ring Binder

For the orderly visual display and safe transport of microscope slides. This loose-leaf binder has ten vinyl View-Pack™ pages (hold 160 slides). Each page holds 16 slides 3x1" (75x25mm) in individual pockets with a white back and clear front. A flap in the center keeps slides from falling out. Simply fold the page at the center crease to retrieve slides. The 8 $\frac{1}{2}$ " x 10 $\frac{1}{2}$ " (22x27cm) View-Pack pages comes with a standard 9"x12" (23x30cm) 3-ring binder.

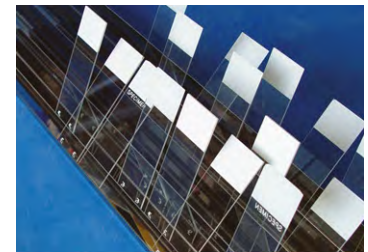


71544-01 View-Pack With 3-Ring Binder each

71544-50 Refill View-Pack 10/pk

► Slide Stand

Made from stainless steel. Stand consists of four rails, which supports various microscope slides almost vertically. Accommodates 68, 3x1" slides



71533-01 Slide Stand, 455x100mm (18x4") each

► Compact Glass Slide Storage Box; The Mini Box

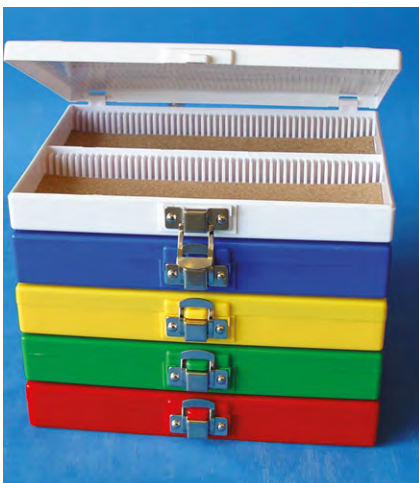
Made from rigid polystyrene, with a removable lid. This 25 capacity slide box measures only 3.625" (92mm)(L) X 3.25"(83mm)(W) X 1.25"(32mm) (H). The box is available in either white, red, or blue.



71455-W 25-Compact Slide Box, White each

71455-B 25-Compact Slide Box, Blue each

71455-R 25-Compact Slide Box, Red each



► Secured Hinge Microscope Slide Boxes

Made from durable polystyrene (with heavy walls). This material is unaffected by humidity and is thoroughly insect proof. Each box is secured with a rust-resistant nickel-plated clasp and hinge pin. The cork lining prevents damage to the stored slides. To ensure proper slide identification, each slot is numbered to correspond to the slide inventory sheet on the inside cover of the box. To save space the boxes are stackable. Each box stores up to 100 3x1" or 25x75mm microscope slides. Available in 5 color coded boxes making the boxes easy to identify Each box measures: 210x162x33mm (8 $\frac{1}{4}$ x 6 $\frac{1}{2}$ x 1 $\frac{1}{4}$ ")

71470-W Hinged 100 Slide Box, White each

71471-W Hinged 100 Slide Box, White 10/pk

71470-B Hinged 100 Slide Box, Blue each

71471-B Hinged 100 Slide Box, Blue 10/pk

71470-G Hinged 100 Slide Box, Green each

71471-G Hinged 100 Slide Box, Green 10/pk

71470-R Hinged 100 Slide Box, Red each

71471-R Hinged 100 Slide Box, Red 10/pk

71470-Y Hinged 100 Slide Box, Yellow each

71471-Y Hinged 100 Slide Box, Yellow 10/pk

► Molded (Living Hinge) Microscope Slide Boxes

Molded one-piece polypropylene construction with an integral living hinge. Numbering in the base corresponds to the printed index in the covers for slide identification purpose. Boxes are designed to be stackable to save space. The tensioned clasp insures a secure closure. Available in 25 or 100 capacity. Fits 1 x 3" (25.4x75mm) microscope slides.

Cat.	Description	Outside Dimensions L x W x H" (mm)	Pack
71472	Molded 100-Slide Box	8 7/8"x6 1/4"x1 1/2"	each
71473	Molded 100-Slide Box	(220x175x38mm)	10/pk



► Carolina™ Blue Box

Molded from blue high-impact styrene, the Carolina™ Blue Box is manufactured to our exacting specifications. Compared to conventional wooden boxes, the Carolina™ Blue Box is smaller in size, lighter in weight, and held to closer dimensional tolerances. The 75x25mm (3x1") slides fit the slots and will not slip out once in place. A shoulder on each box excludes dust and identifies the top of the box. The boxes are available in two sizes: 3 1/4" x 4 1/4" x 1 1/16" (for 25 slides) and 3 1/4" x 2 1/4" x 1 1/16" (for 12 slides).

71482-01	Carolina Blue Box, 12-Slide	each
71482-10	Carolina Blue Box, 12-Slide	10/pk
71483-01	Carolina Blue Box, 25-Slide	each
71483-10	Carolina Blue Box, 25-Slide	10/pk



► 100-Capacity Slide Box

Same construction as (#71470), but with a slip-on cover; gray in color. The box measures: 9"x7 1/4"x1 1/4" (230x185x32).

71474	Slip-on Cover 100-Slide Box	each
71475	Slip-on Cover 100-Slide Box	10/lot

► 50-Capacity Slide Box

Same construction as (#71470), but with a slip on cover; stackable and gray in color. The box measures: 9"x3 3/4"x1 1/4" (230x95x32mm)

71462	Slip-on Cover 50-Slide Box	each
71463	Slip-on Cover 50-Slide Box	10/lot

► Compact 25 Slide Box

Same characteristics as (#71470), but with a slip-on cover; Holds 25 1x3" slides. The box measures 1 1/4"(H) x 3 1/2"(W) x 5 1/2" (L).

71460	Slip-on Cover 25-Slide Box	2/pk
71461	Slip-on Cover 25-Slide Box	10pks/lot (20 bxs)

► Large Glass Slide Storage Box

These storage boxes are available in two sizes.

1. 100-Slide Capacity:

Durable, wood frame, covered with heavy black embossed paper. The hinges and latches are Nickel plated. A numbered plastic insert provides spacing for the handling of the slides. The box accommodates 100 of 3x2" slides. The box measures 9 3/4" (L) x 2 1/4" (H) (24.7x19.7x5.7cm).

71480-01	100 Slide Box, 3x2" Slides	each
71480-10	100 Slide Box, 3x2" Slides	10/pk

2. 25 Slide Capacity:

Made from wood with numbered partitions which correspond to the index card. Very durable and has a detachable lid. The box accommodates 25 of 3x2" slides. The box measures: 9 3/4"x3 3/4"x2 5/8" (174x92x67mm).

71481-01	25 Slide Box, 3x2" Slides	each
71481-10	25 Slide Box, 3x2" Slides	10/pk



► Large Slide Microscope Slide Boxes

Specially designed for the 3 x 2 slides

This reinforced ABS material is rugged and designed not only for storage but transport of slides as well.



- Grooved slots hold individual slides in place
- A soft cork liner ensures that slides will not slip
- Identification card, lining and grooved slots are numbered
- Stackable . The box measures 208mm (L) x 175mm (h) x 60mm. They have a capacity of 100 slides and they are blue in color

Cat No.	Description	W x H x D, mm	Color	Qty.
41149	100 Place Tall Slide Box	208 x 175 x 60	Blue	each

► True North™ Slide Box

These purple unique boxes which are made from durable polycarbonate and rugged stainless steel will protect your slides in ultra-low temperatures (as low as -80 O C). These boxes provide for safe storage and transport of 25x75mm and 1x3" Slides. With temperature sensitive foam lining and grooved slide slots which separate the slides there is always protection for slide contact.

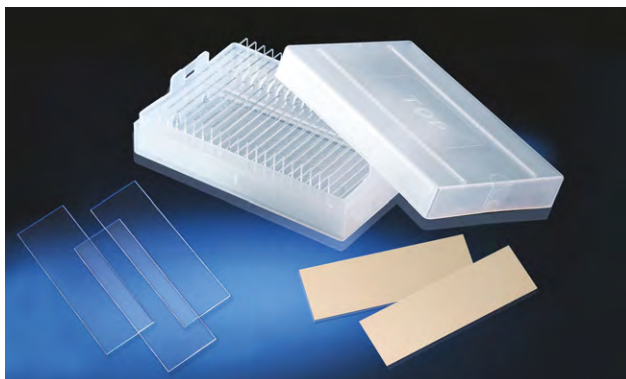


For easy slide retrieval, identification sheet, lining, and grooved slots are numbered. These boxes are stackable and autoclavable. They measure 208x175x34mm.

Cat. #	Description	Qty
71485-01	True North™ Slide Box	each

► ^mBox® in Microarray Slide Handling

Using ^mBox – microarray handling without removing slides!



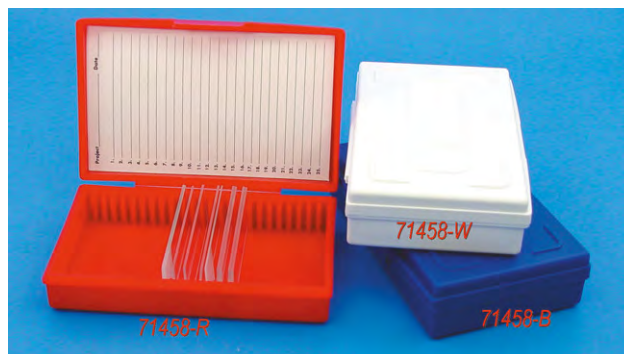
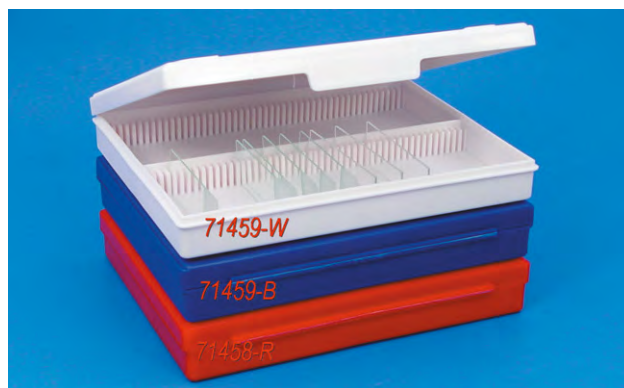
- Immerse 20 slides in liquid during blocking, denaturing, and post-arraying.
- It separates and prevents slide damage during shipping and processing.
- Optimally designed rack spacing for easy slide removal.
- Fits standard microtiter plate formats for centrifuging.
- Manufactured to prevent slide contamination.
- A convenient removable handle available.

Technical

- Material: Polypropylene
- Maximum continuous use temperature: 220°F (104°C)
- Melting point: 334°F (168°C)
- ^mBox withstand boiling water without softening
- Measures 5" L x 3½" W x 1½" H (127mm x 89mm x 38mm)

EMS #	Description	Qty
72188-01	The ^m Box	each

► Color Microscope Slide Boxes



Molded from one piece (lid and bottom) polypropylene these slide boxes are able to accommodate either 25 or 100 standard 3x1" (75x25mm) slides. The attached lid is held securely by a closed latch lock. Stacking feet maximize the stability when boxes are stacked up one atop the other. The boxes have a cork liner to protect the stored slides. Comes complete with a numbered slide index card. These boxes are available in blue, red or white.

25-Slide Box measures: 5½" x 3½" x 1¼" (140x90x32mm)
100-Slide Box measures: 8¼" x 6¾" x 1¼" (210x170x32mm)

71458-W	25-Slide Box, White	each
71458-B	25-Slide Box, Blue	each
71458-R	25-Slide Box, Red	each
71459-W	100-Slide Box, White	each
71459-B	100-Slide Box, Blue	each
71459-R	100-Slide Box, Red	each

► Clear Lid 100 Slide Box

This 100-Slide Storage box has a clear lid enabling lab personnel to read the contents listed on the enclosed index without opening the box. Made of Black ABS plastic with metal clasp hinge and cork lining. Numbered slots correspond to the paper index. Stackable.

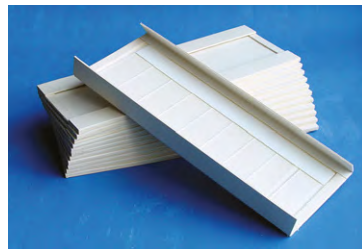
Outside dimension: 8¼"L x 7"W x 1¼"H (210 x 180 x 32mm)



Cat.	Description	Qty
71477-01	Clear Lid 100 Slide Box	1/pk
71477-10	Clear Lid 100 Slide Box	10/pk

► 9/4-Slide Tray

Heavy-duty cardboard construction with cloth hinged flaps to form a single compartment slide holder of various sizes horizontally. Holds 9 3x1" slides or 4 3x2" slides. The tray measures 235 x 78mm (9¼" x 3⅜")



Cat. #	Description	Qty
71497-01	9/4-Slide Tray	each
71497-12	9/4-Slide Tray	12/pk

► Slide Tray Box

Black cloth covered cardboard box 9/4-Slide Tray (#71497). The box has a fall-front and drop on lid. Supplied complete with (6) 9-Slide Trays. Overall measurements of the box : 265 x112 x 68mm (10½" x 4⅜" x 2 ⅝")

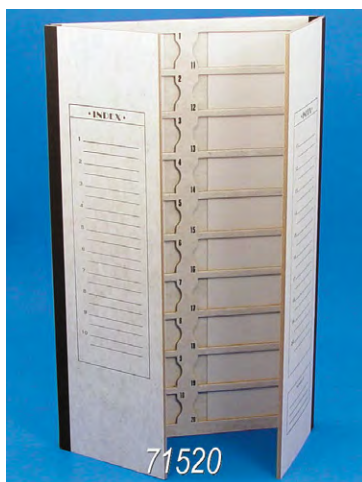


Cat. #	Description	Qty
71496	Slide Tray Box	each

► Pop-Up Slide Holder- 20 or 30 Capacity

Holds 20 and 30 of 1x3" slides in a numbered compartment. The compartments are recessed so the specimen cannot be touched when the cover is closed.

Measurements:
8"(W)x13½"(L)x 1½"(H).



71520	Pop-Up Slide Holder, 20-Place	each
71521	Pop-Up Slide Holder, 20-Place	10/pk
71522	Pop-Up Slide Holder, 30-Place	each
71522-10	Pop-Up Slide Holder, 30-Place	10/pk



► Microscope Slide Tray

White, thermo-formed Polystyrene. Holds 20 of 1"x3" standard slides in a horizontal position. A white background makes it easy to distinguish dyes and stains. The tray features a thumb cut to simplify the removal of slides. Measures: 7½"x13½" (17x34cm).

71500	Microscope Slide Tray	6/pk
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► Slide Tray Cabinet

The outside is made from white polypropylene, the tray rails are polystyrene, and the vertical sliding door is clear acrylic; this 240-slide capacity cabinet holds twelve microscope slide trays (#71500) horizontally, and it is dust free. Measurements: 7¼"x14"x7½" high (17x36x16cm).



71504	Slide Tray Cabinet	each
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► Microscope Slide Tray

This durable, ABS hard plastic slide tray will hold up to 20 standard microscope slides 75 x 25 mm (3x1"). Ivory color consists of two rows, each with securely holds 10 slides. Each numbered cavity has thumb cut and raise notches for easy to remove the slide. Stackable. Measures: 11 7/8"L x 7 ¾"W x ½"H (300x195x12mm)



Cat.	Description	Qty
71503-01	Hard Plastic Microscope Slide Tray	1/pk
71503-10	Hard Plastic Microscope Slide Tray	10/pk

► 12-Slide Holder

White thermo-formed polystyrene. It keeps microscope slides separated. Ideal for use where slide preparation or staining is performed. Measurements: 3¾"x7"x¾" (H) (86x178x19mm)



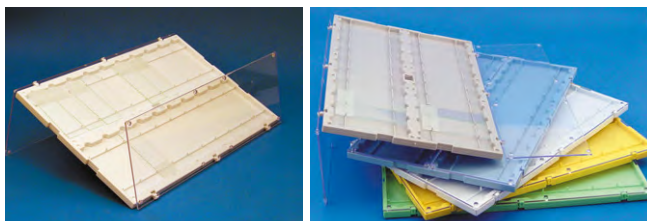
71530	12-Slide Holder	6/pk
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► Microscope Slide Folder

Made from heat resistant injection molded plastic

The Slide Folder™ will hold up to twenty standard microscope slides 75 x 25mm (3x1") and is made of two parts: a base holding the slides horizontally offering numbered space for easy identification, and transparent doors which can either cover the slides or be swung behind the SlideFolder™ for space conservation while using the tray. The base is available in 5 different colors, offering color-coding for each job. Each slide location is identified with a number from 1 to 20. Removal of the slides is made easy by simply pressing on one end, which will lift the other end up. The two transparent hinged covers offer a full view of each stored slide, even bar codes can be read without removing of the slide. All units are stackable and will resist temperatures between -80°C and +100°C. They are not autoclavable.

Measures 7¾ x 11¾".



Cat #	Slide Folder Color	Pack
71502-B1	Blue	Each
71502-B10	Blue	10/pk
71502-G1	Green	Each
71502-G10	Green	10/pk
71502-GR1	Gray	Each
71502-GR10	Gray	10/pk
71502-W1	White	Each
71502-W10	White	10/pk
71502-Y1	Yellow	Each
71502-Y10	Yellow	10/pk
71502-10	Assorted Colors	10/pk

► 5-Slide Container

Holds 5 slides; no contact with one another. Ideal for Air Conveyor Transport System.

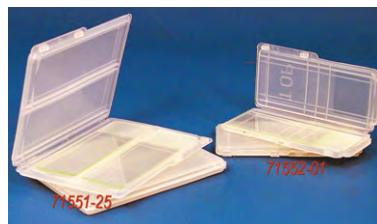
Measures: 3"(L)x¾"(W)x1¼"(H)
(51mmx16mmx32mm)



71550 5 Slide Container 25/pk

► Plastic Slide Mailers

Economical and reusable. These polyethylene mailers have a sturdy resealable clasp. The top of the mailer is clearly labeled and slide labeling is visible through the plastic cover.

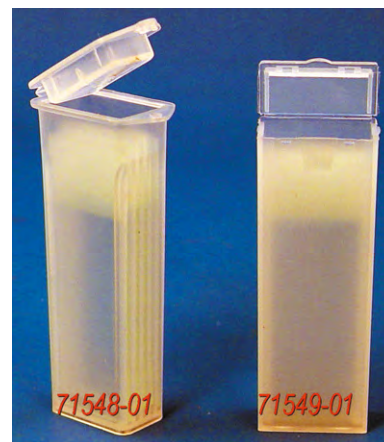


71551-25 Plastic Double Slide Mailer 25/pk

► 5-Slide Mailer – Open Top

Made from polypropylene, rigid, strong and durable with convenient flip-tops, snap-on lids. When they stand in their upright position, they can be used as staining containers, with a minimal amount of solution being used. (Note: they are not leak-proof). Available in 2 models. Model 1 needs 14 ml of solution to stain five slides up to the frosted area; Model 2 needs 12 ml of staining solution. Model 1 measures 3½"L x 1¼" W x ¾" (87x30x22mm).

Model 2 measures 3¼"L x 1⅝"W x ⅝" (82x30x17mm). Packaged 25 mailers per pack, 200 per case.



71548-01	5-Slide Container, Model 1	25/pk
71548-08	5-Slide Container, Model 1	200/cs
71549-01	5-Slide Container, Model 2	25/pk
71549-08	5-Slide Container, Model 2	200/cs

► LockMailer™ - Microscope Slide Jar

This is tamperproof multi purpose container for mailing, staining or storing microscope slides.

Constructed of extra strong and opaque clear polypropylene, and high density polyethylene leakproof tamper evident screw cap (The LockMailer can also be used without the tamper evident feature by not used the lock tab), it will hold up to 4 standard 3 x 1" or 25 x 75mm slides vertically. Inside chambers are slotted to keep slides safely separated. For color coding purposes, use Capinsert™ (#61805-series) that may be inserted on top of closure.

This LockMailer™ can be used as small staining vessel. This unit is designed for maximum stability on a bench top with liquid volume only 14 ml. Each standard volume of one slide is 2 ml, therefore when you want to stain 4 slides in this vessel you need only 6 ml of staining solution.

Dimensions: 35 x 87mm H (1⅜" x 3⅜"H). Packaging: 100 per pack.



EMS #	Description
71406-10	LockMailer™ Microscope Slide Jar

Color coded CapInsert™ is available for the LockMailer™

EMS #	Description
61806-W	CapInsert™, White, 100/pk
61806-B	CapInsert™, Blue, 100/pk
61806-R	CapInsert™, Red, 100/pk
61806-L	CapInsert™, Lilac, 100/pk
61806-Y	CapInsert™, Yellow, 100/pk
61806-AS	CapInsert™, Assorted Colors, 100/pk

Five Slide Gripper, See Grids section, page 146 >>>>

► The UniMailer™

Following many suggestions made to us from our customers in the labs—The UniMailer™ is a truly versatile new model mailer which can easily be used for handling and shipping one or as many slides as needed with one type of mailer.

Made from high impact polystyrene, the UniMailer™ is a one-slide tray. Not only do they fit snugly on top of each other but they are also secured by an innovative locking mechanism. You may also want to insert a tamperproof tie or attach an ID label. Each tray allows for the placing of slide in a horizontal position for full visibility. Slides can be easily inserted or removed. As well UniMailer™ can also be used to provide safe storage for those valuable slides you want to protect.

It accommodates 25 x 75 mm (1" x 3") slides with or without cover glass. The mailer measures 89 mm x 29 mm x 6 mm (3½" x 1½" x ¼").

Identification can be made on three sides or on top. The mailer is available in many popular pastel colors for easy identification. Packaging: 50 per box, 200 per case.



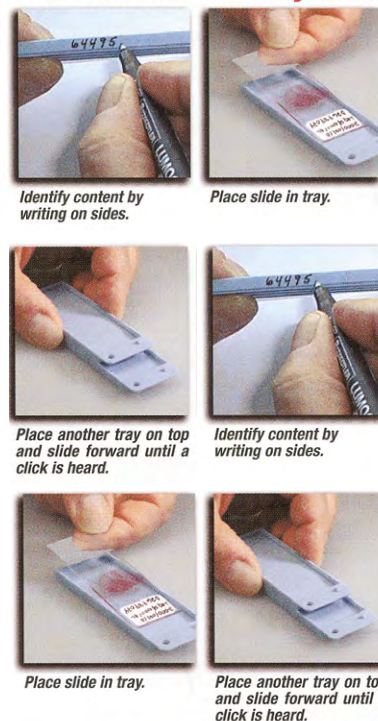
Cat. #	Description	Pack
71537-B	UniMailer™, Blue	50/pk.
71537-G	UniMailer™, Green	50/pk.
71537-P	UniMailer™, Pink	50/pk.
71537-W	UniMailer™, White	50/pk.
71537-Y	UniMailer™, Yellow	50/pk.

► Cyto-Tek® Slide Mailer

Sakura Finetek - Designed for safe transport or mailing of up to two glass slide 1x3". Unbreakable plastic container with flip top cap fits through mail system.

Cat. No.	Tissue-Tek	Description	Pack
62625-10	4310	Cyto-Tek® Slide Mailer	100/cs

The UniMailer™ is easy to use



Identify content by writing on sides.

Place slide in tray.

Place another tray on top and slide forward until a click is heard.

Identify content by writing on sides.

Place slide in tray.

Place another tray on top and slide forward until a click is heard.



► Solid Cardboard Slide Mailers

► 1-Slide Mailer

Made from 0.050" (1.29 mm) solid cardboard, measures 3¼" x 1½" when folded. The mailer holds one 3" x 1" glass slide with or without cover glass and has a thumb groove for easy removal. A special cut corner identifies the top of the mailer.

Cat. #	Description	Pack
71539-01	Single Slide Mailer	100/pk.
71539-10	Single Slide Mailer	1,000/pk.

► 2-Slide Mailer

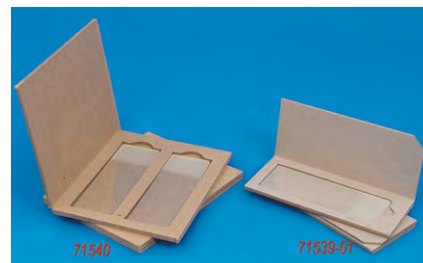
Made from .085" (2.17 mm) chipboard and measures 3" x 4¼" when folded. This mailer is unprinted on both sides which provides warnings for medical specimens and as well as address. Each mailer conforms to U.S. Postal regulations regarding minimum size for First Class.

Cat. #	Description	Pack
71540	2-Slide Mailer	25/pk.
71540-CS	2-Slide Mailer	1,000/pk.

► 4-Slide Mailer

The same construction as 2-slide mailer above, but holds 4 of 3x1" slide.

Cat. #	Description	Pack
71541	4-Slide Mailer - Cardboard	20/pk
71541-CS	4-Slide Mailer - Carboard	200/case



► The SlideFile™

The most convenient, organized and versatile way of storing 3" x 1" (75 x 25 mm) microscope slides vertically. This impact resistant SlideFile™ Storage System can hold up to 400 slide per unit in just 1720 cm³ (105 cu. in.) and are stackable for space saving.

Each SlideFile System includes a slide box and two removable trays. A transparent hinged cover makes it easy to see at a glance the content of the box.

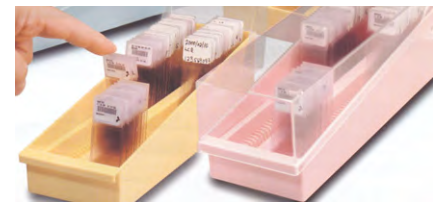
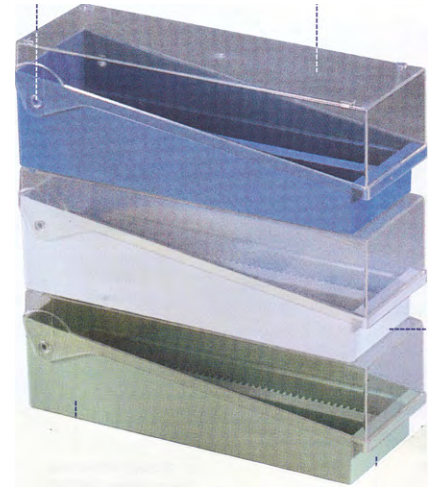
Features:

- SlideFile™ System is a removable tray inside the storage box having 100 numbered slots. All slides are stored vertically for easy insertion and removal.
- In the upright position, one is able to read bar codes without having to remove the slide from the box.
- For space saving purposes, you can double the amount of slides simply by storing two slides side-by-side per slot. And for maximum storage space—long-term storage—simply remove the SlideFile Tray and line up 400 slides in three rows.
- Six drain holes incorporated into the tray ensure complete emptying of the liquid when using the slide holder for drying purposes.
- Two index cards numbered from 1 to 100 are included to allow for slide recording titles.

Dimensions: 86 mm x 248 mm x 83 mm high (3 3/8" x 9 3/4" x 3 1/4" high)

The SlideFile™ System is available in five colors: White, Blue, Green, Pink and Yellow

Cat.#	Description	Pack	Cat.#	Description	Pack
71450-01	SlideFile System, White	each	71452-10	SlideFile System, Green	10/pk.
71450-10	SlideFile System, White	10/pk.	71453-01	SlideFile System, Pink	each
71451-01	SlideFile System, Blue	each	71453-10	SlideFile System, Pink	10/pk.
71451-10	SlideFile System, Blue	10/pk.	71454-01	SlideFile System, Yellow	each
71452-01	SlideFile System, Green	each	71454-10	SlideFile System, Yellow	10/pk.



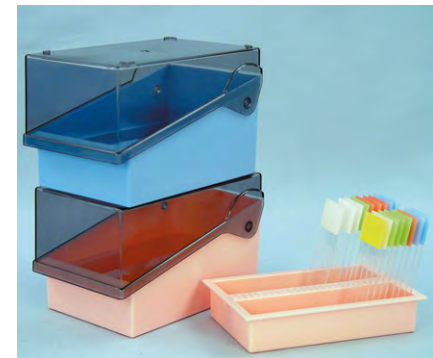
► SlideFile™ Jr. – Storage System

Similar to the SlideFile™, the junior model can hold up to 200 slides per unit in just 860cm³ (53 cu. in.), and it is stackable to save space. Each SlideFile™ Jr. includes a slide box and a removable tray. A tinted hinged cover makes the contents of the box easy to see at a glance.

Removable tray inside the storage box having 50 individual numbered slots. All slides are stored upright for easy insertion and removal as well as reading the bar codes without removing the slides.

To save space, you can double the amount of the slides simply by storing 2 slides per slot. And for maximum storage space, simply remove the tray and line up 200 slides in 3 rows for long term storage. This system is not autoclavable. The system measures: 82mm x 140mm x 86mm(H). (3 1/4" x 5 1/2" x 3 3/8"H)

Cat.#	SlideFile™ Jr. Color	Qty	Cat.#	SlideFile™ Jr. Color	Qty
71448-B1	Blue	each	71448-W1	White	each
71448-B10	Blue	10/pk	71448-W10	White	10/pk
71448-G1	Green	each	71448-Y1	Yellow	each
71448-G10	Green	10/pk	71448-Y10	Yellow	10/pk
71448-P1	Pink	each			
71448-P10	Pink	10/pk			



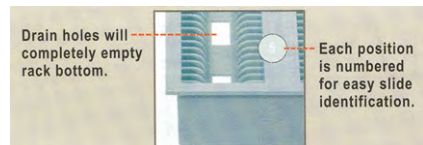
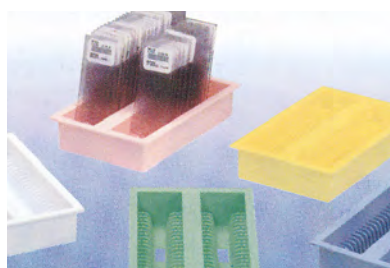
► Drain Rack™

Made from high impact polystyrene.

This rugged tray used as a drain rack can hold up to 200 microscope slides in 100 individual numbered slots. All slides are stored upright for easy insertion and removal. A unique feature with the DrainRack™ is the ability to read bar codes without having to remove the slides from the rack. For space saving purposes, you can double the amount of slides simply by storing 2 slides per slot, giving you a capacity of 200 slides per tray instead of 100. The racks are not autoclavable.

They measure: 75mm x 231mm x 25mm H (3" x 9" x 1" H)

Cat.#	DrainRack™ Color	Qty	Cat.#	DrainRack™ Color	Qty
71446-B	Blue	10/pk	71446-W	White	10/pk
71446-G	Green	10/pk	71446-Y	Yellow	10/pk
71446-P	Pink	10/pk			



► DrainRack Jr.

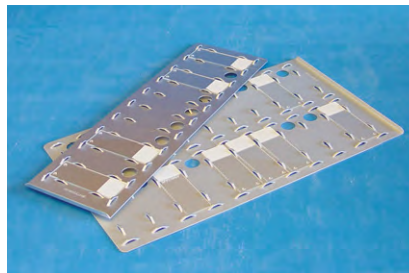
Made from high impact polystyrene

This model is similar to the DrainRack™ above but can hold up to 100 microscope slides in 50 individual numbered slots. The rack is autoclavable. Dimensions: 75mm x 125mm x 25mm H (3" x 5" x 1" H)

Cat.#	DrainRack™ Color	Qty
71445-B	Blue	10/pk
71445-G	Green	10/pk
71445-P	Pink	10/pk
71445-W	White	10/pk
71445-Y	Yellow	10/pk

► Slide Tray Racks & Aluminum Slide Trays

Stainless Steel slide tray racks that accept aluminum slide trays. The rack allows air to circulate over the slides and both sizes of racks hold up to 100 slides. The aluminum slide trays have elevated ridges to separate 76 x 26mm slides and finger holes for easy removal. Ideal for drying fresh mounts. THE Aluminum slide trays are available in two configurations: 10 slide position and 20 slide position.



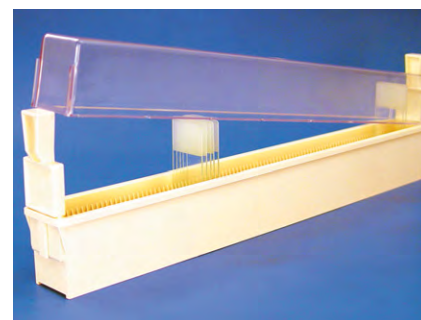
71506-10	Aluminum Slide Tray, 10-Slide – 13"L x 4" W (330 x 100mm). Accommodates 10 slides	each
71506-20	Aluminum Slide Tray, 20-Slide – 13"L x 7½" W (330 x 190mm). Accommodates 20 slides	each
71508-10	Stainless Steel Slide Tray Rack for 10-Slide Tray Accommodate 10 Aluminum Slide Tray, 10-Slide - 13"L x 8¾"W x 4¾"H (330 x 212 x 112mm)	each
71508-20	Stainless Steel Slide Tray Rack for 20-Slide Tray Accommodate 5 Aluminum Slide Tray, 20-Slide - 13"L x 7¾"W x 4¾"H (330 x 197 x 112mm)	each

► Slide Tray for 100 Slides

Made from tough, resilient ASB plastic which offers long life. Holds 100-standard 1 x 3" slides positioned vertically for easy insertion in pre-numbered grooves allowing for simple identification and retrieval. Dimensions: 14¼"L x ¼"W x 3¼"H (360 x 38 x 100mm).

A cover which is optional is made from clear polystyrene offering full visibility and it protects the slides from dirt and dust when they are not in the drawer.

71510-01	100-Slide Tray, Vertical	each
71510-10	100-Slide Tray, Vertical	10/pk
71511-01	100-Slide Tray Cover	each
71511-10	100- Slide Tray Cover	10/pk



71510-10

Slide Warmers, See Histology Section pages 604-605 >>>>

For all of our Slide Storage and Filing Cabinets, See pages 607-610 >>>>

► Specimen Mailers

1. Single Mailing Container, These fiberboard screw cap mailing cases meet all US Postal Regulations in mailing biological specimens. It also meets IATA regulations regarding shipments of infectious substances. They are constructed of heavy duty fiberboard and have crimped metal rims and seamed metal bottoms. The metal screw caps are autoclavable and offer a secure closure.

Available in several sizes:

61003	SM2, size 1¼"ID x 7"L	12/pk
61004	SM3, size 2¼"IDx 5½"L	12/pk



2. Double Mailing Container

The set consists of an inner aluminum screw cap container and an outer fiberboard screw cap mailing tube. This double type unit is required by US Postal for mailing of etiologic agents or biohazard specimens. Each aluminum container is autoclavable and the cap is lined to prevent leakage.



61011	DM2, tube size 1¾" x 7" Alum. can size 1½" x 6"	12/pk
61015	DM4, tube size 2¾"x 6¼" Alum. can size 2½" x 6"	12/pk

► Histology Containers

- Designed for the storage and transport of histology specimens in fixatives.
- Made from durable polypropylene (except 8L size, which is made of polyethylene)
- Leak-proof self-seal caps

All of the containers (except the 5ml size) have graduated markings on three sides. 2L to 8L sizes are supplied with snap-top lids and carrying handles, and has no graduations.



Cat.#	Visibility	Inside Height x Top I.D.	Size	Pack
64233-10	Semi-Clear	2" x ½" (50 x 13mm)	5ml	500/pk
64233-11	Semi-Clear	1½" x 1½" (40 x 28mm)	20ml	200/pk
64233-12	Semi-Clear	1½" x 1¾" (40 x 42mm)	40ml	200/pk
64233-14	Semi-Clear	2¼" x 1¾" (55 x 42mm)	60ml	100/pk
64233-16	Semi-Clear	2¾" x 1¾" (75 x 42mm)	90ml	400/pk
64233-17	Semi-Clear	3" x 1¾" (75 x 48mm)	120ml	300/pk
64233-18	Opaque	2¼" x 3¾" (55 x 88mm)	250ml	100/pk
64233-20	Opaque	4" x 3½" (110 x 88mm)	500ml	100/pk
64233-22	Opaque	5¼" x 4¾" (135 x 110mm)	1000ml	100/pk
64233-24	White	4¾" x 7¾" (120 x 184mm)	2000ml	20/pk
64233-26	White	7½" x 8¾" (190 x 126mm)	5000ml	10/pk
64233-28	White	9¾" x 9" (245 x 230mm)	8000ml	10/pk

► Quality Products for Microarray/Hybridization Systems

► A. LifterSlip™ Premium Printed Coverglass

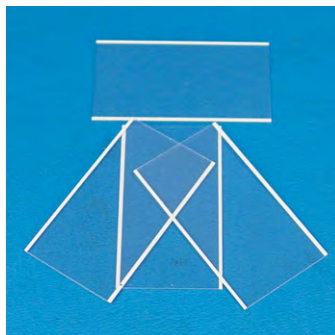
LifterSlip™ offers a simple solution to the problem of hybridization nonuniformity. An innovative raised edge design provides separation and allows for even dispersal hybridization solution between the DNA chip and coverslip.

LifterSlips™ allow for increased data quality by eliminating gradients caused by floating standard coverslips on hybridization solution under the pre-positioned coverslips.

Capillary attraction ensures that LifterSlip™ stays in place.

Depending on size and design configuration LifterSlip™ can hold a range of volumes.

LifterSlip™ is #2 thickness (0.20-0.22 mm) and the bar height is 0.04-0.06 mm.



Catalog No.	Bar Width (mm)	Approx. Volume	Size (mm)	Approx. Pieces per oz.
72184-18	.75	7.55µL	18 x 18	160
72184-22	.75	11.46µL	22 x 22	107
72184-25	.75	13.02µL	22 x 25	94
72184-30	.75	15.63µL	22 x 30	78
72184-40	.75	20.84µL	22 x 40	59
72184-44	.75	22.90µL	22 x 44	53
72184-50	.75	75µL	22 x 50	47
72184-60	.75	31.25µL	22 x 60	39
72185-24	.75	13.72µL	24 x 24	90
72185-60	.75	34.30µL	24 x 60	36
72185-62	.75	35.07µL	24 x 60	37
72186-25	.75	14.93µL	25 x 25	83
72186-35	.75	20.90µL	25 x 35	59
72186-36	.75	21.50µL	25 x 36	58
72186-40	.75	23.89µL	25 x 40	52
72186-42	.75	25.08µL	25 x 42	49
72186-44	.75	26.27µL	25 x 44	47
72186-54	.75	32.25µL	25 x 54	38
72186-60	.75	35.83µL	25 x 60	35

► B. mSeries LifterSlip™

Features:

- 1 mm thick.
- Uniform disposal of hybridization solution.
- Reduced hybridization fluid volume variations.
- Superior flatness – substrate does not flex or bow.
- Precision cut edges.
- Superior surface quality.
- Consistent flatness.



Solving the problem of hybridization non-uniformity

mSeries LifterSlip™ are manufactured from 1mm thick glass specially drawn for flatness and superior surface quality. The 1mm thickness has increased stiffness that reduces variation in hybridization fluid volume. Precise ink printing provides an innovative raised edge design for consistent dispersal and easy injection of hybridization solution under the pre-positioned lifterslip.

Catalog No.	Size (mm)	Approx. Volume	Pieces / Box
72181-25	22 x 25	20 µl	50/pk
72181-22	22 x 22	17 µl	50/pk
72181-40	22 x 40	29 µl	50/pk
72181-50	22 x 50	36 µl	50/pk
72181-60	22 x 60	45 µl	50/pk
72182-30	24 x 30	24 µl	50/pk
72182-45	24 x 45	33 µl	50/pk
72182-60	24 x 60	47 µl	50/pk
72183-25	25 x 25	23 µl	50/pk
72183-60	25 x 60	55 µl	50/pk
72183-75	25 x 75	68 µl	50/pk



► mBox® in Microarray Slide Handling

Using mBox – microarray handling without removing slides!

- Immerse 20 slides in liquid during blocking, denaturing, and post-arraying.
- It separates and prevents slide damage during shipping and processing.
- Optimally designed rack spacing for easy slide removal.
- Fits standard microtiter plate formats for centrifuging.
- Manufactured to prevent slide contamination.
- A convenient removable handle available.

Technical

- Material: Polypropylene
- Maximum continuous use temperature: 220°F (104°C)
- Melting point: 334°F (168°C)
- mBox withstand boiling water without softening
- Measures 5" L x 3½" W x 1½" H (127mm x 89mm x 38mm)

72188-01 The mBox®

each

► Premium Substrate for Microarray™

Premium substrates for microarray™ is used on a standard microscope slide 1 x 3", selective glass. All of the following slides are pre-packaged in a secure, no-contact mBox™, then vacuum-sealed in a foil barrier bag prior to shipping. Each package contains 20 slides.

► 1. UltraClean™ Glass Slide

A premium substrate ready to coat with your chemistry.

UltraClean™ substrate provides users with a pristine glass surface which can be used in any coating process compatible with glass such as silanization and polylysine. Manufactured from the highest quality low fluorescence glass.

UltraClean substrates are manufactured in a precise and controlled process incorporating HEPA filtration. This ensures a clean and consistent surface for optimum performance in microarray applications.

Options:

- Slides are available with ES – Enhanced Surface Treatment. ES Surface treatments produce a smaller, more uniform spot size without having to change your protocol
- Bar Coding – Ability to print all standard bar code formats

Glass Specifications:

- Flatness is <10µ variation over a 76mm diagonal interval
- 60/40 scratch-dig surface quality
- Standard size: 25.10 x 75.36 ±0.38 mm
- Thickness: 1.00 ±0.02 mm
- Soda-lime silicate glass
- 0.98 – 1.02 mm thickness
- Edges: plain cut
- Maximum edge chip: 0.05 mm
- Coating: none
- Printable area: 20 x 70 mm

EMS #	Description	Qty
63472-UC	UltraClean Slide	20/bx
63472-BC	UltraClean Slide with Barcode	20/bx
63472-ES	UltraClean Slide with ES Coating	20/bx

► 2. Aldehyde Silane Coated Substrates

Offers a uniform coating of aldehydes for attaching amine-modified DNA

EMS #	Description	Qty
63476-AS	Aldehyde / Silane Slide	20/bx
63476-ES	Aldehyde / Silane Slide, ES Glass	20/bx
63476-EB	Aldehyde/Silane Slide, ES /Barcode	20/bx

► 3. Epoxy Silane Coated Substrate

A uniform coating of epoxide groups for attaching amine modified DNA with an amine end. This is a vapor-coating process on UltraClean™ slides, which yields a uniform surface free from impurities (as a conventional liquid dip processes)

EMS #	Description	Qty
63477-AS	Epoxy / Silane Slide	20/bx
63477-ES	Epoxy / Silane Slide, ES Glass	20/bx

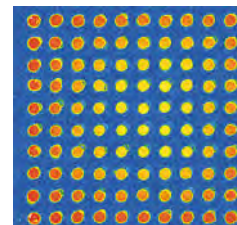
► 4. Poly-L-Lysine Coated Substrates

Using premium select, low fluorescence glass with a consistent uniform coating of poly-L-lysine these slides yield a dense layer of amine groups for initial ionic attachment of the negatively charged phosphate groups in the DNA backbone. The DNA can subsequently be attached covalently to the slide by either baking or by UV irradiation. Our aging and packaging techniques ensure a product with a shelf life in excess of 6 months. Each lot is tested for background uniformity prior to shipping. The slides arrive ready for spotting – no pre-washing required.

EMS #	Description	Qty
63478-AS	Poly-L-Lysine Slide	20/bx
63478-EB	Poly-L-Lysine Slide, ES /Barcode	20/bx

► 5. Aminopropylsilane Coated Substrates

SuperChip™ Aminopropylsilane coated substrates are designed for microarrays fabricated with the PCR products as probes. Manufactured from the highest quality, low fluorescence glass, SuperChip features a consistent, superior surface coating to provide



a uniform DNA immobilizing surface. The result is the slide that binds an optimal amount of probe while minimizing nonspecific binding of labeled targets assuring high density of reactive groups and eliminating virtually all surface artifacts. These SuperChip substrates are compatible with commercial microarray spotting and detection system.

The SuperChip cleaning and coating process is tightly controlled in a HEPA filtered environment. Quality control includes contact angle and background fluorescence measurement of representative samples.

Glass Specifications:

- Edges: plain cut
- 60/40 scratch-dig surface quality
- Contact angle: 40° ± 5°
- Standard size: 25.10 x 75.36 ±0.38 mm
- Thickness: 1.00 – 0.02 mm
- Flatness is <10µm variable across a diagonal of 21mm x 75mm slide
- Thickness: 1.00 ±0.02 mm
- Maximum edge chip: 0.5 mm
- Coating: Aminopropylsilane
- Printable area: 20 x 70 mm

EMS #	Description	Qty
63475-AP	Aminopropylsilane (APS) Slide	20/bx
63475-BC	Aminopropylsilane (APS) Slide, Barcode	20/bx
63475-ES	Aminopropylsilane (APS) Slide, ES	20/bx

► 6. Gold Coated Substrates

BioGold® substrates offer a high level of microarray performance through the use of a specialized thin-filmed gold coating. This specialized gold coating improves the adhesion of biological active cells to the substrate while its background reflective properties provide significant optical advantages for the detection of each cell's unique light-wave signature.

Glass Specifications:

- Glass Type: Soda Lime White Glass
- (Dimensions: 2.992" ±0.005") x (0.984" ±0.040") x 1mm Thick
- Edges: Plain Cut
- Gold Purity: 99.999%
- Coating Application: Vapor Deposition
- Thickness of Coating: 1200 Å ±20%
- Reflective properties: 83%

EMS #	Description	Qty
63479-AS	Gold-Coated Substrates	20/bx

► NUNC™ MaxiSorp™ 96 Well Plates

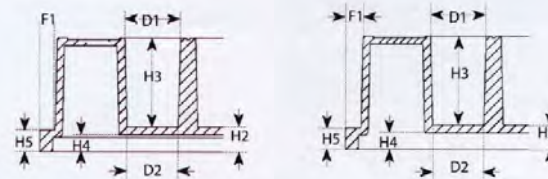
NUNC MaxiSorp plates have been the certified* ELISA plate industry standard for years. This same surface now sets a new standard for protein multiplexing.

- Hydrophilic MaxiSorp™ surface binds antibodies, protein and biomolecules.
- Flat bottom, solid polystyrene plates.
- Excellent for chemiluminescent, fluorescent and luminescent arrays.
- Standard plate footprint is compatible with exiting readers.

ORDERING:

Catalog #	63494-CL	63494-BK	63494-WH
NUNC #	439454	437111	436110
Plate Material	Polystyrene	Polystyrene	Polystyrene
Color	Clear	Black	White
Key Applications	Protein & antibody multiplexing, chemiluminescence	Protein & antibody multiplexing, fluorescence	Protein & antibody multiplexing, luminescence
Method of attachment	Hydrophilic	Hydrophilic	Hydrophilic
Unit per Package/case	5/60	10/80	10/80

*Certified for absorption of IgG; CV of <5% between wells; all results are ±10% from the mean and background of all well ±0.005 absorbance units from the mean



	mm		mm
Plate Total Height	14.5	Plate Total Height	14.6
H2 Vertical distance from inside well bottom to resting plane	3.2	H2 Vertical distance from inside well bottom to resting plane	3.6
H3 Inside depth of well	11.2	H3 Inside depth of well	11.2
H4 Vertical distance from external well bottom to resting plane	2.1	H4 Vertical distance from external well bottom to resting plane	2.1
H5 Height of flange	2.85	H5 Height of flange	2.7
D1 Well diameter, top	7.05	D1 Well diameter, top	7.05
D2 Well diameter, bottom	6.5	D2 Well diameter, bottom	6.55
F1 Depth of flange	2.0	F1 Depth of flange	2.0

► NUNC™ 4-Well Slide Processing Dish

- Holds four 25 x 75 mm slides.
- Sterile.
- Clear polystyrene dish and lid.

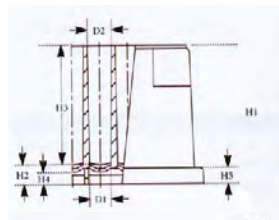


ORDERING:

Catalog #	63496
NUNC #	267061
Material	Polystyrene
Color	Clear
Unit per pack / case	10/100

► NUNC 384-Well Plate

- Natural polypropylene.
- Non-sterile.
- Without lid.



	mm
Plate Total height	22
H2 Vertical distance from inside well bottom to resting plane	2.5
H3 Inside depth of well	20.0
H4 Vertical distance from external well bottom to resting plane	2.0
H5 Height of flange	2.5
D1 Well diameter, top	3.9
D2 Well diameter, bottom	3.4
F1 Depth of flange	1.8



ORDERING:

Catalog #	63498-LV	63498-ST	63498-DW
NUNC #	267 459	264573	269390
Description	Low Volume	Standard	Deep Well
Max Volume, µl/well	58	120	252
Working Volume, µl/well	2 - 35	10 - 100	5 - 240
Unit per Pack/Case	25/100	20/120	5/60

► Pronto™ Epoxide Slide Spotting Solution

The Microarray spotting solution is optimized for printing short oligonucleotides (~30 mers) providing excellent spot morphology, extremely low background, and minimal evaporation when used in conjunction with above Epoxide Slides (#63477-series). Higher density arrays can be printed due to the smaller spot size achieved using the spotting solution



EMS #	Description	Qty
63500-25	Pronto™ Spotting Solution	250 ml

Pronto is a Trade Mark of Corning

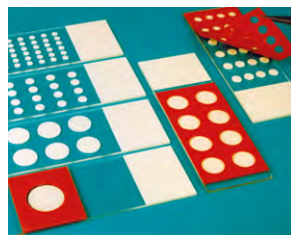
► Pronto™ Universal Slide Spotting Solution

The Microarray spotting solution is optimized for printing both long oligonucleotides (>50 mers) and cDNA providing excellent spot morphology, extremely low background, and minimal evaporation when used in conjunction with Aminopropylsilane Slides (#63475-series). The hygroscopic formulation minimizes evaporation to < 5% after four hours of exposure allowing more arrays to be printed from the same source plate during extended printing runs.



EMS #	Description	Qty
63501-25	Pronto™ Spotting Solution	250 ml

Pronto is Trade Mark of Corning



► **ONCYTE® Film Slides**

Nitrocellulose-coated (NC) slides for protein microarrays, cell lysate arrays, tissue printing and other applications

ONCYTE® is a three-dimensional microarray comprised of a combination of nitrocellulose polymer and proprietary chemistry that provides increased protein affinity and binding. It is also provides enhanced fluorescent chemiluminescent, radiographic, colorimetric and visual signal compared to glass or other coated glass surfaces.

We provide nitrocellulose-coated products that include anything from standards 25 mm x 75 mm glass microscope slides to SBS microtiter plate substrates in standard and custom formats. Nitrocellulose film excels in various applications including:

- Protein Microarrays
- Immuno-arrays
- Analyte Microarrays
- Cell Lysate Arrays
- Antibody Arrays
- Tissue Printing

Our nitrocellulose film surfaces are manufactured and quality tested to the most exacting standards. To provide an optimal balance between binding capacity and fluorescence sensitivity, we offer two variants of nitrocellulose coatings.

- The ONCYTE® AVID™ nitrocellulose-coated substrates are for applications that require the highest possible protein binding affinity and capacity. Therefore AVID™ slides are characterized by unparalleled protein binding capacity and affinity, making them ideal for colorimetric and infrared applications that require extremely high levels of binding.
- The ONCYTE® NOVA™ nitrocellulose-coated substrates are recommended for applications that require the greatest fluorescent sensitivity but can accept reduced binding capacity. Therefore NOVA™ slides extremely low background fluorescence and an elegant, clean surface make them the most sensitive slides available for fluorescence –dependent arrays.

We offer two distinct nitrocellulose film coatings:

ONCYTE® AVID™ for applications that require the highest possible binding capacity and affinity

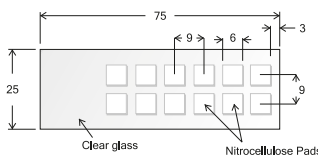
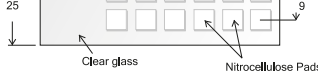
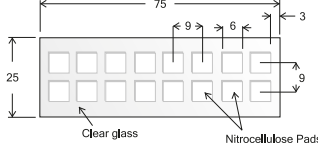
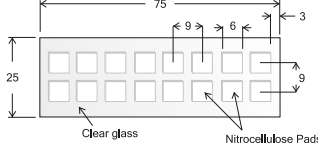
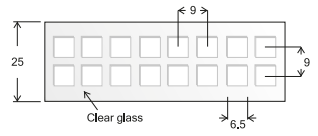
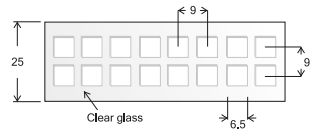
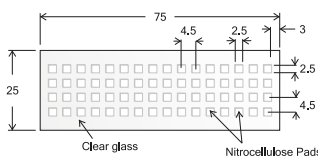
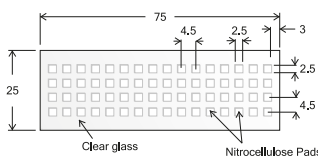
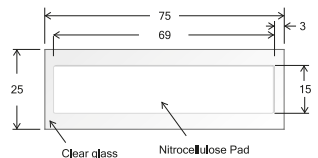
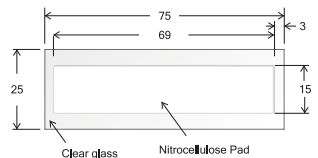
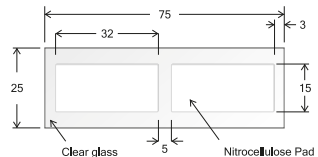
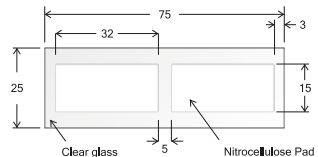
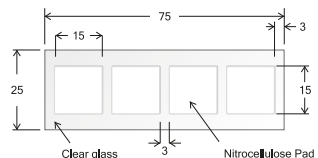
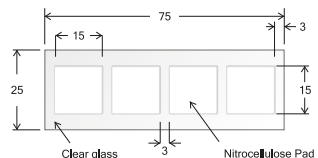
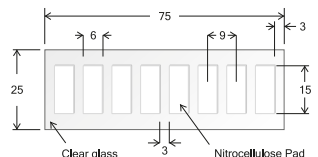
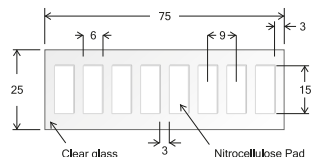
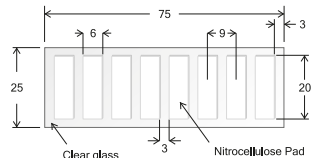
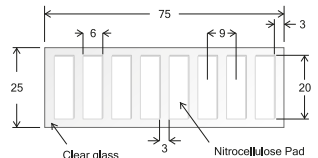
ONCYTE™ NOVA™ for applications that require the greatest fluorescence sensitivity

Ordering: ONCYTE® Film Slides

EMS #	Dimensions	Description	Qty.
70335-50A		ONCYTE® AVID™ 1 – 20 x 51 mm NC pad per slide; Frosted End Glass 25 x 75 x 1 mm	20
70335-50N		ONCYTE® NOVA™ 1 – 20 x 51 mm NC pad per slide; Frosted End Glass 25 x 75 x 1 mm	20
70335-51A		ONCYTE® AVID™ 1 – 20 x 60 mm NC pad per slide; Plain Glass 25 x 75 x 1 mm	20
70335-51N		ONCYTE® NOVA™ 1 – 20 x 60 mm NC pad per slide; Plain Glass 25 x 75 x 1 mm	20
70335-52A		ONCYTE® AVID™ 1 – 21 x 71 mm NC pad per slide; Pad placement ± 0.3 mm; Glass 25 x 75 x 1 mm	20
70335-52N		ONCYTE® NOVA™ 1 – 21 x 71 mm NC pad per slide; Pad placement ± 0.3 mm; Glass 25 x 75 x 1 mm	20
70335-53A		ONCYTE® AVID™ 2 – 20 x 20 mm NC pad per slide; Frosted End Glass Slide 25 x 75 x 1 mm	20
70335-53N		ONCYTE® NOVA™ 2 – 20 x 20 mm NC pad per slide; Frosted End Glass Slide 25 x 75 x 1 mm	20
70335-54A		ONCYTE® AVID™ 8 – 6 x 6 mm NC pad per slide; Frosted End Glass Slide 25 x 75 x 1 mm	20
70335-54N		ONCYTE® NOVA™ 8 – 6 x 6 mm NC pad per slide; Frosted End Glass Slide 25 x 75 x 1 mm	20

MICROARRAYING

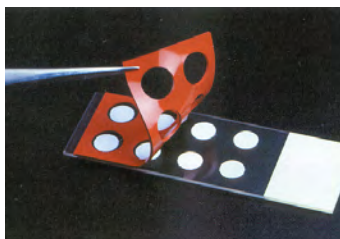
Ordering: ONCYTE® Film Slides (cont.)

EMS #	Dimensions	Description	Qty.
70335-55A		ONCYTE® AVID™ 12 – 6 x 6 mm NC pad per slide; Frosted End Glass Slide 25 x 75 x 1 mm	20
70335-55N		ONCYTE® NOVA™ 12 – 6 x 6 mm NC pad per slide; Frosted End Glass Slide 25 x 75 x 1 mm	20
70335-56A		ONCYTE® AVID™ 16 – 6 x 6 mm NC pad per slide; Plain Glass Slide 25 x 75 x 1 mm	20
70335-56N		ONCYTE® NOVA™ 16 – 6 x 6 mm NC pad per slide; Plain Glass Slide 25 x 75 x 1 mm	20
70335-57A		ONCYTE® AVID™ 16 – 6.5 x 6.5 mm NC pad per slide; Plain Glass Slide 25 x 75 x 1 mm	20
70335-57N		ONCYTE® NOVA™ 16 – 6.5 x 6.5 mm NC pad per slide; Plain Glass Slide 25 x 75 x 1 mm	20
70335-58A		ONCYTE® AVID™ 64 – 2.5 x 2.5 mm NC pad per slide; Plain Glass Slide 25 x 75 x 1 mm	20
70335-58N		ONCYTE® NOVA™ 64 – 2.5 x 2.5 mm NC pad per slide; Plain Glass Slide 25 x 75 x 1 mm	20
70335-59A		ONCYTE® AVID™ 1 – 15 x 69 mm NC pad per slide; Plain Glass Slide 25 x 75 x 1 mm	20
70335-59N		ONCYTE® NOVA™ 1 – 15 x 69 mm NC pad per slide; Plain Glass Slide 25 x 75 x 1 mm	20
70335-60A		ONCYTE® AVID™ 2 – 15 x 32 mm NC pad per slide; Plain Glass Slide 25 x 75 x 1 mm	20
70335-60N		ONCYTE® NOVA™ 2 – 15 x 32 mm NC pad per slide; Plain Glass Slide 25 x 75 x 1 mm	20
70335-61A		ONCYTE® AVID™ 4 – 15 x 15 mm NC pad per slide; Plain Glass Slide 25 x 75 x 1 mm	20
70335-61N		ONCYTE® NOVA™ 4 – 15 x 15 mm NC pad per slide; Plain Glass Slide 25 x 75 x 1 mm	20
70335-62A		ONCYTE® AVID™ 8 – 6 x 15 mm NC pad per slide; Plain Glass Slide 25 x 75 x 1 mm	20
70335-62N		ONCYTE® NOVA™ 8 – 6 x 15 mm NC pad per slide; Plain Glass Slide 25 x 75 x 1 mm	20
70335-63A		ONCYTE® AVID™ 8 – 6 x 20 mm NC pad per slide; Plain Glass Slide 25 x 75 x 1 mm	20
70335-63N		ONCYTE® NOVA™ 8 – 6 x 20 mm NC pad per slide; Plain Glass Slide 25 x 75 x 1 mm	20

Ordering: ONCYTE® Film Slides (cont.)

EMS #	Dimensions	Description	Qty.
ONCYTE® for SBS Compliant Microtiter Plates with Glass Substrate			
70335-70A		ONCYTE® AVID™ 96 NC Round Pads 6 mm diameter for SBS Microtiter Plate with Glass Substrate	each
70335-70N		ONCYTE® NOVA™ 96 NC Round Pads 6 mm diameter for SBS Microtiter Plate with Glass Substrate	each
70335-71A		ONCYTE® AVID™ 96 NC Square Pads 6 x 6 mm for SBS Microtiter Plate with Glass Substrate	each
70335-71N		ONCYTE® NOVA™ 96 NC Square Pads 6 x 6 mm for SBS Microtiter Plate with Glass Substrate	each
70335-72A		ONCYTE® AVID™ 384 NC Square Pads 2.5 x 2.5 mm for SBS Microtiter Plate with Glass Substrate	each
70335-72N		ONCYTE® NOVA™ 384 NC Square Pads 2.5 x 2.5 mm for SBS Microtiter Plate with Glass Substrate	each
ONCYTE® for SBS Compliant Microtiter Plates			
70335-BF1		ONCYTE® Barcode 20 x 2.5 mm; Code 128 Format	Each
70335-BF2		ONCYTE® Barcode 20 x 7 mm; Code 128 Format	Each
70335-BF3		ONCYTE® Barcode 22 x 14mm; CODABAR Format	Each

MICROARRAYING



► ONCYTE® Film Wells

Film Well™: Slide based low volume, removable chambers for protein binding.

A combination of our SecureSeal™ chambers and ONCYTE® nitrocellulose film coated slides that provide an easily removable, low volume chamber and the protein binding benefits of a nitrocellulose coating.

ONCYTE® is a 3-dimensional microarray substrate bound to a standard 25mm x 75mm glass slide. A combination of nitrocellulose polymer and proprietary chemistry maximize protein binding and stability. The film is compatible with virtually all detection systems, including fluorescent, chemiluminescent, radiographic and colorimetric.

Please refer to the SecureSeal™ chambers (pages 350–352) and ONCYTE® Film Slides (pages 339–341) for ordering information.

How to Use ONCYTE® Film-Wells/Film-Slides

- Specimens may be applied to a Film-Slide by any conventional method including centrifugation, cryostat mounting, tissue printing pipetting, and array depositors.
- Film-Slides provide superior specimen adherence, out performing silane and protein treated glass slides.
- Soluble analyte may be bound to Film-slides by air drying, UV crosslinking, baking or microwaving. Film-slides are autoclavable.
- Specimens may be chemically fixed using aqueous fixatives or compatible alcohols.
- Film-slides are ideally suited for use in most cytochemistry assay protocols including ICC, ISH, ISPCR and HTS.
- Film-slides are chemically resistant to reagents typically used in most assays for cell analysis including 50% formamide.
- Film-slides are not recommended for use with acetone, ethanol & methanol. Isopropanol and butanol are common substitutes.
- Bi-directional access to specimen by reagents may reduce incubation times and reagent concentrations.
- Film-slides are compatible with a variety of counterstains including Mayer's hematoxylin, nuclear fast red and light green SF. Gill's hematoxylin is recommended (0.05% HCl may be used to de-stain). Eoin (0.5%, diluted in isopropanol). In some cases counterstains may bind to the film, this usually does not interfere with the microscopic examination of specimens.
- Film-Slides are made transparent for microscopic and imaging applications by xylenes or immersion oil with a refractive index of 1.515. For aqueous mounting Vectashield (Vector Labs), Slow Fade & Slow Fade Light (Molecular Probes, Inc.) are recommended.
- Permanent sections may be made by coverslip mounting specimens using non-aqueous media after dehydration through alcohol or by air drying.

User Protocol:

Instructions for Immunohistochemical Staining

1. Apply specimen to Film area (see side A).
 2. Air dry
 3. Fix specimens using appropriate fixative for the antigen studied. Commonly recommended fixatives are:
 - A. Paraformaldehyde: 4% in phosphate buffered saline (PBS). 0.05M magnesium chloride, 0.3% Tween-20, pH 7.4. Fix at 4 C. Fixation time may vary according to specimen thickness and specific antigen.
 - B. Zamboni's: Nature 216:174-175, 1967.
 4. Wash with three changes of PBS containing Tween-20 (0.1%) pH 7.5 (TPBS).
 5. Block non-specific binding of primary antibody: -
 - peroxidase based detection:* incubate specimens for 15 minutes with 0.3% hydrogen peroxide prepared in de-ionized water.
 - alkaline phosphatase based detection:* incubate specimens 15 minutes at room temperature in TPBS containing 1% normal serum from the species in which the secondary antibody is made.
 6. Blot excess serum from specimens.
 7. Incubate specimens for 30 minutes with primary antibody diluted in TPBS containing 1% serum.
 8. Wash Film-slides with 3 changes of TPBS.
 9. Incubate with secondary antibody diluted in TPBS containing 1% normal serum.
 10. Repeat Step 8.
- Note: remaining steps refer to alkaline phosphatase based detection.*
11. Incubate specimens in alkaline phosphatase labeled reagent.
 12. Repeat Step 8.
 13. Equilibrate specimens for 2 minutes in 0.1M TRIS pH 9.5.
 14. Incubate in substrate or solution 20-30 minutes.
 15. Rinse with tap water.
 16. Counterstain if desired (see side A).
 17. Air dry or dehydrate through isopropyl alcohol series.
 18. Clear with 3 changes of xylenes.
 19. Coverslip using non-aqueous mounting medium.

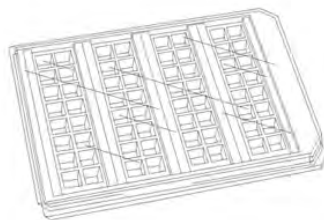
References:

High-Definition Cell Analysis In Situ Using Microporous Films. *Cel Vision* 2:499-509, 1995.

Cytometrically Coherent Transfer of Receptor Proteins on Microporous Membranes. *BioTechniques* 20:641-650. 1991.

ONCYTE® Film-Slides & Film-Wells are Intended for Laboratory Use Only

ONCYTE® is a registered trademark of Grace Bio-Labs, Inc.



➤ **ProPlate™ Multi-Array Slide System**
Integration of microplate and biochip technologies



ProPlate™ Integrates microscope slide based array technology with automated microtiter plate processing. Up to 64 individual arrays can be assayed per slide. Four slide fit into a tray, producing a modular plate with a standard microtiter plate footprint and well spacing allowing automated robotic processing of up to 256 arrays.

- Up to 64 leak-proof wells on any slide surface without the use of adhesive
- Microtiter plate well spacing facilitates use with multichannel pipettes
- 7 x 7 mm square well are ideal for high content arrays
- 5 – 350 µl well volumes accommodate small reagent and large wash volumes
- Available in Chip Chip™ compatible formats.

Ordering: ProPlate™ Multi-Array Slide System

EMS #	Description	Qty.
ONCYTE® for SBS Compliant Microtiter Plates		
63484-01	1 Well ProPlate Tray set / 3 – 16.5 x 70 mm Well, Stainless Steel Spring Clips, Tray, Cover, 10 Seal Strips and 1 Seal Strip applicator	Each
63484-02	2 Well ProPlate Tray set / 3 – 16.5 x 34 mm, 2 Well Modules, Stainless Steel Spring Clips, Tray, Cover, 10 Seal Strips and 1 Seal Strip applicator	Each
63484-03	3 Well ProPlate Tray set / 3 – 18 x 20 mm, 3 Well Modules, Stainless Steel Spring Clips, Tray, Cover, 10 Seal Strips and 1 Seal Strip applicator	Each
63484-04	4 Well ProPlate Tray set / 3 – 16 x 16 mm, 4 Well Modules, Stainless Steel Spring Clips, Tray, Cover, 10 Seal Strips and 1 Seal Strip applicator	Each
63484-05	8 Well ProPlate Tray set / 3 – 7 x 16 mm, 8 Well Slide Modules, Stainless Steel Spring Clips, Tray, Cover, 10 Seal Strips and 1 Seal Strip applicator	Each
63484-06	16 Well ProPlate Tray set / 3 – 6 mm Diameter, 16 Well Slide Modules, Stainless Steel Spring Clips, Tray, Cover, 10 Seal Strips and 1 Seal Strip applicator	Each
63484-07	16 Well ProPlate Tray set / 3 – 7 x 7 mm, 16 Well, Stainless Steel Spring Clips, Tray, Cover, 10 Seal Strips and 1 Seal Strip applicator	Each
63484-08	64 Well ProPlate Tray set / 3 – 3.5 x 3.5 mm, 64 Well Slide Modules, Stainless Steel Spring Clips, Tray, Cover, 10 Seal Strips and 1 Seal Strip applicator	Each
63484-09	1 Well ProPlate Tray set / 4 – 16.5 x 70 mm Well Modules, Delrin Snap Clips, Tray, Cover, 10 Seal Strips and 1 Seal Strip applicator	Each
63484-10	2 Well ProPlate Tray set / 4 – 16.5 x 34 mm, 2 Well Modules, Delrin Snap Clips, Tray, Cover, 10 Seal Strips and 1 Seal Strip applicator	Each
63484-11	3 Well ProPlate Tray set / 4 – 18 x 20 mm, 3 Well Modules, Delrin Snap Clips, Tray, Cover, 10 Seal Strips and 1 Seal Strip applicator	Each
63484-12	4 Well ProPlate Tray set / 4 – 16 x 16 mm, 4 Well Modules, Delrin Snap Clips, Tray, Cover, 10 Seal Strips and 1 Seal Strip applicator	Each
63484-13	8 Well ProPlate Tray set / 4 – 7 x 16 mm, 8 Well Slide Modules, Delrin Snap Clips, Tray, Cover, 10 Seal Strips and 1 Seal Strip applicator	Each
63484-14	16 Well ProPlate Tray set / 4 – 6 mm Diameter, 16 Well Slide Modules, Delrin Snap Clips, Tray, Cover, 10 Seal Strips and 1 Seal Strip applicator	Each
63484-15	16 Well ProPlate Tray set / 4 – 7 x 7 mm, 16 Well Slide Modules, Delrin Snap Clips, Tray, Cover, 10 Seal Strips and 1 Seal Strip applicator	Each
63484-16	64 Well ProPlate Tray set / 4 – 3.5 x 3.5 mm, 64 Well Slide Modules, Delrin Snap Clips, Tray, Cover, 10 Seal Strips and 1 Seal Strip applicator	Each

Ordering Information for ProPlate™ Multi-Array Slide System continued on next page >>>>

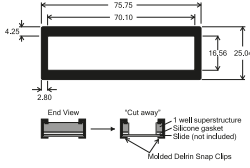
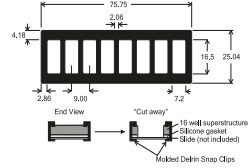
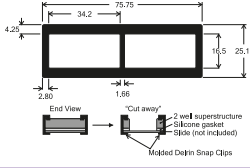
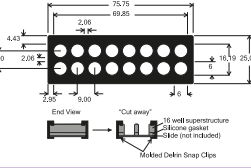
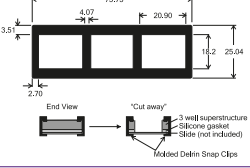
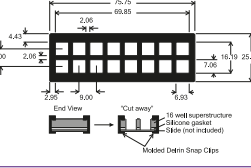
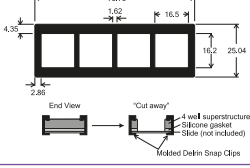
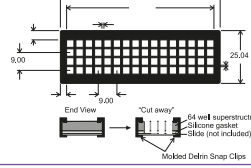
MICROARRAYING

Ordering: ProPlate™ Multi-Array Slide System (cont.)

EMS #	Dimensions	Description	Qty.	EMS #	Dimensions	Description	Qty.
63484-21		1 Well ProPlate Module only/16.5 x 70 mm Well, without Clips	10	63484-31		1 Well ProPlate Slide Module/16.5 x 70 mm Well, Delrin Snap Clips	2
63484-22		2 Well ProPlate Module only/16.5 x 34mm, 2 Well, without Clips	10	63484-32		2 Well ProPlate Slide Module/16.5 x 34 mm, 2 Well, Delrin Snap Clips	2
63484-23		3 Well ProPlate Module only/18 x 20 mm, 3 Well, without Clips	10	63484-33		3 Well ProPlate Slide Module/18 x 20 mm, 3 Well, Delrin Snap Clips	2
63484-24		4 Well ProPlate Module only/16 x 16 mm, 4 Well, without Clips	10	63484-34		4 Well ProPlate Slide Module/16 x 16 mm, 4 Well, Delrin Snap Clips	2
63484-25		8 Well ProPlate Module only/7 x 16mm, 8 Well, without Clips	10	63484-35		8 Well ProPlate Slide Module/7 x 16 mm, 8 Well, Delrin Snap Clips	2
63484-26		16 Well ProPlate Module only/6 mm Diameter, 16 Well, without Clips	10	63484-36		16 Well ProPlate Slide Module/6 mm Diameter, 16 Well, Delrin Snap Clips	2
63484-27		16 Well ProPlate Module only/7 x 7 mm, 16 Well, without Clips	10	63484-37		16 Well ProPlate Slide Module/7 x 7 mm, 16 Well, Delrin Snap Clips	2
63484-28		64 Well ProPlate Module only/3.5 x 3.5 mm, 64 Well, without Clips	10	63484-38		64 Well ProPlate Slide Module/3.5 x 3.5 mm, 64 Well, Delrin Snap Clips	2

Ordering Information for ProPlate™ Multi-Array Slide System continued on next page >>>>



Ordering: ProPlate™ Multi-Array Slide System (cont.)

EMS #	Dimensions	Description	Qty.	EMS #	Dimensions	Description	Qty.
63484-41		1 Well ProPlate Slide Module/16.5 x 70 mm Well, Stainless Steel Clips	2	63484-45		8 Well ProPlate Slide Module/7 x 16 mm, 8 Well, Stainless Steel Clips	2
63484-42		2 Well ProPlate Slide Module/16.5 x 34 mm, 2 Well, Stainless Steel Clips	2	63484-46		16 Well ProPlate Slide Module/6 mm Diameter, 16 Well, Stainless Steel Clips	2
63484-43		3 Well ProPlate Slide Module/18 x 20 mm, 3 Well, Stainless Steel Clips	2	63484-47		16 Well ProPlate Slide Module/7 x 7 mm, 16 Well, Stainless Steel Clips	2
63484-44		4 Well ProPlate Slide Module/16 x 16 mm, 4 Well, Stainless Steel Clips	2	63484-48		64 Well ProPlate Slide Module/3.5 x 3.5 mm, 64 Well, Stainless Steel Clips	2

Silicone Gasket Only

EMS #	Description	Qty.
63484-51	1 Well ProPlate Silicone Gasket only / 16.5 x 70 mm Well	10
63484-52	2 Well ProPlate Silicone Gasket only / 16.5 x 24 mm, 2 Well	10
63484-53	3 Well ProPlate Silicone Gasket only / 16 x 20 mm, 3 Well	10
63484-54	4 Well ProPlate Silicone Gasket only / 16 x 16 mm, 4 Well	10
63484-55	8 Well ProPlate Silicone Gasket only / 7 x 16 mm, 8 Well	10
63484-56	16 Well ProPlate Silicone Gasket only / 6 mm Diameter, 16 Well	10
63484-57	16 Well ProPlate Silicone Gasket only / 7 x 7 mm, 16 Well	10
63484-58	64 Well ProPlate Silicone Gasket only / 3.5 x 3.5 mm, 64 Well	10

Accessories

EMS #	Description	Qty.
63484-80	 Seal Strips (50) and Seal Strip Applicator	50
63484-81	ProPlate Delrin, Non-Numbered Snap Clips	20
63484-82	 Stainless steel spring clips are recommended for use with glass slides which have un-polished edges. Spring Clip End View, Slide module assembled using Spring Clips End View, Slide module assembled using Spring Clips Top View	20
63484-83	ProPlate Tray and Cover for Snap Clip Modules Holds 4 Slide Modules	each
63484-84	ProPlate Tray and Cover for Spring Clip Modules Holds 3 Slide Modules	each

MICROARRAYING

► ProPlate Microtiter Plate (MP)

Patented ProPlate™ technology for high throughput robotic processing of microarrays

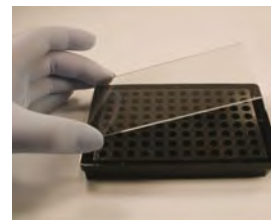
Grace BioLabs developed bottomless SBS compliant microtiter plate superstructures for use with robotic processors. The Superstructures come in a permanently affixed well format – the ProPlate MP™, or a removable well format – the FlexPlate MP™.

The ProPlate MP™ SBS compliant microtiter plate features a SecureSeal™ Plus adhesive bonding system applied to a bottomless 96-round well, black, polystyrene microtiter plate. Simply peel off the protective polyliner and apply large format array for automated processing.

The proprietary adhesive forms a water-tight seal between a microarray substrate and the bottomless microtiter plate. Grace Bio Labs offers plate with SBS standard spacing in both 96-well (shown) and 384-well formats.

Key product features include:

- Guaranteed flat SBS compliant microtiter plate format which enables robotic processing of assays
- Water-tight seal between superstructure and substrate
- Compatible with glass or plastic substrates.
- Available in 96 round or square or 384 square well format
- Available as a complete microtiter plate with microcellulose film coated substrate, uncoated substrate or as an adhesive superstructure alone.
- Plates are available with SBS standard spacing in both 96-well and 384-well formats.



Ordering: ProPlate Microtiter Plates

EMS #	Description	Qty.
SBS Compliant Adhesive and Non-Adhesive Microtiter Plates		
63485-01	96 Square Well ProPlate / Adhesive SBS Microtiter Plate / Black Polystyrene	Each
63485-02	96 Round Well ProPlate / Adhesive SBS Microtiter Plate / Black Polystyrene	Each
63485-05	384 Square Well ProPlate / Adhesive SBS Microtiter Plate / Black Polystyrene	Each
63485-10	96 Square Well FlexWell / 7.25 x 7.25 mm / 9 mm Center to Center Well Spacing / 4.5 mm Depth / 110 x 75 mm OD / Clear Silicone / Adhesive One Slide	Each
63485-11	96 Square Well FlexWell / 7.25 x 7.25 mm / 9 mm Center to Center Well Spacing / 4.5 mm Depth / 110 x 75 mm OD / Clear Silicone / Adhesive One Slide / Black Polystyrene Frame	Each
SBS Compliant Microtiter Plates with ONCYTE® Nitrocellulose Coated Substrates		
63485-20	ONCYTE AVID® 96 NC Round Pads / 6 mm Diameter for SBS Microtiter Plate / Glass Substrate	Each
63485-21	ONCYTE AVID® 96 NC Square Pads / 6 x 6 mm for SBS Microtiter Plate / Glass Substrate	Each
63485-22	ONCYTE AVID® 96 NC Round Pads / 6 mm Diameter for SBS Microtiter Plate / Plastic Substrate	Each
63485-23	ONCYTE AVID® 384 NC Square Pads / 2.5 x 2.5 mm for SBS Microtiter Plate / Glass Substrate	Each
63485-24	ONCYTE NOVA® 96 NC Round Pads / 6 mm Diameter for SBS Microtiter Plate / Glass Substrate	Each
63485-25	ONCYTE NOVA® 96 NC Square Pads / 6 x 6 mm for SBS Microtiter Plate / Glass Substrate	Each
63485-26	ONCYTE NOVA® 96 NC Round Pads / 6 mm Diameter for SBS Microtiter Plate / Plastic Substrate	Each
63485-27	ONCYTE NOVA® 384 NC Square Pads / 2.5 x 2.5 mm for SBS Microtiter Plate / Glass Substrate	Each

► Chambers for Microarrays

Versatile Hybridization Chambers for Genomic and Proteomic Arrays

- Versatile sizes and styles
- Ideal for high throughput screening of genomic and protein arrays on microscope slides
- Designed to minimize reagent volume, eliminate evaporation and promote reagent mixing for uniform hybridization
- Materials are nuclease free and temperature resistant

► HybriSlip™ Hybridization Coverslips

(See page 355 for ordering)

- Specially selected hydrophobic plastic covers do not bind probes to surfaces like glass coverslips
- HybriSlips™ are lighter weight than glass, minimizing friction and facilitating uniform reagent distribution
- HybriSlips™ are ready-to-use without pretreatment
- Working surfaces are protected with clean release liners to prevent contaminations
- HybriSlips™ remain flat and will not curl, even at high temperatures



Note: HybriWell™ and SecureSeal™ are recommended for most protein and nucleic acid assays. If you are using CY5® or Alexa Fluor® 647 direct-labeled DNA probes, please refer to our new "fluorescent friendly" chambers for DNA microarrays or see page 323 for details.

► HybriWell™ Hybridization System

(See pages 351-352)

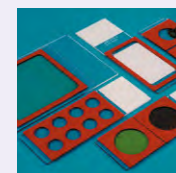
- Seals securely to a microscope slide surface in seconds
- Access ports in the chamber surface allow the addition of reagents
- Ports are easily sealed using seal tabs provided with each order
- Sealed chambers are water tight
- The disposable chamber removes cleanly and easily even after heating.



► SecureSeal™ Hybridization Chambers

(See pages 348-350 for ordering)

- Gasketed chambers provide optimum surface volume fluid dynamics for hybridization assays.
- Designed to minimize friction especially when active mixing is employed during assay
- Partially filled chambers may be sealed and rotated continuously for superior mixing



► FlexWell™

(See page 347 for ordering)

- Silicone gasket forms wells on slides using clean release adhesive to isolate up to 16 specimens per slide
- Slides fit into a reusable slide tray organizing wells into the footprint of a SMS compliant microtiter plate
- Gasket may be sealed for mixing and to prevent evaporation. Available 8-wells and 16-wells.

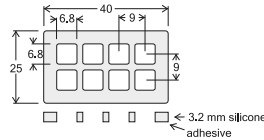
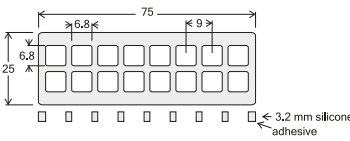
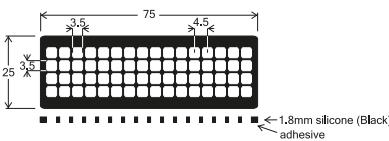
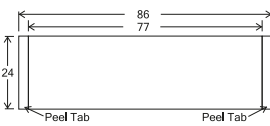
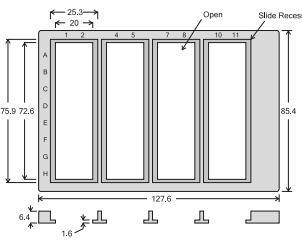
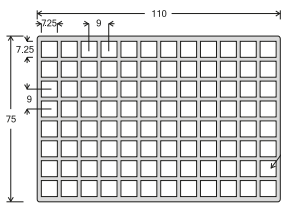
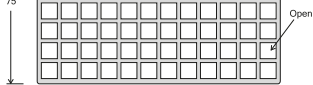


► FlexWell™ Removable Incubation Chambers for Microarrays Using ONCYTE® Slides



- Silicone FlexWell™ forms well on slides using a clean release adhesive to isolate up to 16 specimens per slide
- Slides and FlexWell™ fit into a reusable slide tray organizing wells into the footprint of a SBS compliant microtiter plate
- Gasket may be sealed for mixing and to prevent evaporation
- Available in eight-well and 16-well formats

Ordering: FlexWell™ Removable Incubation Chambers

EMS #	Dimensions	Description	Qty.
63485-50		FlexWell 8 – 6.5 x 6.5 mm Wells / 3.2mm Depth / 25 x 75 mm OD Clear Silicone Adhesive one Side	10
63485-51		FlexWell 16 – 6.5 x 6.5 mm Wells / 3.2mm Depth / 25 x 75 mm OD Clear Silicone Adhesive one Side	10
63485-52		FlexWell 64 – 3.5 x 3.5 mm Wells / 1.8mm Depth / 25 x 75 mm OD Clear Silicone Adhesive one Side	10
63485-53		Seal Strips 24 mm x 77 mm Seal Area	50
63485-54		4 Slide Tray Holds up to 4 Slides / Tray Measures 75.9 x 127.6 mm OD	each
63485-55		FlexPlate 96 Square Well / 7.25 x 7.25 mm / 9 mm Center-to-Center Well Spacing / 4 mm Depth / 110 x 75 mm OD / Clear Silicone / Adhesive on Side	5
63485-56		FlexPlate 96 Square Well / 7.25 x 7.25 mm / 9 mm Center-to-Center Well Spacing / 4 mm Depth / 110 x 75 mm OD / Clear Silicone / Adhesive on Side/ Black Polystyrene Frame	each

HYBRIDIZATION AND INCUBATION

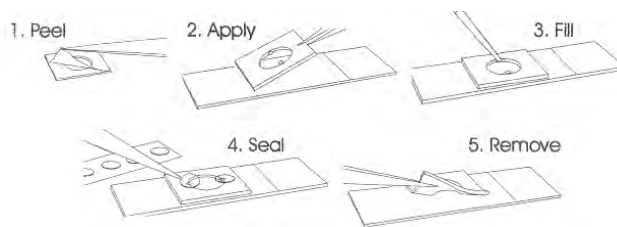
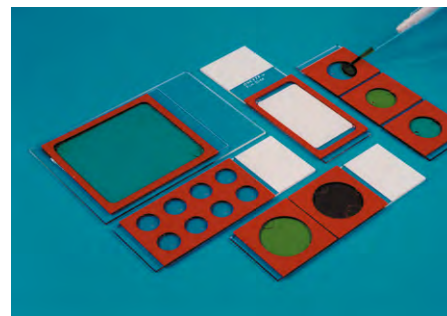
► SecureSeal™ Hybridization Chambers

SecureSeal™ hybridization chambers provide optimum surface to volume fluid dynamics

SecureSeal™ adhesive chambers form peel-and-stick enclosures to isolate specimens affixed to glass microscope slides. RNase free, gasketed chambers provide optimum surface-to-volume fluid dynamics for hybridization assays on large or multiple specimens and genomic arrays on glass slides or film coated slides.

FEATURES:

- Design minimize friction, promotes reagent mixing, and facilitates uniform hybridization.
- Sealable access ports (1.5mm) in the chamber surface allow for the addition and removal of reactants.
- Adhesive seal tabs create leak-proof chambers that are temperature resistant
- SecureSeal™ adhesive bonds chambers to glass in seconds and removes cleanly and easily even after heating.
- SecureSeals™ are ideally suited for protocols utilizing autoradiographic, fluorescent or cheminescent end points.
- Polycarbonate HybriSlip used, 0.25mm thick

**RNASE
FREE**

Ordering: SecureSeal™ Hybridization Chambers

EMS #	Dimensions	Description	Qty.
70333-10		Hybridization Chamber, 1 – 13mm Dia x 0.6mm Depth / 22mm x 25mm OD / 1.5mm Dia Ports with 120 Port Seals	50
70333-30		Hybridization Chamber, 1 – 20mm Dia x 0.6mm Depth / 22mm x 25mm OD / 1.5mm Dia Ports with 120 Port Seals	40
70333-32		Hybridization Chamber, 1 – 20mm Dia x 0.9mm Depth / 22mm x 25mm OD / 1.5mm Dia Ports with 120 Port Seals	40
70333-34		Hybridization Chamber, 1 – 20mm Dia x 1.7mm Depth / 22mm x 25mm OD / 1.5mm Dia Ports with 120 Port Seals	40
70333-36		Hybridization Chamber, 1 – 20mm Dia x 2.5mm Depth / 22mm x 25mm OD / 1.5mm Dia Port with 120 Port Seals	40
70333-40		Hybridization Chamber, 8 – 9mm Dia x 0.6mm Depth / 26mm x 51mm OD / 1.5mm Dia Ports with 120 Port Seals	20
70333-42		Hybridization Chamber, 8 – 9mm Dia x 0.9mm Depth / 26mm x 51mm OD / 1.5mm Dia Port with 120 Port Seals	20
70333-44		Hybridization Chamber, 8 – 9mm Dia x 1.7mm Depth / 26mm x 51mm OD / 1.5mm Dia Ports with 120 Port Seals	20
70333-46		Hybridization Chamber, 8 – 9mm Dia x 2.5mm Depth / 26mm x 51mm OD / 1.5mm Dia Ports with 120 Port Seals	20

HYBRIDIZATION AND INCUBATION

Ordering: SecureSeal™ Hybridization Chambers (cont.)

EMS #	Dimensions	Description	Qty.
70333-20		Hybridization Chamber, 1 – 22mm x 22mm x 0.6mm Depth ID / 25mm x 25mm OD / 1.5mm Dia Ports with 120 Port Seals	50
70333-22		Hybridization Chamber, 1 – 22mm x 40mm x 0.6mm Depth ID / 25mm x 44mm OD / 1.5mm Dia Ports with 120 Port Seals	50
70333-27		Hybridization Chamber, 1 – 22mm x 60mm x 0.6mm Depth ID / 25mm x 65mm OD / 1.5mm Dia Ports with 120 Port Seals	50
70333-37		Hybridization Chamber, 1 – 22mm x 53mm x 0.6mm Depth ID / 26mm x 57mm OD / 1.5mm Dia Ports with 120 Port Seals	25
70333-47		Hybridization Chamber, 1 – 21mm x 60mm x 0.6mm Depth ID / 25mm x 65mm OD / 1.5mm Dia Ports with 120 Port Seals	25
70333-58		Hybridization Chamber, 1 – 21.5mm x 71.5mm x 0.6mm Depth ID / 25.5mm x 75.5mm OD / 1.5mm Dia Ports with 120 Port Seals	25
70333-50		Hybridization Chamber, 1 – 45mm x 45mm x 0.6mm Depth ID / 51mm x 51mm OD / 1.5mm Dia Ports with 120 Port Seals	20
70333-62		Hybridization Chamber, 2 – 21mm x 21mm x 0.6mm Depth ID / 25mm x 51mm OD / 1.5mm Dia Ports with 120 Port Seals	25

HYBRIDIZATION AND INCUBATION

Ordering: SecureSeal™ Hybridization Chambers (cont.)

EMS #	Dimensions	Description	Qty.
70333-66		Hybridization Chamber, 2 – 21.5mm x 34.5mm x 0.6mm Depth ID / 25mm x 75mm OD / 1.5mm Dia Ports with 120 Port Seals	25
70333-70		Hybridization Chamber, 3 – 20mm x 21mm x 0.6mm Depth ID / 25mm x 75mm OD / 1.5mm Dia Ports with 120 Port Seals	25
70333-74		Hybridization Chamber, 6 – 9.8mm x 20mm x 0.6mm Depth ID / 25mm x 75mm OD / 1.5mm Dia Ports with 120 Port Seals	25
70333-76		Hybridization Chamber, 6 – 9.8mm x 20mm x 0.9mm Depth ID / 25mm x 75mm OD / 1.5mm Dia Ports with 120 Port Seals	25
70333-82		Hybridization Chamber, 8 – 7mm x 7mm x 0.6mm Depth ID / 26mm x 43mm OD / 1.5mm Dia Ports with 120 Port Seals	25
70333-83		Hybridization Chamber, 8 – 7mm x 7mm x 0.9mm Depth ID / 26mm x 43mm OD / 1.5mm Dia Ports with 120 Port Seals	25
70333-86		Hybridization Chamber, 16 – 7mm x 7mm x 0.9mm Depth ID / 26mm x 43mm OD / 1.5mm Dia Ports with 120 Port Seals	25
70328-00		Adhesive Port Seal Tabs/ 7.62mm Diameter	200

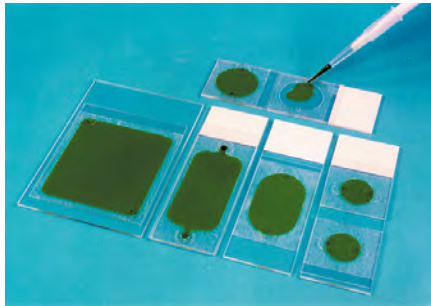
SHEET MATERIAL

EMS #	Description	Sheet size	Thick	Qty
70333-01	Double sided Secureseal Adhesive	7.25" x 10"	0.12mm Thick	each
70333-02	Double sided Secureseal Adhesive	7.25" x 10"	0.24mm Thick	each
70333-03	Double sided Secureseal Adhesive	7.25" x 10"	0.36mm Thick	each
70333-04	Double sided Secureseal Adhesive	7.25" x 10"	0.48mm Thick	each

HYBRIDIZATION AND INCUBATION

► HybriWell™ Sealing System

HybriWell Sealing Chambers System seals securely to a microscope slide surface in seconds – for most protein and nucleic acid assays



FEATURES:

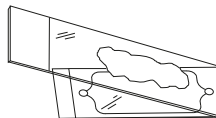
- Enclose a single or multiple specimens in a small reagent volume
- Access ports in the chamber surface allow for the addition or removal of reactants
- Ports are easily sealed using Adhesive Seal Tabs (provided) to prevent reagent evaporation.
- Sealed chambers are watertight and ideally suited for water-bath incubations.
- RNase free, hydrophobic surfaces will not trap or bind probes.
- Disposable chamber remove cleanly and easily even after heating.
- Come with Non-Adhesive Peeling Tab

**RNASE
FREE**

1. Peel off liner



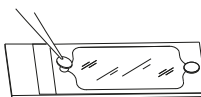
2. Enclose Specimen



3. Fill



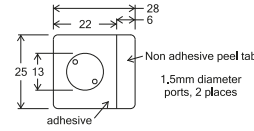
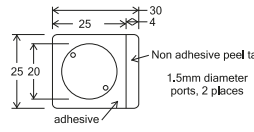
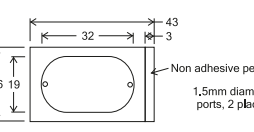
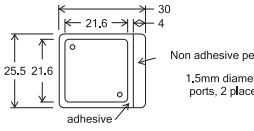
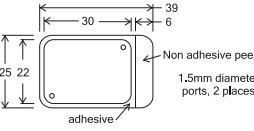
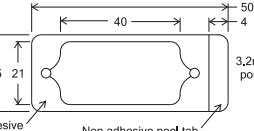
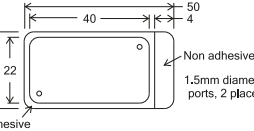
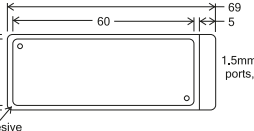
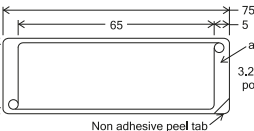
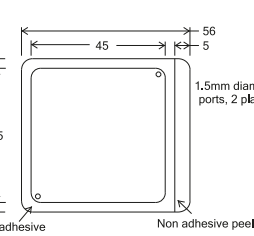
4. Seal



5. Remove

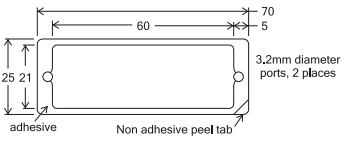
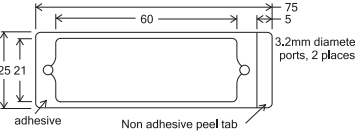
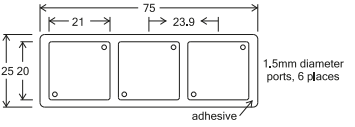
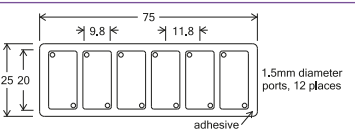


Ordering: HybriWell™ Sealing System

EMS #	Dimensions	Description	Qty.
70328-01		Secure-Seal Adhesive Chamber, 1 - 13mm Dia x 0.15mm Depth / Approx. 18 µl Vol / 25mm x 28mm OD / 1.5mm Dia port, 200 port seals included	100
70328-03		Secure-Seal Adhesive Chamber, 1 - 20mm Dia x 0.15mm Depth / Approx. 30 µl Vol / 25mm x 30mm OD / 1.5mm Dia port, 200 port seals included	100
70328-05		Secure-Seal Adhesive Chamber, 1 - 19mm x 32mm x 0.15mm Depth / Approx. 30 - 50 µl Vol / 26mm x 43mm OD / 1.5mm Dia port, 200 port seals included	100
70328-08		Secure-Seal Adhesive Chamber, 1 - 21.6mm x 21.6mm x 0.15mm Depth / Approx. 30 - 50 µl Vol / 25.5mm x 30mm OD / 1.5mm Dia port, 200 port seals included	100
70328-09		Secure-Seal Adhesive Chamber, 1 - 22mm x 30mm x 0.15mm Depth / Approx. 40 - 70 µl Vol / 25.5mm x 39mm OD / 1.5mm Dia port, 200 port seals included	100
70328-10		Secure-Seal Adhesive Chamber, 1 - 21mm x 40mm x 0.15mm Depth / Approx. 50 - 100 µl Vol / 25mm x 50mm OD / 3.2mm Dia port, 200 port seals included	100
70328-12		Secure-Seal Adhesive Chamber, 1 - 22mm x 40mm x 0.25mm Depth / Approx. 180 - 200 µl Vol / 25.5mm x 50mm OD / 1.5mm Dia port, 200 port seals included	100
70328-13		Secure-Seal Adhesive Chamber, 1 - 22mm x 60mm x 0.25mm Depth / Approx. 280 - 330 µl Vol / 25mm x 69mm OD / 1.5mm Dia port, 200 port seals included	100
70328-14		Secure-Seal Adhesive Chamber, 1 - 22mm x 65mm x 0.25mm Depth / Approx. 310 - 425 µl Vol / 25mm x 75mm OD / 3.2mm Dia port, 200 port seals included	100
70328-15		Secure-Seal Adhesive Chamber, 1 - 45mm x 45mm x 0.15mm Depth / Approx. 150 - 300 µl Vol / 52mm x 56mm OD / 1.5mm Dia port, 200 port seals included	100

HYBRIDIZATION AND INCUBATION

Ordering: HybriWell™ Sealing System (cont.)

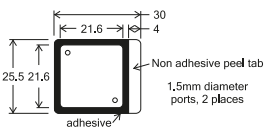
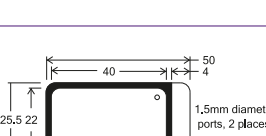
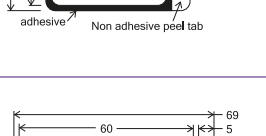
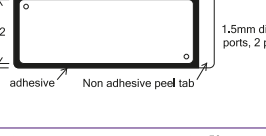
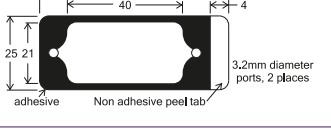

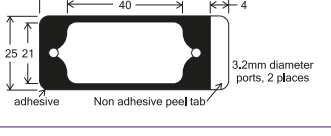
EMS #	Dimensions	Description	Qty.
70328-17		Secure-Seal Adhesive Chamber, 1 - 60mm x 21mm x 0.25mm Depth / Approx. 275 - 320 µl Vol / 25mm x 70mm OD / 3.2mm Dia port, 200 port seals included	100
70328-19		Secure-Seal Adhesive Chamber, 1 - 60mm x 21mm x 0.15mm Depth / Approx. 275 - 320 µl Vol / 25mm x 75mm OD / 3.2mm Dia port, 200 port seals included	100
70328-30		Secure-Seal Adhesive Chamber, 3 - 20mm x 21mm x 0.15mm Depth / Approx. 100 µl Vol per chbr / 25mm x 75mm OD / 1.5mm Dia port, 200 port seals included	100
70328-35		CodSecure-Seal Adhesive Chamber, 6 - 9.8mm x 20mm x 0.25mm Depth / Approx. 50 µl Vol per chbr / 25mm x 70mm OD / 1.5mm Dia port, 200 port seals included	100

► HybriWell™ Fluorescent Friendly Chambers for Sensitive DNA Microarrays

These new microarray chambers are designed specially for compatibility with Cy5® or Alexa Fluor 647 direct labeled DNA probes for hybridization assays. These chambers as well as the original HybriWells may also be used with all other fluorochrome labeled probes.

Each package included illustrated instructions for use, applicator and 200 adhesive port seals. (Additional seal tabs are sold separately m, Cat #70328-00)

Ordering: Fluorescent Friendly Chambers for Sensitive DNA Microarrays

EMS #	Dimensions	Description	Qty.
70328-50		Fluor Friendly Adhesive Chamber, 1 - 22mm x 22mm x 0.25mm Depth / Approx. 30 - 50µl Vol / 25.5mm x 30mm OD / 1.5mm Dia port, 200 port seals included	100
70328-51		Fluor Friendly Adhesive Chamber, 1 - 22mm x 22mm x 0.12mm Depth / Approx. 15 - 25µl Vol / 25.5mm x 30mm OD / 1.5mm Dia port, 200 port seals included	100
70328-52		Fluor Friendly Adhesive Chamber, 1 - 22mm x 40mm x 0.25mm Depth / Approx. 180 - 200µl Vol / 25.5mm x 50mm OD / 1.5mm Dia port, 200 port seals included	100
70328-53		Fluor Friendly Adhesive Chamber, 1 - 22mm x 40mm x 0.12mm Depth / Approx. 90 - 100µl Vol / 25.5mm x 50mm OD / 1.5mm Dia port, 200 port seals included	100
70328-54		Fluor Friendly Adhesive Chamber, 1 - 22mm x 60mm x 0.25mm Depth / Approx. 280 - 330µl Vol / 25mm x 69mm OD / 1.5mm Dia port, 200 port seals included	100
70328-55		Fluor Friendly Adhesive Chamber, 1 - 22mm x 60mm x 0.12mm Depth / Approx. 140 - 165µl Vol / 25mm x 69mm OD / 1.5mm Dia port, 200 port seals included	100
70328-56		Fluor Friendly Adhesive Chamber, 1 - 21mm x 40mm x 0.12mm Depth / Approx. 50 - 100µl Vol / 25mm x 50mm OD / 3.2mm Dia port, 200 port seals included	100

HYBRIDIZATION AND INCUBATION

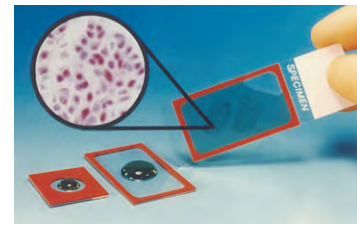
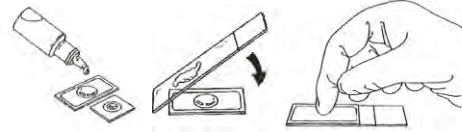
► CoverWell™ Incubation Chambers

CoverWell™ incubation reusable chambers – exceptionally secure seals during incubations

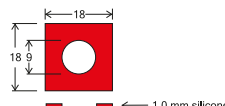
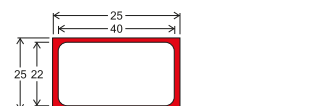
FEATURES:

- CoverWell™ incubation chambers are reusable, easy to apply incubation chambers that attach without the use of adhesive
- Microwavable for permeabilization and retrieval steps. (J. Histotechnology 18:115-117, 1995)
- Preserve kinetic (non-capillary) fluid dynamics for better reagent mixing and lower backgrounds. (CellVision 2:165-169, 1995)
- Eliminate precipitate deposits on specimens by incubating slides and specimens upside down during enzymatic color precipitation reaction.
- Provides an exceptionally secure seal during submerged water bath and/or high temperature incubations.
- RNase and DNase free
- Hydrophobic
- Easy removed – reusable
- Adheres to wet or dry surfaces

**RNase
FREE**

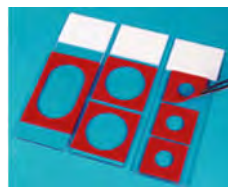


Ordering: CoverWell™ Incubation Chambers

EMS #	Dimensions	Description	Qty.
70324-02		Incubation Chamber, 1 - 13 mm Dia x 0.2 mm Depth ID / 22 x 25 mm OD / Approximately Volume 20µl	25
70324-05		Incubation Chamber, 1 - 13 mm Dia x 0.5 mm Depth ID / 22 x 25 mm OD / Approximately Volume 50µl	50
70324-20		Incubation Chamber, 1 - 22 mm x 40mm x 0.2 mm Depth ID / 25 x 44 mm OD / Approximately Volume 200µl	25
70324-50		Incubator Chamber, 1 - 22 mm x 40 mm x 0.5 mm Depth ID / 25 x 44 mm OD / Approximately Volume 500µl	50
70325-01		Water Bath Holder	1
70325-05		Water Bath Holder	5

► FastWells™

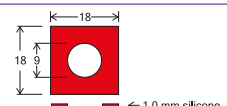
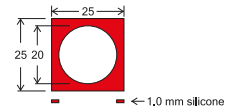
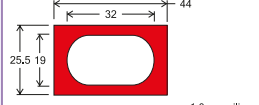
FastWell™ stickable, stackable, sealable, peelable and reusable reagent barriers!



FEATURES:

- Sticky, flexible silicone gaskets form hydrophobic reagent barriers around specimens without messy adhesives or special slides
- FastWells may be stacked to increase depth and volume
- They remain sealed during agitated washing steps
- They can be washed, autoclaved and reused
- FastWell™ can also be sealed to form incubation chambers using flexible HybriSlip™ Covers

Ordering: FastWells™

EMS #	Dimensions	Description	Qty.
70325-50		1 - 9mm Dia x 1.0mm Depth / 18mm x 18mm OD	50
70325-52		1 - 20mm Dia x 1.0mm Depth / 25mm x 25mm OD	50
70325-54		1 - 32mm x 19mm x 1.0mm Depth / 25.5mm x 44mm OD	50

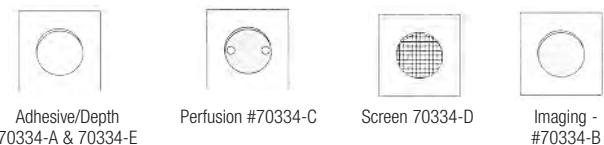
► CoverWell™ Modular Hybridization System

An assortment of flexible, press-to-seal gasket and coverslip enclosures which can be quickly assembled and disassembled for the specialized challenges of hybridizing and imaging thick and free-floating specimens.

All steps - from permeabilizing to image analysis are made easy and trouble free with chambers you assemble from modular components.

For neural explants, plant or animal specimens of any texture and thickness.

Build up to three chambers on one microscope slide. Ideally suited for overnight hybridizations and agitated washing steps. The screen is made from polyester and is 1.6mm square.

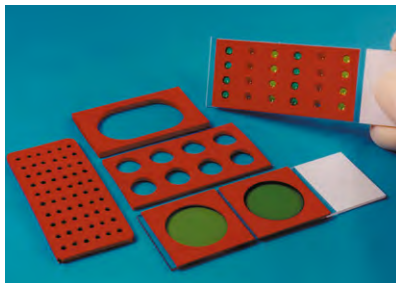


Catalog Number	Interior		Exterior			Pack
	Diameter	Depth	Length	Width	Height	
70334-A	13	0.6	25	22	0.6	25/pk
70334-B	13	0.7	22	22	0.8	25/pk
70334-C	13	0.7	25	22	0.8	25/pk
70334-D	13	0.7	25	22	1.6	25/pk
70334-E	13	1.3	25	22	1.3	25/pk
70334-05	Assortment pack of 5 each of A, B, C, D, & 10 of E					

HYBRIDIZATION AND INCUBATION

► Press-to-Seal Silicone Isolators

Isolate specimens using press-to-seal silicone isolators with removable hydrophobic barriers



Silicone isolators allow researchers to isolate specimens using removable hydrophobic barriers. They may be used to isolate cells grown in culture dishes or separate multiple specimens affixed to microscope slides.

**RNASE
FREE**

FEATURES:









- Silicone isolators are available in silicone thickness 0.5 to 2.5 mm
- Isolators are pre-cut into gaskets or as sheet materials with and without SecureSeal™ clean release adhesive on one or both surfaces.
- Isolators remain sealed to smooth surfaces during washing steps.
- Non-adhesive isolators are autoclavable and reusable.
- Closed chambers may be formed using flexible RNase free, HybriSlip™ covers.

Ordering: Isolators are available without coverslips, and packaged 25 per pack. They are available with either:

- Silicone (S) / Silicone (S) – press-to-seal silicone gasket only, no adhesive
- Silicone (S) / Adhesive (A) – press-to-seal silicone on one side and adhesive on the other side.
- Adhesive (A) / Adhesive (A) – press-to-seal adhesive on both sides.

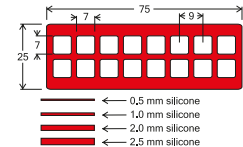
To fulfill your needs, we also offer the SHEETS MATERIAL they will serve to your own design chambers

Ordering: Press-to-Seal Silicone Isolators

EMS #			Well Dimensions, mm		Wells	Qty.	size
Silicone(S)/ Silicone(S)	Silicone(S)/ Adhesive(A)/	Adhesive(A)/ Adhesive(A)/	Depth	Length/Width/Diam	per Slide		(mm)
70336-01	70336-31	70336-61	0.5		1	25	13
70336-02	70336-32	70336-62	1.0		1	25	13
70336-03	70336-33	70336-63	2.0		1	25	13
70336-04	70336-34	70336-64	2.5		1	25	13
70336-05	70336-40	70336-70	0.5		1	25	20
70336-10	70336-42	70336-72	1.0		1	25	20
70336-20	70336-44	70336-74	2.0		1	25	20
70336-25	70336-46	70336-76	2.5		1	25	20
70337-05	70337-40	70337-70	0.5		1	25	32
70337-10	70337-42	70337-72	1.0		1	25	32
70337-20	70337-44	70337-74	2.0		1	25	32
70337-25	70337-46	70337-76	2.5		1	25	32
70339-05	70339-40	70339-70	0.5		8	25	9
70339-10	70339-42	70339-72	1.0		8	25	9
70339-20	70339-44	70339-74	2.0		8	25	9
70339-25	70339-46	70339-76	2.5		8	25	9
70344-05	70344-38	70344-68	0.5		12	25	45
70344-10	70344-39	70344-69	1.0		12	25	45
70344-20	70344-40	70344-70	2.0		12	25	45
70345-05	70345-38	70345-68	0.5		24	25	2
70345-10	70345-39	70345-69	1.0		24	25	2
70345-20	70345-40	70345-70	2.0		24	25	2
70346-05	70346-40	70346-70	0.5		8	25	7x7
70346-10	70346-42	70346-72	1.0		8	25	7x7
70346-20	70346-44	70346-74	2.0		8	25	7x7
70347-05	70347-40	70347-70	0.5		8	25	7x7
70347-10	70347-42	70347-72	1.0		8	25	7x7
70347-20	70347-44	70347-74	2.0		8	25	7x7

HYBRIDIZATION AND INCUBATION

► Press-to-Seal Silicone Isolators (continued)

Ordering: Press-to-Seal Silicone Isolators								
EMS # (S)/(S)	EMS # (S)/(A)	EMS # (A)/(A)	Well Depth	Dimensions	Wells/Slide	Qty.	Size (mm)	
70348-05	70348-40	70348-70	0.5		16	25	7x7	
70348-10	70348-42	70348-72	1.0		16	25	7x7	
70348-20	70348-44	70348-74	2.0		16	25	7x7	
SHEET MATERIAL								
70338-05	70338-40	70338-70	0.5	Red Silicone Sheet 13x15 cm	—	5		
70338-10	70338-42	70338-72	0.8	Red Silicone Sheet 13x15 cm	—	5		
70338-20	70338-44	70338-74	1.6	Red Silicone Sheet 13x15 cm	—	5		
70338-25	70338-46	70338-76	2.4	Red Silicone Sheet 13x15 cm	—	5		
73338-29	—	70338-79	0.25	Clear Silicone Sheet 13x15 cm	—	5		
70338-30	—	—	0.5	Clear Silicone Sheet 13x15 cm	—	5		
70338-31	—	—	0.8	Clear Silicone Sheet 13x15 cm	—	5		
70338-32	70338-52	—	1.6	Clear Silicone Sheet 13x15 cm	—	5		

► HybriSlips™

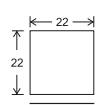
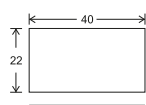
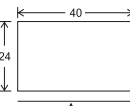
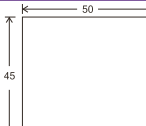
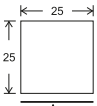
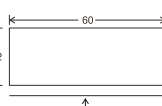
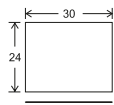
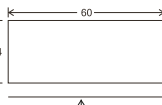
HybriSlips™ - ideally suited for *in situ* hybridization, *in situ* PCR and hybridization to genomic arrays on glass slides.

HybriSlips™ are flexible, thin (0.25mm) covers that minimize fluid friction and facilitate uniform reagent distribution. RNase free, hydrophobic covers will not trap or bind probes to their surfaces like coverglass. Product is ready-to-use without pretreatment. Working surfaces are protected with clean release liners to prevent RNase contamination. HybriSlips™ remain flat and will not curl, even at high temperatures.

FEATURES:

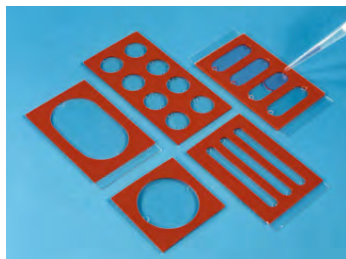
- RNase and DNase free
- Hydrophobic
- Disposable
- Will not chip or break
- Clear – stay flat



Ordering: HybriSlips™				Ordering: HybriSlips™			
EMS #	Dimensions	Description	Qty.	EMS #	Dimensions	Description	Qty.
70329-22		HybriSlip Size 22mm x 22mm x 0.25mm Thickness	100	70329-40		HybriSlip Size 22mm x 40mm x 0.25mm Thickness	100
70329-22C	0.25 mm polycarbonate	HybriSlip Size 22mm x 22mm x 0.25mm Thickness	1000	70329-40C	0.25 mm polycarbonate	HybriSlip Size 22mm x 40mm x 0.25mm Thickness	1000
70329-24		HybriSlip Size 24mm x 40mm x 0.25mm Thickness	100	70329-45		HybriSlip Size 45mm x 50mm x 0.25mm Thickness	100
70329-24C	0.25 mm polycarbonate	HybriSlip Size 24mm x 40mm x 0.25mm Thickness	1000	70329-45C	0.25 mm polycarbonate	HybriSlip Size 45mm x 50mm x 0.25mm Thickness	1000
70329-25		HybriSlip Size 25mm x 25mm x 0.25mm Thickness	100	70329-60		HybriSlip Size 22mm x 60mm x 0.25mm Thickness	100
70329-25C	0.25 mm polycarbonate	HybriSlip Size 25mm x 25mm x 0.25mm Thickness	1000	70329-60C	0.25 mm polycarbonate	HybriSlip Size 22mm x 60mm x 0.25mm Thickness	1000
70329-30		HybriSlip Size 24mm x 30mm x 0.25mm Thickness	100	70329-62		HybriSlip Size 24mm x 60mm x 0.25mm Thickness	100
70329-30C	0.25 mm polycarbonate	HybriSlip Size 24mm x 30mm x 0.25mm Thickness	1000	70329-62C	0.25 mm polycarbonate	HybriSlip Size 24mm x 60mm x 0.25mm Thickness	1000

IMAGING AND MICROSCOPY

► CoverWell™ Perfusion Chambers

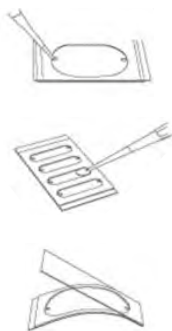


CoverWell Perfusion Chambers allows up to 16 different specimens on one coverglass

"Press-to-Seal" covers form water-tight, multiwell cell incubation or cytochemistry chamber when pressed to coverslips or microscope slides. Reagents can be quickly added and removed through dual access ports (1.5mm Dia) without disturbing or cross-contaminating specimens in adjacent wells.

FEATURES:

- Chambers are removable for permanent mounting of specimens
- CoverWell™ chambers are made from medical grade silicone bonded to clear, UV transparent plastic
- Available in multiple designs allowing up to sixteen different specimens or analytical test on one coverglass.
- Ideal for cell imaging on upright or inverted microscopes.

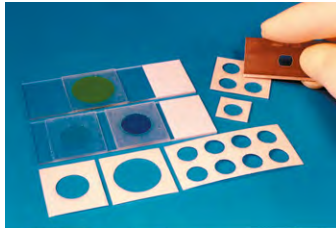


Ordering: CoverWell™ Perfusion Chambers

EMS #	Dimensions	Description	Appx. Vol. μ l	Qty.
70326-10		1 - 20 mm ID x 0.6 mm Depth / 25 mm x 25mm OD / 1.5mm Dia Port	180	40
70326-12		1 - 20 mm ID x 0.9 mm Depth / 25 mm x 25mm OD / 1.5mm Dia Port	300	40
70326-14		1 - 20 mm ID x 1.7 mm Depth / 25 mm x 25mm OD / 1.5mm Dia Port	520	20
70326-16		1 - 20 mm ID x 2.5 mm Depth / 25 mm x 25mm OD / 1.5mm Dia Port	750	20
70326-20		1 - 22mm x 22mm x 0.6mm Depth / 25mm x 25mm OD / 1.5mm Dia Port	200	40
70326-22		1 - 19mm x 32mm x 0.6mm Depth / 26mm x 43mm OD / 1.5mm Dia Port	350	40
70326-24		1 - 19mm x 32mm x 0.9mm Depth / 26mm x 43mm OD / 1.5mm Dia Port	550	40
70326-26		1 - 19mm x 32mm x 1.7mm Depth / 26mm x 43mm OD / 1.5mm Dia Port	1000	20
70326-28		1 - 19mm x 32mm x 2.5mm Depth / 26mm x 43mm OD / 1.5mm Dia Port	1550	20
70326-30		3 - 3mm x 32mm x 0.6mm Depth / 26mm x 43mm OD / 1.5mm Dia Port	75	40
70326-32		3 - 3mm x 32mm x 0.9mm Depth / 26mm x 43mm OD / 1.5mm Dia Port	120	40
70326-34		3 - 3mm x 32mm x 1.7mm Depth / 26mm x 43mm OD / 1.5mm Dia Port	200	20
70326-36		3 - 3mm x 32mm x 2.5mm Depth / 26mm x 43mm OD / 1.5mm Dia Port	300	20
70326-40		4 - 6.35mm x 19mm x 0.6mm Depth / 26mm x 43mm OD / 1.5mm Dia Port	70	40
70326-42		4 - 6.35mm x 19mm x 0.9mm Depth / 26mm x 43mm OD / 1.5mm Dia Port	110	40
70326-44		4 - 6.35mm x 19mm x 1.7mm Depth / 26mm x 43mm OD / 1.5mm Dia Port	200	20
70326-46		4 - 6.35mm x 19mm x 2.5mm Depth / 26mm x 43mm OD / 1.5mm Dia Port	300	20
70326-50		8 - 9mm Dia x 0.6mm Depth / 26mm x 51mm OD / 1.5mm Dia Port	35	20
70326-52		8 - 9mm Dia x 0.9mm Depth / 26mm x 51mm OD / 1.5mm Dia Port	60	20
70326-54		8 - 9mm Dia x 1.7mm Depth / 26mm x 51mm OD / 1.5mm Dia Port	100	10
70326-56		8 - 9mm Dia x 2.5mm Depth / 26mm x 51mm OD / 1.5mm Dia Port	150	10

► **Imaging Spacers**

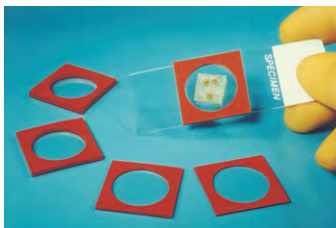
Confine specimens without compression with SecureSeal™ imaging spacers



SecureSeal™ imaging spacers are ultra thin adhesive spacers which peel and stick to coverglass or microscope slides to confine specimens without the need for compression.

► **CoverWell™ Imaging Chambers**

Designed to stabilize and support thick and free-floating specimens for confocal microscopy and imaging applications.



Reusable press-to-seal silicone chamber forms removable enclosure for repeat staining or specimen repositioning. Polycarbonate CoverSlip

Ordering: Imaging Spacers

EMS #	Dimensions	Description	Qty.
70327-8S		Imaging Spacer, 1 – 9mm Dia ID x 0.12mm Depth / 18mm x 18mm OD	100
70327-13S		Imaging Spacer, 1 – 13mm Dia ID x 0.12mm Depth / 25mm x 25mm OD	100
70327-20S		Imaging Spacer, 1 – 20mm Dia ID x 0.12mm Depth / 25mm x 25mm OD	100
70327-9S		Imaging Spacer, 8 – 9mm Dia ID x 0.12mm Depth / 25mm x 51mm OD	100

Ordering: CoverWell™ Imaging Chambers

EMS #	Dimensions	Description	Appx. Vol. µl	Qty.
Silicone Imaging Chambers				
70327-05		1 – 20mm Dia x 0.6mm Depth / 25mm x 25mm OD	180	40
70327-10		1 – 20mm Dia x 0.9mm Depth / 25mm x 25mm OD	300	40
70327-20		1 – 20mm Dia x 1.7mm Depth / 25mm x 25mm OD	520	20
70327-25		1 – 20mm Dia x 2.5mm Depth / 25mm x 25mm OD	750	20
70327-04		1 – 28mm Dia x 0.26mm Depth / 45mm x 45mm OD	180	25
Silicone Imaging Chambers with Adhesive on One Side				
70327-08		1 – 20mm Dia x 0.8mm Depth / 25mm x 25mm OD / Adhesive	180	40
70327-13		1 – 20mm Dia x 1.3mm Depth / 25mm x 25mm OD / Adhesive	300	40
70327-23		1 – 20mm Dia x 2.3mm Depth / 25mm x 25mm OD / Adhesive	520	20
70327-28		1 – 20mm Dia x 2.8mm Depth / 25mm x 25mm OD / Adhesive	750	20

CELL CULTURE

**KEY PRODUCT DIMENSIONS INCLUDE:**


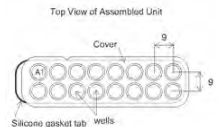
- Coverslip gasket thickness is 0.5 mm
- Interior diameter of each well is approx. 6 mm
- Volume per gasket well (upper structure removed) is approx. 9 μ l
- Volume per well with the upper structure is 250 μ l

► **CultureWell™ Chambered Coverglass**

With removable chambered coverglass – ideal for cell culture and fluorescence imaging applications.

The 2 x 8, 16 chambered coverglass is like a chambered slide with the imaging advantages of a removable coverglass substructure. It is designed with standard 96 well plate volumes and well spacing. The non-cytotoxic silicone well gasket forms a leak-proof seal between the polystyrene upper structure and the coverglass. CultureWell™ Chambered Coverglass is shipped sterile and ready to use.

- The growth surface is No. 1.5 German borosilicate coverglass.
- Inert, non-cytotoxic silicone permits complete edge-to-edge growth of cells.
- Well spacing allows use of multi-channel pipettes for ease and speed of handling
- Cell growth characteristics are optimal due to the use of inert silicone materials and manufacturing process.
- Quality test for non-leakage, cell growth and coverglass removal to ensure consistent results
- Silicone well gasket remains attached to coverglass after separation, allowing wells to be used as reagent reservoirs
- Gasket well design is ideally suited for small volume incubations, in-situ hybridization and immunostaining
- Black well gasket reduces light scatter, enhancing fluorescence applications. The gasket can easily be removed from the coverglass for mounting
- Frosted microscope slides are provided for mounting

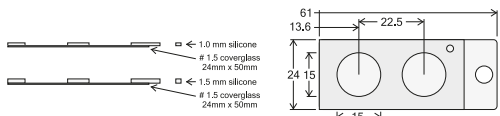

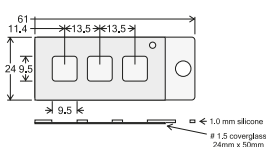
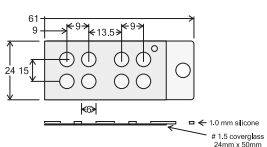
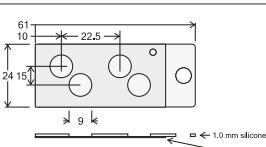
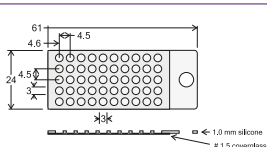
70459-08			CultureWell™ Removeable Chambered Coverglass/ 16-Well/ #1.5 Coverglass/ Sterile / Removable Tool Included	8/pk
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► **CultureWell™ Coverglass**

Optimal for high resolution microscopy

Chambered coverglass products consists of removable / reusable non-cytotoxic silicone gaskets secured to 24 mm x 50 mm, #1.5 German coverglasses. They may be placed in sterile culture plates or 100 mm diameter culture dishes.

- The thin flat coverglass is the optimal platform for high resolution microscopy and high- sensitivity, quantitative, fluorescent imaging
- Gaskets stabilize coverglass and provide convenient handling using conventional microscope slide holders and accessories
- Gaskets are removable for high resolution imaging
- Gasket may be re-sterilized and reused
- Leak-proof design eliminates well-to-well cross contamination
- Well spacing facilitates liquid handling utilizing multichannel pipettes and robotic dispensers

EMS #	Dimensions	Description	Qty.				
70460-2R1		CultureWell™ Chambered Coverglass. 2 – 15mm Dia x 1mm Depth / 250-400 μ l / #1.5 Coverglass / Sterile	20				
70460-2R2		CultureWell™ Chambered Coverglass. 2 – 15mm Dia x 1.5mm Depth / 300-500 μ l / #1.5 Coverglass / Sterile	20				
EMS #	Dimensions	Description	Qty.	EMS #	Dimensions	Description	Qty.
70460-3S		CultureWell™ Chambered Coverglass. 3 – 9.5mm x 9.5mm x 1mm Depth / 300-500 μ l / #1.5 Coverglass / Sterile	20	70460-50R		CultureWell™ Chambered Coverglass. 50 – 3mm x 1mm Depth / 3-10 μ l / #1.5 Coverglass / Sterile	20
70460-4R		CultureWell™ Chambered Coverglass. 4 – 9mm x 1mm Depth / 50-100 μ l / #1.5 Coverglass / Sterile	20	70460-8R		CultureWell™ Chambered Coverglass. 8 – 6mm x 1mm Depth / 15-30 μ l / #1.5 Coverglass / Sterile	20



► CultureWell™ Chambered Coverglass Inserts

Each CultureWell™ insert is comprised of four chambered coverglass assembled in a disposable frame which is placed in a standard 86 mm x 128 mm culture plate. All are sterile and ready to use.

The stabilizing insert design and accessory hardware allow fragile coverglass to be easily integrated into protocols for high throughput handling of microscope slides and SBS compliant microtiter plates.

Ordering: CultureWell™ Chambered Coverglass Inserts

EMS #	Dimensions	Description	Qty.	
70461-2R1		 ◻ 1.0 mm silicone ◻ 1.5 coverglass 24mm x 50mm ◻ 1.5 mm silicone ◻ 1.5 coverglass 24mm x 50mm	Chambered Coverglass Inserts, 4 x 2 6mm Dia x 1mm Depth Per Tray / 300 – 500µl / #1.5 Coverglass / Sterile	10
70461-2R2		 ◻ 1.0 mm silicone ◻ 1.5 coverglass 24mm x 50mm ◻ 1.5 mm silicone ◻ 1.5 coverglass 24mm x 50mm	Chambered Coverglass Inserts, 4 x 2 6mm Dia x 1.5mm Depth Per Tray / 300 – 500µl / #1.5 Coverglass / Sterile	10
70461-3S		 ◻ 1.0 mm silicone ◻ 1.5 coverglass 24mm x 50mm ◻ 1.5 mm silicone ◻ 1.5 coverglass 24mm x 50mm	Chambered Coverglass Inserts, 4 x 3 9.5mm x 9.5mm x 1mm Depth Per Tray / 300 - 500µl / #1.5 Coverglass / Sterile	10
70461-4R		 ◻ 1.0 mm silicone ◻ 1.5 coverglass 24mm x 50mm	Chambered Coverglass Inserts, 4 x 4 9mm Dia x 1mm Depth Per Tray / 50 - 100µl / #1.5 Coverglass / Sterile	10
70461-50R		 ◻ 1.0 mm silicone ◻ 1.5 coverglass 24mm x 50mm	Chambered Coverglass Inserts, 4 x 50 3mm Dia x 1mm Depth Per Tray / 3 - 10µl / #1.5 Coverglass / Sterile	10
70461-8R		 ◻ 1.0 mm silicone ◻ 1.5 coverglass 24mm x 50mm	Chambered Coverglass Inserts, 4 x 8 6mm Dia x 1mm Depth Per Tray / 15 - 30µl / #1.5 Coverglass / Sterile	10

► SecureSlip™ Cell Culture Coverglass

Convenient, secure coverglass that will not move during cultivation

The coverglass is affixed to a thin microscopically transparent silicone base which secure to culture vessels by an electrostatic charge, not an adhesive, to prevent movement during cultivation.



The silicone also acts as a hydrophobic barrier to isolate liquid reagents on glass. Individual coverglass with silicone backing can be adhered to a petri dish or plate. These can be easily removed one at a time from the dish during culture. Once removed, coverglass can be affixed to a microscope slide by means of the tacky silicone backing for routine processing, or placed cell side down onto a drop of reagent using the silicone backing as a cover to prevent evaporation.

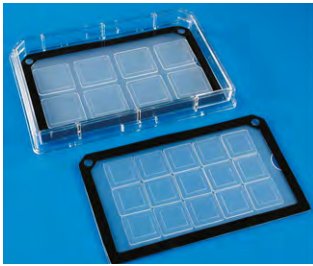
- Silicone backing peels off easily for conventional mounting on microscope slides
- During culture, cells may be imaged without interference from the optical grade silicone

- Eliminates coverglass overlapping during culture. Handle SecureSlips™ with forceps by the silicone backing to avoid damage to glass or cells
- Easily identify “cell side” of coverglass

Ordering: SecureSlip™ Cell Culture Coverglass

EMS #	Dimensions	Description	Qty.
70462-12		SecureSlip™ Silicone Supported Coverglass / 15 – 12 mm x 12mm Coverglass / #1.5 Thickness / Sterile	75
70462-14		SecureSlip™ Silicone Supported Coverglass / 15 – 12 mm Diameter Coverglass / #1.5 Thickness / Sterile	75

CELL CULTURE



► MultiSlip™ Cell Culture Coverglass Inserts

Sterile, ready-to-use MultiSlip™ for culture of cells where pretreatment with a biological coating of glass surface is required.

MultiSlip™ insert with 8 (18mm x 18mm) or 15 (12mm x 12mm) number 1.5 thickness German coverglass per insert are sterile and ready to use in conventional 86mm x 128mm culture plates.

Staining and washing procedures may be performed with MultiSlip™ inserts in the plate, or silicone backed coverglass may be removed individually and affixed to glass microscope slides. Alternatively, inserts may be easily removed for batch processing in glass staining dishes.

MultiSlips™ are ideally suited for the culture of cells where pretreatment of glass surfaces with a biological coating is required. Simply add sterile solution to the plate incubates and aspirate. Coating is applied evenly to one side of the glass only, with no over-lapping, handling with forceps.

Ordering: MultiSlip™ Cell Culture Coverglass Inserts

EMS #	Dimensions	Description	Qty.
70463-12		MultiSlip™ Coverglass Inserts / 15 – 12mm x 12mm Silicone Supported Coverglass Per Tray / #1.5 Thickness Coverglass / Sterile	10
70463-18		MultiSlip™ Coverglass Inserts / 8 – 18mm x 18mm Silicone Supported Coverglass Per Tray / #1.5 Thickness Coverglass / Sterile	10

► CultureWell™ Accessories

Reusable CultureWell™ gaskets from CultureWell™ Chambered Coverglass and CultureWell™ Chamber Coverglass Inserts are available bulk packaged.

- Gaskets are ideal for forming wells on glass microscope slides or in polystyrene dishes
- Gaskets are non-sterile and may be sterilized by autoclaving, UV or alcohol.

EMS #	Dimensions	Description	Qty.
70465-2R1		CultureWell™ Gasket. 2 – 15mm Dia x 1mm Depth / 250-400µl / Gasket only / Non-Sterile	10
70465-2R2		CultureWell™ Gasket. 2 – 15mm Dia x 1.5mm Depth / 300-500µl / Gasket only / Non-Sterile	10

EMS #	Dimensions	Description	Qty.	EMS #	Dimensions	Description	Qty.
70465-3S		CultureWell™ Gasket. 3 – 9.5mm x 9.5mm x 1mm Depth / 300-500µl / Gasket only / Non-Sterile	10	70465-8R		CultureWell™ Gasket. 8 – 6mm x 1mm Depth / 15 - 30µl / Gasket only / Non-Sterile	10
70465-4R		CultureWell™ Gasket. 4 – 9mm Dia x 1mm Depth / 50-100µl / Gasket only / Non-Sterile	10	70465-50R		CultureWell™ Gasket. 50 – 3mm x 1mm Depth / 3-10µl / Gasket only / Non-Sterile	10

EMS #	Description	Qty.	EMS #	Description	Qty.
70466-10	86mm x 128mm Polystyrene Culture Plate, Sterile	10	70466-40	Reusable Silicone Well Dividers 2 - 18mm x 18mm Wells, 2.0mm Depth, Sterile	4
70466-20	Stainless Steel Handle for Inserts	5			
70466-30	24mm x 50mm, #1.5 Thickness German Coverglass	100			

PROTEIN CRYSTALLIZATION

CREATIVE TOOLS FOR THE STUDY OF CELLS



► ProCrystal™ Protein Crystallization Covers

Hanging drop microtiter plate seals with unmatched drop formation and segregation and no noticeable x-ray diffraction

ProCrystal™ covers are designed for high throughput protein x-ray crystallography to generate atomic resolution structures of protein molecules¹. They fit SBS compliant microtiter plates and are TTP Mosquito®* compatible. They are packed dust-free, ready-to-use in packs of 5 with either pre-cut or uncut seals.

The seals sit directly over the microplate crystallization wells. The seals are validated to be incorruptible and materials will not ingress into samples. They are available in either an individual well pre-cut format so that one can easily remove crystals using a forceps from individual wells without affecting neighboring wells or uncut format.

The plate seals are UV compatible with the highest optical quality available. They are exceptionally hydrophobic which maintains drop footprint and segregation even with the use of MPD, Glycerol or detergents.

FEATURES:

- Two Formats: - Individually cut & single sheet un-cut seals
- TTP LabTech Mosquito®* compatible
- Ready-to-use, dust-free
- UV Compatible
- No noticeable X-ray diffraction
- Accommodates up to 3 protein drops per well

References:

1. Newby, et. al. A General Protocol for the Crystallization of Membrane Proteins for X-ray Structural Investigation. Nature Protocols, Vol. 4, 619—637 (April 1, 2009)

Ordering: ProCrystal™ Protein Crystallization Covers

EMS #	Dimensions	Description	Qty.
70470-10		PCC Uncut Paper Liner 45232	5
70470-20		PCC Uncut Plastic Liner 45233	5
70470-60		PCC Cut Paper Liner 45236	5
70470-70		PCC Cut Plastic Liner 45237	5

► Laboratory Filtration - Plastic Corning™ Brand

■ For Tissue culture and HPLC applications ■ Choice of membranes, variety of sizes

Membrane choices include: Regenerated Cellulose (RC), Polyethersulfone (PES), Surfactant-free Cellulose Acetate (SFCA), Nylon (NY), and PTFE Fluorocarbon Resin (PTFE)

Excellent chemical resistance, low protein binding, and the best DMSO compatibility.

TECHNICAL NOTE: TYPICAL CHARACTERISTICS

Filter	RC	PES	SFCA	NY	PTFE
Medium	Regenerated Cellulose HPLC certified & sterile	Polyethersulfone, Sterile	Surfactant-free cellulose acetate, Sterile	Nylon, HPLC certified and Sterile	Fluorocarbon resin HPLC certified & Non sterile
Applications	Tissue culture & HPLC. Compatible with DMSO. Extra chemical compatibility & low protein binding. Choose 0.2µm pore size for sterile filtration and ultra cleaning; 0.45µm for particle removal and clarification	Tissue culture. High throughput/flow rate. Choose 0.2µm pore size for sterile filtration and ultra cleaning. 0.45µm for particle removal and clarification	Tissue culture. Lowest protein binding. Choose 0.2µm pore size for sterile filtration and ultra cleaning. 0.45µm for particle removal and clarification; and 0.8µm for coarse particle removal	Tissue culture and HPLC. Low extractable, naturally hydrophilic. Choose 0.2µm pore size for sterile filtration and ultra cleaning. 0.4µm for particle removal and clarification	HPLC. Most aggressive solvents. Choose 0.2µm pore size for sterile filtration and ultra cleaning. 0.4µm for particle removal and clarification
Diameter	4mm 15mm 25mm	26mm	26mm	25mm	4mm 5mm 25mm 50mm
Filter area	0.07cm ² 1.7cm ² 4.8cm ²	5.3cm ²	5.3cm ²	4.8cm ²	0.07cm ² 1.7cm ² 4.8cm ² 1.7cm ²
Pore Size	0.2µm, 0.45µm	0.2µm	20.2µm, 0.45µm, 0.8µm	0.2µm, 0.45µm	0.2µm, 0.45µm
Hold-up Vol.	5µl 10µl 150µl	100µl	100µl	150µl	5µl 10µl 100µl 500µl
Housing	Polypropylene	Acrylic	Acrylic	Polypropylene	Polypropylene
Temp. Limit	127°C (260.6°F)	50°C (127°F)	50°C (127°F)	127°C (260.6°F)	127°C (260.6°F)
Pressure Limit	87psi 87psi 87psi	87psi	87psi	87psi	87psi 87psi 87psi 58psi
Connections	Inlet female locking luer Outlet male slip luer	Inlet female locking luer Outlet male slip luer	Inlet female locking luer Outlet male slip luer	Inlet female locking luer Outlet male slip luer	Inlet female locking luer Outlet male slip luer

► Syringe Filters

Syringe filters with high burst strength for assured performance. Manufactured to ISO 9002 and GMP standard and 100% integrity tested.

Syringe filter sizes include 4, 15, 25, or 26mm diameter to handle volumes ranging from 0.5 to 100 ml. The 50mm diameter PTFE syringe filter are ideal for protecting the vacuum line and pump. These disposable filter units are ideal for tissue culture media, buffer solution, stain solution, biological fluids, and most other aqueous solutions and reagents that are used daily in the EM lab.

Pore size and membrane type are printed on every syringe and the filters are certified non-cytotoxic and non-pyrogenic. Sterile syringe filters are individually blister-wrapped in cases of 50. Non sterile syringe filter are packaged in cases of 50. The 50mm PTFE syringe filter is supplied in a case of 12.

1. Filter units with polypropylene housing.

Catalog Number	Membrane	Diameter	Pore Size	Pack
67000	RC	4mm	0.2µm	50/pk
67002	RC	15mm	0.2µm	50/pk
67002-25	RC	25mm	0.2µm	50/pk
67018	NY	25mm	0.2µm	50/pk
67019	NY	25mm	0.45µm	50/pk
67022-50*	PTFE	50mm	0.2µm	12/pk
67025-25	PTFE	25mm	0.45µm	50/pk

*Not HPLC certified, but is sterile.

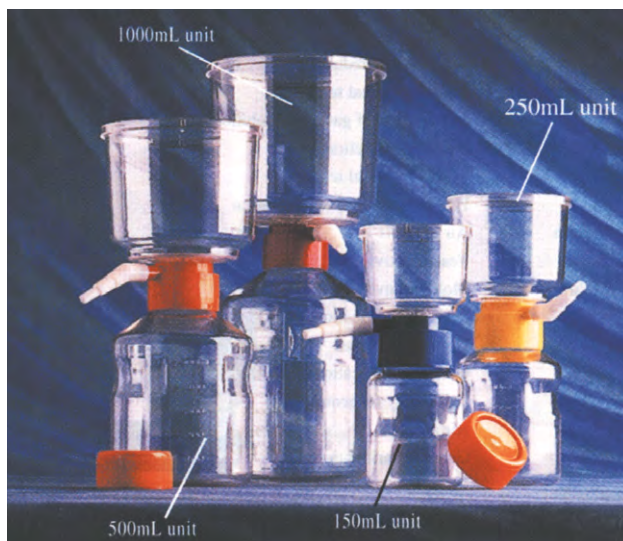
2. Filter with acrylic housing:

Catalog Number	Membrane	Diameter	Pore Size	Pack
67004	PES	26mm	0.2µm	50/pk
67005	SFCA	26mm	0.2µm	50/pk
67006	SFCA	26mm	0.45µm	50/pk
67007	SFCA	26mm	0.8µm	50/pk
67008*	SFCA-PF	26mm	0.2µm	50/pk

*Surfactant Free Cellulose Acetate with Pre-filter



► Disposable Sterile Vacuum Filter Units



Vacuum filtration units fit standard threaded bottle tops. Designed for use on glass or polystyrene media bottles. The unit includes membrane filter, glass fiber pre-filter, and graduated funnel of clear polystyrene with polyethylene neck adapter. Attaches to most popular 33 and 45mm diameter bottle's necks with standard GPI threads. Systems are individually packed, gamma irradiation sterilized and certified non-pyrogenic. Comes with tubing adapter that fits most vacuum hoses. Units are color coded by membrane type (CA: Orange; NYL: Red; CN: Blue; and PES: Yellow).

Choice of membrane media: Cellulose acetate (CA), for low protein binding. Nylon (NYL), for low extractable. Cellulose Nitrate (CN), for general-purpose filtration. Or polyethersulfone (PES), for fast flow rates and low protein binding. Membranes come in 0.20, 0.22 or 0.45µm pore sizes. All four-type membranes are detergent-free, tissue culture compatible, and heat-sealed to the support grid to maximize flow rate, reduce foaming and protein denaturation. Ideal for filtration of tissue culture media, biological fluids, fixation buffers etc. (not for parenteral use.)

► 1. Plastic 150 ml Tube Top Filter 50 mm Membrane Diameter

These tubes minimize unnecessary transfer by filtering directly into the centrifuge tube. Each case comes with two centrifuge tube stands. The polypropylene tube is supplied with an individually wrapped cap for storage. Individually packaged, sterile, certified non-pyrogenic.



Funnel Size/ EMS #	Pore Size Membrane	Tube Size, ml	µm	Pack
67043-22	CA	150/50	0.22	12/pk
67043-45	CA	150/50	0.45	12/pk

► Tri-Seal Specimen Container, see page 537 >>>>

► 2. Plastic 115 ml Filter Unit 60 mm Membrane Diameter

These filter units have a low center of gravity and wide base for stability. They have a separate pour spout to remove filtered sample which minimizes contamination. Individually packaged, sterile, certified non-pyrogenic



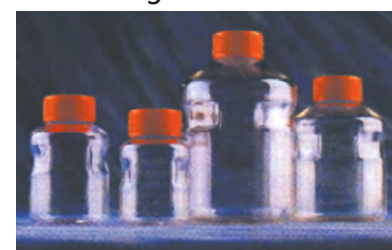
EMS #	Membrane	Volume, ml	Pore Size µm	Pack
67044-22	CA	115	0.22	24/pk
67044-45	CA	115	0.45	24/pk

► 3. Complete Units: All filter units are packaged 12 per case

Catalog Number	Pore Size	Membrane
150ml Funnel/ 150ml Receiver with 50mm diameter membrane		
67045-11	0.22µm	PES (Yellow)
67045-12	0.22µm	CA (Orange)
67045-13	0.45µm	CA (Orange)
250ml Funnel/250ml Receiver with 50mm diameter membrane		
67046-11	0.2µm	CN (Blue)
67046-12	0.22µm	CA (Orange)
67046-13	0.45µm	CA (Orange)
67046-14	0.2µm	NY (Red)
67046-15	0.22µm	PES (Yellow)
500ml Funnel/500ml Receiver with 70mm diameter membrane		
67047-11	0.2µm	CN (Blue)
67047-12	0.22µm	CA (Orange)
67047-13	0.45µm	CA (Orange)
67047-14	0.2µm	NY (Red)
67047-15	0.22µm	PES (Yellow)
1000ml Funnel/1000ml Receiver with 90mm diameter membrane		
67048-12	0.2µm	CN (Blue)
67048-13	0.2µm	NY (Red)
67048-14	0.45µm	CA (Orange)
67048-15	0.22µm	CA (Orange)
67048-16	0.22µm	PES (Yellow)

► 4. Disposable Sterile Collecting Bottles

Disposable polystyrene bottles for the storage of media, buffers and other aqueous solutions. Easy grip sides facilitate handling. Plug seal cap provides an airtight seal and helps minimize the risk of contamination.



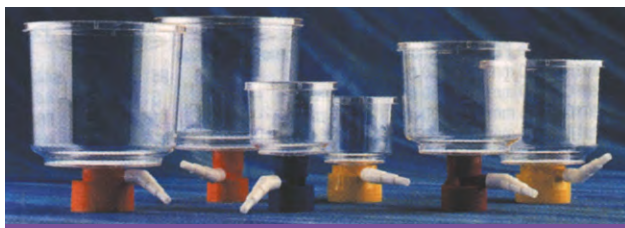
Sterile, certified non-pyrogenic. Neck size 45mm.

Catalog #	Graduation Range/Interval	Pack
64244-01	25 to 150ml/25ml	24/pk
64244-02	50 to 250ml/25ml	24/pk
64244-05	100 to 500ml/50ml	24/pk
64244-10	100 to 1000ml/50ml	24/pk

► Disposable Sterile Vacuum Filter Units (continued)

► 5. Bottle-Top Unit only

Available in 33mm and 45mm neck sizes. Connector neck with unique polyethylene gasket ensures a positive seal between filtration unit and collecting bottle. Funnel has tubing adapter that fits most vacuum hoses. Units come individually packaged and are pre-sterilized by gamma irradiation, certified non-pyrogenic. Pre-filters included. Choice of membrane media is same as above.



Catalog Number	Pore Size	Membrane	Diameter
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150ml Funnel, packaged 48 per case

67050-51	0.22µm	CA (Orange)	33mm
67050-52	0.22µm	CA (Orange)	45mm
67050-54	0.22µm	PES (Yellow)	33mm
67050-55	0.22µm	PES (Yellow)	45mm
67050-56	0.45µm	CA (Orange)	33mm
67050-57	0.45µm	CA (Orange)	45mm

500ml Funnel, packaged 12 per case

67051-51	0.20µm	NY (Red)	45mm
67051-52	0.22µm	CA (Orange)	33mm
67051-53	0.22µm	CA (Orange)	45mm
67051-56	0.22µm	PES (Yellow)	33mm
67051-57	0.22µm	PES (Yellow)	45mm
67051-58	0.45µm	CA (Orange)	33mm
67051-59	0.45µm	CA (Orange)	45mm

1000ml Funnel, packaged 12 per case

67052-52	0.22µm	CA (Orange)	45mm
67052-54	0.22µm	PES (Yellow)	45mm

► Centrifugal Filter Devices – Costar™ Brand

Filter samples in microcentrifuges

Choice of cellulose or nylon membrane

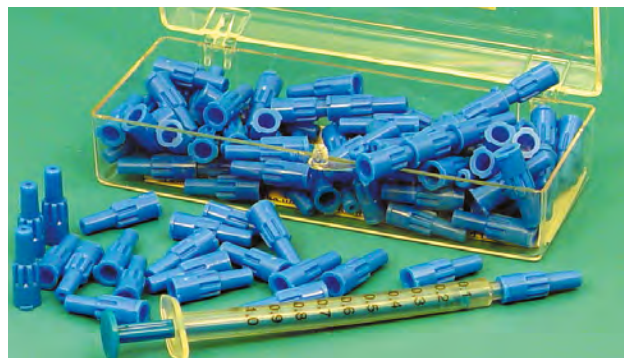
For volume up to 500 µl

Spin-X* centrifuge tube filters utilize centrifugation for the filtering of small volumes. The unit consists of a polypropylene filter insert and a centrifuge tube. It handles volumes up to 500µl. They have a **cellulose acetate** membrane for aqueous solutions which is ideal for the removal of bacteria, particles, and cells from media. They are also effective for DNA removal from agarose or acrylamide gels.

Spin-X LC units have a **nylon** membrane for applications such as HPLC sample preparation. Both have retained volume of <5µl, and withstand relative centrifugal force (RFC) to 16,000xG

Tube Size	Pore Size	Sterile	Catalog#	Case
Spin-X - Cellulose Acetate				
2.0ml	0.22µm	Yes	67030-60	96/cs
		No	67030-61	100/cs
	0.45µm	Yes	67030-62	96/cs
		No	67030-63	100/cs
Spin-XLC - Nylon				
2.0ml	0.22µm	No	67031-69	200/cs
	0.45µm	No	67031-70	200/cs

► Syringe Filters, for use in Immunolabeling



Cellulose Acetate membrane with 4mm diameter Polypropylene housing with 7mm² filter area. This 1ml syringe filter is very useful in sterilization of micro/immunological reagents, enzymes, antibodies and immunolabeling. Non-sterile, bulk pack: 100/pkg, 400/case, autoclavable. Filter pore size is 0.2µm.

67015	Immunolabeling Syringe Filter	100/pkg
67016	Immunolabeling Syringe Filter	400/cs

► Fiberglass Pre-filters

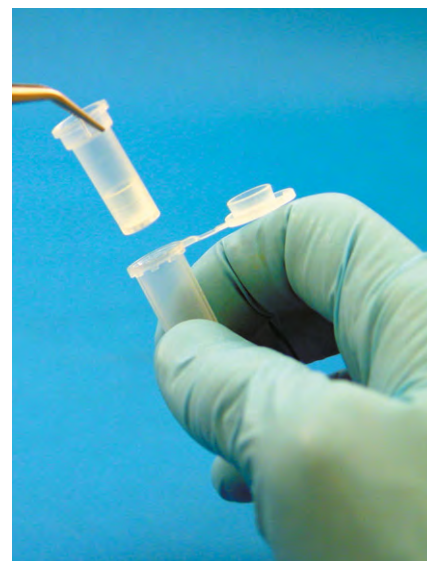
Fiberglass pre-filters for use in Bottle Top and Vacuum Filtration Systems above.

Recommended filter size dependant on apparatus used. The Pre-Filters are available in two sizes: 50mm and 70mm diameters. Packaged: 12/pkg, 96/case



67070-series

EMS #	Description	Pack
67070-50	50mm, for use with 150ml & 250 ml Filter Funnels	96/pk
67070-70	70mm, for use with 500ml Filter Funnels	96/pk



► Plastic Syringes; Disposable

► 1. Syringes Without Needles – Rubber Piston

These high quality disposable rubber piston syringes offer substantial savings. A lubricated synthetic rubber piston allows for a smooth draw while a positive stop prevents accidental pull out. Bold graduations are easily read and resist wipe-off. Syringes are ETO gas sterilized, latex and pyrogen free. All syringes are packaged in individual sterile strip packs.

Cat. #	Size and Description	Pack
72508	2.5 ml, Luer Slip Centric	100/pk
72509	5 ml, Luer Slip Centric	100/pk
72510	10 ml, Luer Slip Eccentric	100/pk
72512	20 ml, Luer Slip Eccentric	100/pk
72513-LS	30 ml, Luer Slip Eccentric	50/pk
72513-LL	30 ml, Luer Lock Centric	50/pk

► 2. Syringes With Mounted Needles – Rubber Piston

Cat. #	Size x Needle Gauge x length	Pack
72515	1 ml x 25G x 5/8", Tuberculin	100/pk
72517	5 ml x 21G x 1 1/2", Luer Lock Centric	100/pk
72518	10ml x 21G x 1 1/2", Luer Lock, Centric	100/pk

► 3. All Plastic Syringes Without Needles

These syringes are latex free; contain no rubber, no silicone oil or styrene. They are the choice for any situation needing an inert, hypoallergenic syringe. Because of their purity, they are indicated for IVF, embryo transfer, chromatography and many laboratory procedures. Manufactured only from laboratory grade polypropylene and polyethylene, these unique plastic syringes have a positive safety stop to prevent accidental spills. These syringes are individually sterile strip packed.

Cat. #	Size and Description	Pack
72520	1 ml, Tuberculin*	100/pk
72522	5 ml, Luer Slip Centric	100/pk
72524	10 ml, Luer Slip Eccentric	100/pk
72526	20 ml, Luer Slip Eccentric	100/pk
72528	30 ml, Luer Slip Eccentric	50/pk
72529	50 ml, Luer Slip Eccentric	30/pk
72529-A	50ml, Luer Slip, Eccentric, Amber	30/pk

► Hypodermic Needles

These sterile-disposable regular wall hypodermic needles with a plastic translucent hub are individually wrapped and color-coded.

Cat. #	Needle Gauge and Length	Pack
72530	Hypodermic Needle, 18G x 1"	100/pk
72532	Hypodermic Needle, 19G x 1"	100/pk
72534	Hypodermic Needle, 20G x 1"	100/pk
72536	Hypodermic Needle, 21G x 1"	100/pk
72538	Hypodermic Needle, 22G x 1"	100/pk

► Puritan® - Wood Products

► 1. Wooden Sticks – Tongue Depressors

These sticks are made from closed-grain Northern White Birch. This selective wood provides a smooth, splinter-free finish with good tensile strength. In addition to medical uses, these sticks are ideal for spreading ointments and salves, stirring and mixing etc.

Cat. #	Descriptions	Pack
72320	Wooden Sticks, 5 1/2" x 3/8"	500/pk
72322	Wooden Sticks, 4 1/2" x 3/8"	1000/pk

► 2. Wooden Applicators Sticks, Orange Sticks

Manufactured from closed-grain Northern White Birch these sticks are ideal for use in specimen transfer, as a mixing rod, and for general laboratory applications.

Orange Sticks are 7 inches long and 5/8" diameter, choice of beveled ends.

Cat. #	Descriptions	Pack
72300	Applicator Stick, 6" x 1/2"	1000/pk
72303	Applicator Stick, 12" x 3/8"	500/pk
72304-10	Double Bevel Both ends Orange Stick	100/pk
72304-30	One Single Bevel, one Double Bevel End Orange Stick	100/pk



► Caps for Syringes

One size fits-all syringe caps that can be used with either a luer slip or luer locking syringe tip. These tips make the syringes suitable for usage as embedding media storage vessels.

72500-05	Caps for Syringes	500/pk
72500-10	Caps for Syringes	1000/pk



From Left : 72538 - 72530



(1) 72300 & 72303 Applicator Sticks
(2) 72322 Small Wooden Stick
(3) 72300 Large Wooden Stick



Double Bevel End



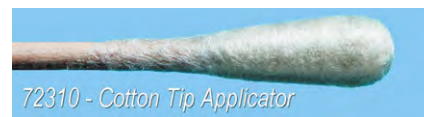
Single Bevel End

► 3. Cotton Tipped Applicators

■ **Medical Quality:** The cotton is carded, spun, and applied in an ISO 9002 Registered facility to assure you consistent quality.

Handy Vial Packs: 3" (8cm) wooden shaft, small-tipped applicators come pre-packed in a plastic-capped vial, a handy way to keep a supply of swabs available anytime on the bench top. Packed 100 per vial

Cat. #	Descriptions	Pack
72310	Cotton Tipped Applicator, Wooden Shaft, Single End, 6" x 1/2", Regular Tip. Non Sterile	100/pk
72310-10	Same as above	10x100/pk
72310-S	Same as 72310 but Sterile	10x100/pk
72307	Handy Vial Pack, 100/vial	10Vials/pk



■ **Industrial Cleaning Applicators:** 6" Cotton Tipped Applicators, Choose from different cotton tipped sizes. Tips are specially processed to resist tears and pulls and leave your cleaning environment virtually lint-free. Available with a wooden shaft or a polypropylene shaft.



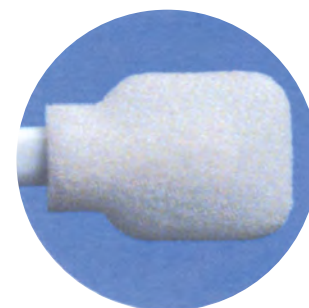
Cat. #	Descriptions	Pack
72308	Double Tips. Tapered Tip 3/16" Dia. Tapering to 1/32" Dia. x 5/8" L, Regular Tip 3/16" W x 5/8" L. Wooden Shaft	100/pk
72308-05	Same as above	5x100/pk
72309	Large Tip 1/4" Dia. x 1 1/8" L. Wooden Shaft	5x100/pk
72306	Anti-Static, Lint-Free. Regular Tip 1/4" Dia. x 1 1/8" L. Polypropylene Shaft.	10x100/pk



► Wooden Picks

They are round and double tapered; used for cleaning pole pieces and parts of the EM. Also used for orienting the specimen during the embedding stage.

72340 Wooden Picks 100/bx



► 4. Foam Tipped Applicators

Tips are made from shred-resistant, 100% urethane foam with 100PPI porosity. Except where wood is noted, all shafts are polypropylene.

Newly introduced PurSwab Popule, which is filled with 91% isopropyl alcohol and 9% deionized water. Simply squeeze the handle to break the patented seal and allow liquid to flow to the foam head.

Cat. #	Descriptions	Pack
72317	Foam Tipped Applicator, Wooden Shaft. Tip 3/8" Dia x 1" L	50/pk
72314	5" Shaft, Rectangular Foam Tip 1/8" W x 7/8" L, Polypropylene Shaft	50/pk
72315	6" Shaft Arrow End Tip 3/8" Dia x 7/8" L	50/pk
72312	6" Wooden Shaft, Tip 3/8" Dia x 1 1/8" L. Foam-over-Cotton Tip	50/pk
72330	Popule, 4 1/2" Self-Saturating Foam Swab with 91% Isopropanol in DI Water	50/pk

► 5. Chemical Resistant Applicators

The tips on these applicators are specially designed to withstand many of the chemicals and solutions commonly use in labs and clean rooms. Tips are resistant to deterioration – they won't swell or break apart.

Cat. #	Descriptions	Pack
72325	6" Wooden Shaft, Foam over-Cotton. Tip 3/8" Dia x 1 1/8" L	50/pk
72326	6" Polypropylene Shaft, Foam-over-Cotton Tip 3/8" Dia x 1 1/8" L	50/pk



► 6. Antistatic Foam Tipped Applicators

Choose from swabs that feature an antistatic foam head – or swabs with completely static-free construction. Static-dissipative swabs attract dirt and dust for easy cleaning, while reducing and dissipating static electricity. Antistatic properties will not decay over time. Swabs meet all industry standards and requirements, including ASTM-D257 and Federal test method 4046, standard #101C.

Cat. #	Descriptions	Pack
72316	6" Wooden Shaft, Anti-Static Foam-over-Cotton. Tip 3/8" Dia x 1 1/8" L	50/pk
72318	6" Polypropylene Shaft, Anti-Static, Foam-over-Cotton Tip 3/8" Dia x 1 1/8" L	50/pk

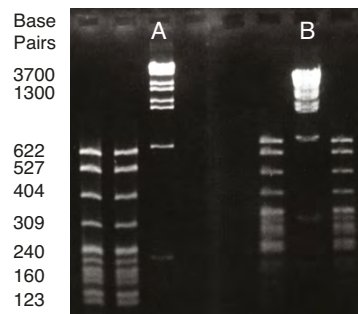


► Gel, Electrophoresis, Chemilluminescence, and Autography

► Synergel™

Improving Agarose Gel Performance

- Superior Sieving – Better sieving than agarose alone, 1 gr Synergel = 2 gr agarose
- High Resolution – Synergel / Agarose gels exhibit improved spatial separation and tighter banding for DNA fragments of 50-2000bp
- Easy To Use – Mix, boil and pour!
- No Background Fluorescence – The superior optical clarity permits high quality photo-documentation
- Increased Load Capacity – Accommodates greater quantities of DNA reducing band tailing and smearing



(A) 1.5% Synergel and 0.7% agarose (SeaKem LE)
(B) 4% NuSieve Agarose (FMC)

68500-10	Synergel - Agarose Additive	100g
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► Gel Handler™

Flexible UV Transparent Sheets for Handling Gels, Visualizing and Photo Documentation



- Ideally sized at 8.5" x 11" (216mm x 279mm)
- Thin sheet easily slides beneath a gel
- Flexible sheets eliminates air bubbles
- Protects the surface of transilluminators from cuts & scratches
- Polyolefin composition allows acid washing and autoclaving without a chemical reaction
- Optical densities for the 5 mil thick sheets at 254 and 300nm emission wavelengths of the transilluminator are 0.14 and 0.04 respectively

68510-10	Gel Handler - 5 mil thick	10/pack
68510-20	Gel Handler - 10 mil thick	5/pack

► RadTape™ and RadTape Plus™

An easy way to identify autograms – radiological & chemilluminescence

- Versatile – phosphorescent, non-radioactive adhesive labels that may be cut to the specific size and shape needed for each individual membrane, dried gel or microarray
- Fast and Easy – marking system is great for documentation and archiving and ideal for chemilluminescence and radiological autography (patented)
- Use an ordinary pen to mark the label using the investigator's own codes and symbols
- Simply peel the custom label from its backing and affix it to the membrane, gel or microarray
- Permanent - exposes a negative image of the markings directly
- RadTape Plus is finer grained and waterproofed



68520-10	RadTape; 4 x 6" sheet	10/pack
68520-20	RadTape Plus; 4 x 6" sheet	10/pack

► Glow Writer™

Fine-Point Phosphorescent Marking Pen for Laboratory Autography

Glow Writer is a phosphorescent pen for marking chemiluminescent and isotope-labeled substrates for X-ray film autography. The unique marker delivers a phosphor-containing ink through a fine point porous nib. Before exposure to X-ray film, the phosphorescent writing is excited by room light. The pen utilizes a phosphor ink having an optimum concentration of phosphor and a relatively short afterglow half-life (approximately 2-3 minutes) has been selected so that upon exposure to X-ray film, autographic exposures of almost any duration will be easily readable on the film. The fine point nib is easily replaceable if it dries out.



68551-01	Glow Writer Pen	each
68551-RT	Glow Writer Replacement Nibs	4/pack

► Gel, Electrophoresis, Chemilluminescence, and Autoradiography (continued)

► FlowMesh™

A Permeable Support Mesh for Gels and Membranes

Protects - Place FlowMesh above or below a gel or filter to protect from tearing, bending or folding

Sturdy - Supports gels during incubation with nucleic acid probes, antibody probes, equilibration buffers, stain, destain solutions, etc.

Versatile - Use as a permeable spacer for stacking as well as for staining and destaining procedures

Access - Both sides of a container or plastic bag are assured of constant solution access, which improves the uniformity of hybridizations and binding assays.

Convenient - FlowMesh is re-usable and easily cut to size

68505-20 FlowMesh Sheet - 8.50" x 11.00" / 216mm x 279mm 20/pack



► Fluorescent Ruler Kit

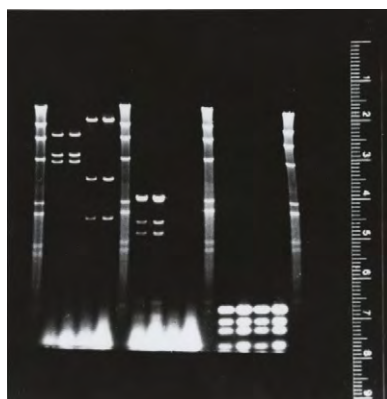
No more guesswork – Accurately measure the mobility of electrophoretic markers and ethidium bromide-DNA complexes during electrophoresis

Thin - At 7mm wide they require only a single lane of an agarose gel

Fluorescent ink markings are sharp and photograph well under UV light (300nm & 350nm)

Rulers are made of a flexible, UV-clear plastic so only the fluorescent markings will show under UV light

68552-04 (2) 10cm & (2) 20cm 4/pack



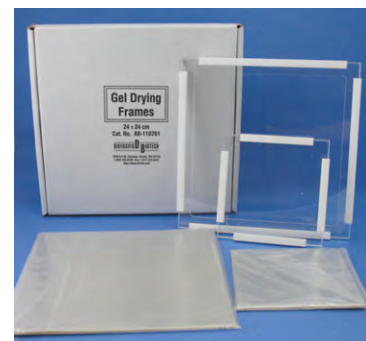
► Gel Drying Frames™

Gel Drying Frames allow researchers to quickly and easily dry gels between two sheets of cellophane without the use of expensive heat/vacuum gel dryers. The 24 x 24cm frames allow for drying of larger format gels, while the 14 x 14cm frames are ideal for mini gels and other smaller formats.

Each kit includes

- 2 open frames,
- 2 solid back plates,
- 12 side clips and
- 50 sheets of pre-cut cellophane

68510-14	14 x 14cm Gel Frame	Kit*
68510-24	24 x 24cm Gel Frame	Kit*
68511-14	14 x 14cm Cellophane	50/pack
68511-24	24 x 24cm Cellophane	50/pack



► Autoradiography Ruler Set

Phosphorescent, Non-Radioactive Metric Rulers for Radiographs

The Autoradiography Ruler Set (ARS) is an orientation and measurement device that exposes metric ruler markings directly onto X-ray film

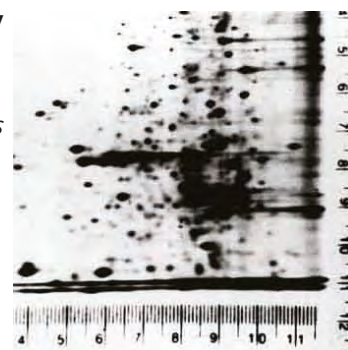
Ideal- Utilizes a specially formulated phosphorescent dye compound and a unique emission filter which serves as an ideal non-radioactive substitute for ink markings

Easy- Make easy electrophoretic mobility calculations

Re-usable- The phosphorescent emission of each ruler can be regenerated indefinitely and can be reused any number of times

High Resolution - Produces a high resolution image that is unaffected by intensifying screens or pre-flashed film

68550-04 20cm length rulers 4/pack



► Rapid Coomassie Stain

Fast - Complete in 30-60 minutes

Easy - Destaining is not necessary

Highly Sensitive - Detects as little as 30ng of protein

Quality - Bands are sharper than those stained with conventional Coomassie Blue

Versatile - Gels can be restained with Silver

68511-25 Rapid Coomassie Stain, 100ml Each



SECTION 12

Materials Science & Metrology

Cold and Hot Mounting Media, & Accessories
Adhesives and Mountants
Replicating Films and Membrane Boxes
Polishing Supplies
Sample Grinding and Sectioning
Micro & Mini-tools
Probes, Scribes, Pin Vise, Cleavers, Sharpeners
Instrumentation, including:

*Micro-Manipulators, Micro Drilling Systems,
and Disc Punch*

Grinder, Otolith Polishing, and Micro Polisher

Spark Cutter and Accessories

Rotary Disc and UltraSonic Cutters

Electropolisher and Electrolytic Jet Thinning

Diamond Wheel Saws

Wire Saws

Dimpler for TEM Preparation

Tripod Polishers for SEM TEM Preparation

Lapping and Polishing Machines and Fixtures

*Rail Polisher, Twin Jet Electropolishing System
and UniDisc*

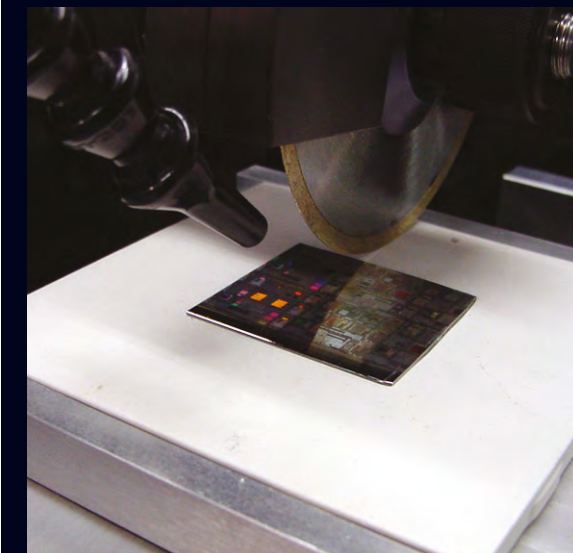
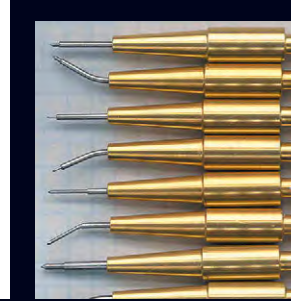
Plasma Cleaning and Etching and Ion Beam Sputter

Crystal Orientation

Diamond Band Saw

Micro Cleaving

and more...



**Electron
Microscopy
Sciences**

► Mounting and Embedding Media:

EMS introduces a selective range of embedding and mounting medium on the market for both HOT MOUNTING and COLD MOUNTING - for literally all kinds of material specimens.

For a complete line of all of our Embedding Media Kits see pages 92-102.

► 1. Hot Mounting

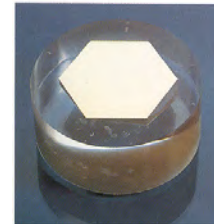
When preparation requirements include less expensive, uniform size and shape, and short processing times, hot mounting (hot compression mounting) is ideal.

Hot mounting takes place under pressure in a mounting press, where the specimen is placed in a cylinder together with the appropriate mounting resin. A temperature of up to 200° C, and a pressure of up to 50kN are then applied during the embedding of the specimen. There are two types of hot mounting processes: thermoplastic resins and thermo-setting resins.

- **Thermoplastic Resins** melt when heated, offering the opportunity of repeating the process with the same specimen if the result is not satisfactory the first time. Thermoplastic resins harden during a chemical reaction with or without pressure. That means high pressure is not necessary during heating and cooling. This process is good when mounting fragile specimens.
- **Thermo-setting Resins** cure at elevated temperatures under pressure. Thermo-setting resins cannot be re-melted after mounting.



1210



1212



1214

Hot Compression Mounting Resins Selection Guide

Resin	Recommended Use	Specific Properties	Comments	Resin Color
Gray Resin	Electropolishing Electrically conductive mounts	Electrically conductive Very low shrinkage	Acrylic resin with iron filler Thermoplastic powder	Gray
Clear Resin	Glass clear mounts Porous samples Surface electrical insulator for Gray Resin	Translucent Medium Shrinkage	Transparent acrylic resin Thermoplastic	Clear
Green Resin	High Edge retention needed Planeness Very Hard Mount	Low shrinkage Low removal rate Granular	Diallyl phthalate with glass fiber filler Thermosetting	Green

Ordering Hot Mount Resins:

Cat #	Descriptions	Pkg. Size
1210	Gray Resin - Thermoplastic	1 kg
1212	Clear Resin - Thermoplastic	1 kg
1214	Green Resin - Thermosetting	1 kg

For our pressure chamber see page 372 >>>>

► 2. Cold Mounting

Cold mounting or embedding is when a resin is mixed with a hardener (or accelerator) to provide the mounting compound, and then the polymerization process take place to form the block. In some cases, this process gives-off heat. However this heat generation can be controlled by the use of ice or cool air blow setting. Cold mounting compounds are preferred for specimens that are sensitive to the heat or pressure, which applies during the hot mounting process. There are three types of cold mounting:

1. **Epoxy Systems** - Epoxies have the lowest shrinkage of all cold mounting resins. The curing time is relatively long, but the adhesion to most materials is excellent. They are also used for vacuum impregnation. The hardened epoxy is duroplastic and not affected by moderate heat or chemicals.
2. **Acrylic System** - Acrylics are easy to use resins with short curing times and negligible shrinkage. They consist of self-polymerizing components that harden with the addition of catalyst. Hardened acrylic is thermoplastic and resistant to most chemicals.
3. **Polyester Systems** - Polyester belongs to the catalyzed system, like acrylics. Curing times are relatively short and the hardened specimen is duroplastic.

continued >>>>



1232

Electron Microscopy Sciences offers a full range of equipment used in materials preparation for a variety of technological fields. Electron microscopy, metallography, wafer lapping and polishing, failure analysis, crystal orientation, plasma processing, MEMS and many other applications are facilitated by our equipment. Please contact us or see our comprehensive website, which includes our complete line.

Cold Mounting and Embedding Resins Selection Guide

Resin	Recommended Use	Specific Properties	Curing Time	Recommended Mounting Cup
EpoFix	Vacuum impregnation Porous & complicated specimens Mineralogical specimens	Transparent Epoxy Negligible curing heat Low viscosity Practically no shrinkage Excellent wetting and adhesion Peak temperature 43°C	8 hours at room temperature	Disposable Mold Cups (50480-10)
UniMount	Vacuum impregnation Porous specimens Mineralogical specimens Need more time to manipulating specimen	Transparent Epoxy Low viscosity Excellent penetration to cracks & pores No shrinkage Peak temperature 130°C	1½ - 2 hours at 70-80°C 4 hours at 40-60°C	Disposable Mold Cups (50480-10)
AcryMount	Routine work Single or small series of specimens	Translucent Acrylic	9 – 10 minutes at room temperature	Disposable Mold Cups (50480-10) Silicone Molds
PolyMount	Large series of uncomplicated specimens Used for specimens are not sensitive to heat.	Transparent Polyester Low viscosity Due to shrinkage, it's recommended for specimens without holes or cavities.	45 minutes at room temperature	Disposable Mold Cups (50480-10) Silicone Molds
PolyAcryMount	Edge retention Planeness Complicated specimens	Polyester/Acrylic Mineral filler White Peak temperature 114°C Excellent hardness Practically no shrinkage	25 – 18 minutes	Disposable Mold Cups (50480-10) Silicone Molds
Epoxy-Dye	For use with EpoFix and Unimount	Fluorescent dye for use in microscopy to make cracks and pores visible. Special filters for microscopy	N/A	N/A
Acrylic-Dye	For use with Acrylmount	For color-coding specimens Color include blue, red & yellow	N/A	N/A

1) All peak temperatures stated is a 30mm mount cured at room temperature of 23°C

Ordering Cold Mount Resins:

(a) Epoxy Systems

Cat. #	Description and Packaging
1232	EpoFix - Kit with 1L liquid resin; 130 ml hardening liquid kit
1234	UniMount - Kit with 500 ml liquid resin; 200ml hardening liquid kit
1245	Epoxy-Dye 20g

(b) Acrylic Systems

Catalog #	Description and Packaging
1256	AcrylMount - Kit with 500g resin powder; 225ml hardening liquid kit
1265	Acrylic-Dye, 180ml (60ml each yellow, red, blue) 60ml x 3

(c) Polyester Systems

Catalog #	Description and Packaging
1270	PolyMount - Kit with 500 ml liquid resin; 15 ml hardening liquid kit

(d) Polyester/Acrylic Systems

Catalog #	Description and Packaging
1276	PolyAcryMount - 870gm resin powder, 500ml hardening liquid kit

Cold Embedding Molds

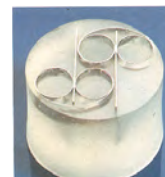
These 2 part molds may be used for all cold embedding epoxies. Comes with a detached cap for easy removal. The molds come in 3 different sizes to accommodate all of the samples you may have. The molds are made from HDPE and we recommend the use of mold release spray (cat #71619) prior to use.



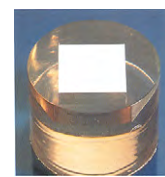
50481-20	Cold Embedding Molds 1"	10/pk
50481-21	Cold Embedding Molds 1 ½ "	10/pk
50481-22	Cold Embedding Molds 1 ¼ "	10/pk



1234



1256



1270



1276

Mounting Cups for Cold Mounting/Embedding

Disposable Mold Cup

Polyethylene, one part molds. Closed one end. Red



50480- Disposable Mold Cups

Cat. #	Diameter	Pkg.
50480-10	1½"	50/pk
50480-15	1¼"	50/pk
50480-20	1½"	50/pk

Silicone Mold

Flexible Silicone Rubber, Closed bottom; red

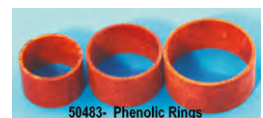


51012- Silicone Molds

Cat. #	Diameter	Pkg.
51012-25	25mm	5/pk
51012-30	30mm	5/pk
51012-40	40mm	5/pk

Phenolic Ring Mold

Impregnated phenolic



50483- Phenolic Rings

Cat. #	Diameter	Pkg.
50483-15	¾"	10/pk
50483-20	1½"	10/pk

► Hot & Cold Mounting/Embedding Accessories

Catalog #	Description	Qty.
50486-00	6mm height metal spring clip to hold or position a small specimen upright. 100/pk	
50487-25	PlastiClips - Plastic clip used to support up to 5 small, thin specimens. 25/pk (May not be suitable with Acrylic Resins),	
50488-10	Mold Release - Mold release agent to be used with mounting press. 16 oz can	
72619	Mold Release - Mold release agent to be used with cold mounting mold. 15 oz can	
50494-25	Thermo Conductive Paste - For better heat transfer between heating/cooling unit and cylinder in hot mounting press.	25g



50487-25



50486-00

► Silicone Rubber Molds, Reusable

These reusable molds for cold embedding are made from sturdy, flexible, white silicone, and are easily removed without the need for release agents. Much smoother than rubber molds, enabling easy identification of samples in clear resins. They hold their shape to produce consistent, reliable round embedding.



Round Silicone Rubber Molds, Reusable

1" high, 3/4" internal depth.

Cat. #	Description	Qty.
50484-10	1" (25.4mm) dia.	10/pk
50484-12	1-1/4" (31.75mm) dia.	10/pk
50484-14	1-1/2" (38.1mm) dia.	10/pk
50484-16	2" (50.8mm) dia.	5/pk



Rectangular Silicone Rubber Molds, Reusable

1" high, 3/4" internal depth.

Cat. #	Description	Qty.
50484-17	2-1/4 x 1"	5/pk
50484-18	3 x 2"	each

► Pressure Chamber

This chamber is designed in conjunction with our cold molded acrylic and epoxy media. After encapsulating the sample, they are placed inside the chamber. By applying between 30 to 40 PSI during the cure time, the mounting compound is compressed down and around the sample, forcing air up to the surface. This process helps eliminate shrinkage and increase clarity and edge retention. Comes with an air hose. As an option an air pump tank is available. This Air Pump is designed for hand pumping pressure. The chamber inside measures 6" deep x 6" diameter.



50465-10	Pressure Chamber	each
50465-20	Air Pump	each

- For More Embedding Molds & Supplies
See Specimen Preparation section, pages 237-243
- Tripour Beakers and all other embedding supplies,
See page 217 >>>
- Staccups: 100ml, 500ml, *See page 217 >>>*
- Disposable Syringes: 1 ml, 5ml 10ml, 20ml, 30ml, 50ml, *See page 365 >>>*
- Wooden Stirring Rods, *See pages 365-366 >>>*

- Mounting Medium: Eukitt, DPX, Entellan, Permout, etc, *See pages 9-21, 514-519 >>>*
- Technovit - GMA Embedding Kits
see page 98-100 >>>
- For More Embedding Materials, *see Embedding Media Kits, pages 92-102 >>>*
- For Mold Release Spray, *see Specimen preparation section, pages 247 >>>*

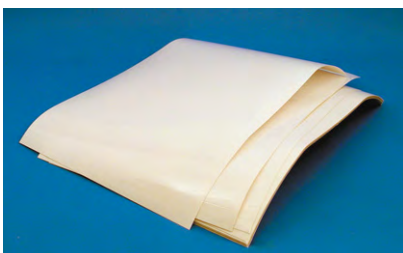
► Adhesives and Mountants

► Crystalbond™/Wafer-Mount™

A temporary adhesive. These wash away adhesives are used as a temporary bond for holding delicate crystals, metallurgical specimens, glass components, and ceramic substrates for dicing, slicing, drilling and polishing. These materials adhere readily to metals, glass, ceramic and then can be washed after machining away using various solvents.

APPLICATIONS:

- Machining or slicing single crystal metal specimens.
- Grinding and polishing sapphire, ceramic, optical garnets, ferrites, and LCD glass.
- Dicing and slicing germanium and silicon wafers in semiconductor production.
- Holding beam leads in IC devices for pull-off tests.
- Dicing and slicing alumina and beryllia substrates for IC and micro-electronic production.
- Dicing subminiature chip capacitors and microwave IC substrates.



Crystalbond™ Properties and Ordering:

Type	509	555	590
Description	Thermo polymer*	Thermo polymer	Thermo polymer*
Form	7/8" Dia. x 7" stick	1/2" x 1" x 7" stick	3/8" x 1 1/4" x 7 1/2" stick
Softening	160°F (71°C)	125°F (52°C)	257°F (125°C)
Flow Point	250°F (121°C)	130°F (54°C)	302°F (150°C)
Viscosity at Flow Point	6,000 cps	500 cps	9,000 cps
Color	Clear/Amber	White	Brown
Solvent	Acetone or 509-S Stripper	Water	Methanol or 590-S Stripper

*Thermoplastic polymer



► **Crystalbond™ 509:** offers excellent adhesion to metals, glass, and ceramic. This material is the best for precise high purity work since it leaves no residue after dissolving and does not clog the diamond wheel as compared to conventional waxes. Each stick weighs about 90 grams.

50400-01	Crystalbond 509, Clear Stick	each
50400-05	Crystalbond 509 Clear Stick	5/pk
50400-50	Crystalbond 509 Amber Stick	each
50400-S1	Crystal Bond 509 Stripper	1 qt
50400-S2	Crystal Bond 509 Stripper	1 gal

► **Crystalbond™ 555:** the same as 509 but used in applications where it is desirable to have a temporary bond which is water soluble. Each stick weighs about 90 grams.

50401-01	Crystalbond 555	each
50401-10	Crystalbond 555	10/pk

► **Crystalbond™ 590:** the same as 509 but offers maximum adhesion to subminiature parts. Each stick weighs about 225 grams.

50402-01	Crystalbond 590	each
50402-02	Crystalbond 590	2/pk
50402-S	Stripper	100 g

► **Wafer-Mount™ 559:** is available in sheet form 10"x10" (254x254mm). To use, remove the paper backing exposing the adhesive layer. The substrate is positioned on the film and pressed down firmly so that it adheres to the plastic film. No heating is required. The wafer mounted on the plastic film can then be held down using a vacuum manifold or mechanical means for dicing or scribing. After dicing or scribing, the parts can be separated from the wafer-mount 559 film by washing in acetone or MEK. Ideal for holding down silicon wafers, alumina, or glass substrates for scribing.

50403-02	Wafer-Mount 559	2/pk
50403-10	Wafer-Mount 559	10/pk

► **Wafer-Mount™ 562:** a dry temporary adhesive film, 0.003" thick, which can be easily cut to size with either a razor or scissor. This mount permits pre-placement of the adhesive film exactly where the user wants it. It melts at 195-210°F. After application it can be dissolved rapidly in trichloroethylene or toluene. This material is particularly useful in applications where a pre-formed adhesive film is needed to assure uniform bonding and flatness or in bonding stacks of substrates such as LCD glass slides for slicing. Sheet size 8"x10".

50404-10	Wafer-Mount 562	10/pk
50404-20	Wafer-Mount 562	20/pk

For a complete line of Silicon Nitride Mesh and Film, see pages 152-157 ►►►

► QuickStick™ 135 Temporary Mounting Wax

- Acetone Soluble - Ideal for high purity work
- Low Melting Point - Flows at 135° C
- Crystal Clear - Good for applications utilizing transmitted light.



This temporary mounting wax is used in a variety of applications to bond samples during a processing application. After processing, the mounting wax is washed away in acetone leaving no residue.

TYPICAL APPLICATIONS INCLUDE:

- Single Microscopy Sample Preparation.
- Single Crystal Mounting
- Metallurgical Applications
- Wire Sawing
- Grinding and Polishing
- Ultrasonic Cutting

SPECIFICATIONS:

Thermoplastic polymer. Softening point is 71° C (160°F). Flow point is 135° C (275° F). Viscosity at flow point is 6,000cps. The color is crystal clear and it dissolves in acetone. QuickStick™ comes 20 sticks/tray and it weighs approximately 350 grams. Each stick measures 3"(L) x ¼" (W) x ¼"(H) (76mm x 6mm x 6mm)

50419-20	Quick-Stick™ 135	20/pk
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► Mounting Wax 100

MWM100 Black Wax is designed for use as a masking material in jet polishing applications. As it is chemically inert, it is resistant to etching solutions such as hydrofluoric acid, perchloric acid and acetic acid. While it is resistant to many acids, it can be easily removed with hydrocarbon or chlorinated solvents. 100 Gram/Pkg (5 - 20 gram sticks). Moderate Hardness and a Melting Point of 100° C.



Diluent: Hydrocarbon or Chlorinated solvents

50390-100	Mounting Wax 100	100 Grams
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► Mounting Wax 80

MWH080 is an amber colored wax, which is translucent in thin films. High hardness makes it ideal for sawing, ultrasonic cutting and lapping & polishing operations. Best suited to vitreous materials, polished metal surfaces, semiconductors and piezoelectric materials with large contacted areas. Chemical resistant. 100 Gram/Pkg of 4 sticks .5" x .5" x 7" long (12.5 x 12.5 x 175mm). Hard hardness with a Melting Point of 80°C.



Diluent: Ethanol and Acetone

50390-80	Mounting Wax 80	100 Grams
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► Mounting Wax 70

MWM070 is a quartz type sticky, orange colored wax (translucent in thin films) used to hold crystals or other materials while they are being sliced, lapped or polished. Moderate hardness and strength make it useful for bonding small samples in diamond wheel sawing and wire sawing operations. Widely used for holding semiconductors, optical materials, ceramics and metals with medium to large contact areas. Chemical resistant. 100 Gram /Pkg of 29 sticks, .25" dia x 4" long (6mm dia x 100mm). Moderate Hardness and a Melting Point of 70°C.



Diluent: Warm soapy water

50390-70	Mounting Wax 70	100 Grams
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► Mounting Wax 52

MWS052 is a tan colored wax, which is translucent on thin films. Softness makes it most useful with abrasive slurry cutting of materials. Best suited to non-porous surfaces such as glass or polished metal with a reasonably large area. Easily soluble in a variety of solvents. 113 Grams/1 Stick, 1" x 1" x 7.5" long (25 x 25 x 190 mm). Soft Hardness and a Melting Point of 52°C.



Diluent: Perchloroethylene

50390-52 Mounting Wax 52 1/pk

► Wax Stripper

WaxStrip™ is an environmentally safe powder compound prepared primarily for the removal of mounting waxes in semiconductor processing. WaxStrip™ is compatible for use on silicon, glass, iron, aluminum, zinc, brass, copper, magnesium and other materials. 1lb/bottle.



50392-01 Wax Stripper each

► M-Bond System

The M-Bond system includes M-Bond 43-B, M-bond 600 and M-Bond 610. These adhesives are high-performance epoxy resins, which are formulated especially for bonding strain gages and special-purpose sensors. When properly cured, these adhesives are useful in temperatures ranging from -452°F to +350°F (-269°C to +175°C) with M-Bond 43-B, and to +700°F (+370°C) for short periods with M-bond 600 and 610. In common with other organic materials, oxidation and sublimation effects at elevated temperatures limit life. M-Bond 43B is particularly recommended for transducer applications up to +250°F (+120°C) and M-Bond 610 for transducers up to +450°F (+230°C)

Shelf Life and Post Life: At room temperature, M-Bond 600 has a useful storage life of approximately three months, while M-Bond 43-B and M-Bond 610 will last about nine months.

Once opened and mixed, M-Bond 600 and 610 have room temperature pot lives of two weeks and six weeks, respectively. Since M-Bond 43B is supplied already mixed, its pot life is about the same as its shelf life when kept in a tightly closed container. These periods of adhesive usefulness can often be doubled by refrigeration at +30° to +40°F (0 to +5°C). Never open a refrigerated bottle until it has reached room temperature.

Curing Time:

M-Bond 43B is about 2 hours at +375°F (+190°C)

M-Bond 600 is about 3.5 hours at +350°F (170°C)

M-Bond 610 is about 3 hours at 375°F (190°C)

RT	50410-10	M-Bond 43B	(4x25 ml)	Kit
RT	50410-20	M-Bond 600	(4 x 10 ml A and 4 x 15 ml B)	Kit
RT	50410-30	M-Bond 610	(4 x 15 ml A and 4 x 10 ml B and Catalyst)	Kit

► Mikrostik™ Adhesive, Non-Conductive

Fast drying, ultrathin clear adhesive suitable for mounting small particles which can be submerged in other adhesives. It can be diluted with methyl ethyl ketone. Quick-drying. Comes in a bottle with an applicator brush. 14 ml.

RT **12646-01** Mikrostik™ Adhesive, Non-Conductive 14ml

► Loctite Adhesives

Loctite 409™ Super Bonder®

For a general-purpose gel adhesive, clear, gap fills 0.010"; surface insensitive Ethyl, tensile shear strength 3,200 psi, and temperature range -65°F to 180°F. Cure speed: fixture - 75 seconds, full - 24 hours.

Loctite 454™ Prism®

For use with porous surfaces, clear, gap fills 0.010", surface insensitive Ethyl, gel type, tensile shear strength 3200 psi, temperature range -65°F to 180°F. Cure speed: fixture - 15 seconds, full - 24 hours.

Loctite 4861™ Prism®

For use with flexible surfaces, clear, gap fill 0.008", surface flexible Alkyl, viscosity 4,000 cP, tensile shear strength 2465 psi, temperature range -65°F to 212°F. Cure speed: fixture - 25 seconds, full - 24 hours.

Loctite 349™ Impruv®

For bond glass/metal, appearance: clear/straw, cure type: UV, viscosity: 9,500cP, shore hardness: D70, temperature range: -65°F to 266°F

Loctite 4011™ Prism®

Designed for the assembly of difficult-to-bond materials, such as wood, paper, leather and fabric. Suitable for use in the assembly of disposable medical devices. The product provides rapid bonding of a wide range of materials, including metals, plastic and elastomers. Cure speed: 2 to 20 seconds depending on the material.

Chemical type: Ethyl cyanoacrylate, transparent, colorless to straw colored fluid. One part required no mixing. Low-viscosity (100 cP). Cure by humidity, and temperature range -65°F to 180°F

RT	72570-09	Loctite Super Bonder 409	3 g Tube
RT	72571-54	Loctite Prism 454 Adhesive	3 g Tube
RT	72572-61	Loctite Prism 4861 Adhesive	20 g
RT	72582-01	Loctite 349 Impruv Adhesive	50 ml
RT	72573-11	Loctite Prism 4011 Adhesive	20 g

Loctite 404 Quick Set Tissue Adhesive

This adhesive is perfect for those applications where a quick-curing adhesive is needed. Comes in an applicator-tipped bottle, 0.33 oz. (10ml).

RT **12687-01** Loctite 404 Quick Set Tissue Adhesive 10ml

Loctite™ 460 Adhesive

Our Loctite™ 460 is a quick curing low viscosity glue that can be used for mounting samples to any substrate (glass, metal and/or plastic). It is soluble in acetone. Comes in an applicator-tipped plastic bottle — 20 g.

RT **12646-08** Loctite™ 460 Adhesive each

Loctite® Fixmaster® Poxypak™, Fast Cure Epoxy

This fast cure, general purpose epoxy bonds virtually any material. It will also fill or seal cracks and rebuild worn surfaces. Comes in a 1 oz. syringe with a built-in plunger for easy dispensing without equipment. Working time is approximately 4 minutes. Includes nozzle and mixing stick. This unique adhesive may be made electrically conductive with the addition of any conductive powder (Silver, Carbon etc.)

RT **12646-09** Loctite® Fixmaster® Poxypak™, Fast Cure Epoxy each



► **Cargille Meltmounts**

- Instant thermal mountants that require "no-oven-time".
- 100% Usable; contains no solvents.
- Reversible, thermally, for particle retrieval or re-orientation
- Soluble in toluene for special techniques or clean-up.
- Fluid at 65°C, a temperature chosen because it makes permanent mount and protects the majority of specimens from thermal changes.
- PCB-Free.
- Direct replacement for old mountant mediums (Canada Balsam, Aroclor 5442, Naphrax...)

Cargille Meltmount™ (optical quality) is a series of mounting media which are specifically formulated for use in microscope slide mounting and in other optical coupling applications.

1. Meltmount™ 1.539

Has a refractive index ($n_D @25^\circ\text{C}$) of 1.539 and an Abbe V dispersion of 45. Its optically similar to Canada Balsam and therefore ideal for mounting many biological specimens but without the long drying time of Canada Balsam.

RT	17994-10	Meltmount 1.539	1 oz.
RT	17994-11	Meltmount 1.539 Quick-Stick™	each

2. Meltmount™ for Chrysotile Asbestos

It has dispersion characteristics making it appropriate for mounting chrysotile asbestos.

RT	17994-20	Meltmount for Chrysotile	1 oz.
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3. Meltmount™ 1.582

It has a refractive index ($n_D @25^\circ\text{C}$) of 1.582 and an Abbe V dispersion of 33. Its optical clarity makes it the preferred choice for minimum visible absorption.

RT	17994-30	Meltmount 1.582	1 oz.
RT	17994-31	Meltmount 1.582 Quick-Stick™	each

4. Meltmount™ 1.605

It has a refractive index ($n_D @25^\circ\text{C}$) of 1.605 and an Abbe V dispersion of 30, making it appropriate for mounting Asbestiform Tremolite, Anthophyllite, and Actinolite.

RT	17994-40	Meltmount 1.605	1 oz.
RT	17994-41	Meltmount 1.605 Quick-Stick™	each

5. Meltmount™ 1.662

It has a refractive index ($n_D @25^\circ\text{C}$) of 1.662 and an Abbe V dispersion of 26, optically similar to Aroclor 5442 but is PCB-free.

RT	17994-50	Meltmount 1.662	1 oz.
RT	17994-51	Meltmount 1.662 Quick-Stick™	each

6. Meltmount™ 1.680

It has a refractive index ($n_D @25^\circ\text{C}$) of 1.680 and an Abbe V dispersion of 25, making it appropriate for mounting Amosite and Crocidolite asbestos.

RT	17994-60	Meltmount 1.680	1 oz.
RT	17994-61	Meltmount 1.680 Quick-Stick™	each

7. Meltmount™ 1.704

It has a refractive index ($n_D @25^\circ\text{C}$) of 1.704 and an Abbe V dispersion of 24, similar to Naphrax.

RT	17994-70	Meltmount 1.704	1 oz.
RT	17994-71	Meltmount 1.704 Quick-Stick™	each



Melt Mount is also available in a Quick-Stick™ form which can be used to make permanent microscope slide mounts quickly. These Melt Mount sticks can be applied to a slide on a hotplate. As soon as the specimen and coverglass are positioned and the slide is cooled you have a permanent prepared slide that can be reversed by reheating, if you should wish to retrieve a particular particle. Each Quick-Stick™ weighs approximately ⅓ oz. (18g).

► **Replication Materials**

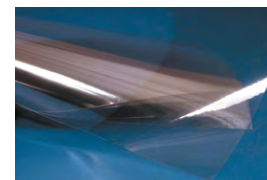
► **Cellulose Acetate Films**



This acetate film softens in acetone and can be used for duplicating purposes. Acetate film which is wet with acetone can then be applied to a surface which has been wet with acetone. It is easily removed away from the object when dry. Acetate films come in 35µm thicknesses.

50420-30	Acetate Film 35µm, 10x15cm Sheet	20/pk
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► **Triaphan Films**



An acetobutyrate film, 100µm thick, suitable for replicating rough surfaces. It is soluble in methylene chloride (plastisolve) or acetone.

50421-10	Triaphan, 100µm, 15x15cm Sheet	20/pk
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► **Collodion (Parlodion), 2% in Amyl Acetate**



Highly purified nitrocellulose (parlodion strip) in glass distilled amyl acetate. Useful for forming a negative replica to very fine detail. Two types are available: Our sterile formula which is filtered down to 0.45 micron and our non-sterile formula.

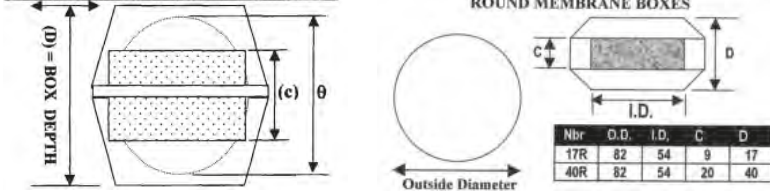
RT	12620-00	Non-Filter 2% Collodion in Amyl Acetate	100 ml
RT	12620-10	Sterile 2% Collodion in Amyl Acetate (Ultra-Pure)	100 ml
RT	12620-30	Non-filter 2% Collodion in Amyl Acetate	30 ml
RT	12620-34	Non-filter 2% Collodion in Amyl Acetate	4x30 ml
RT	12620-50	Sterile 2% Collodion in Amyl Acetate (Ultra-Pure)	30 ml
RT	12620-55	Sterile 2% Collodion in Amyl Acetate (Ultra-Pure)	4x30 ml

For a complete line of Adhesives and Mountants, See Chemicals section, pages 9-21 >>>>

► Membrane Boxes

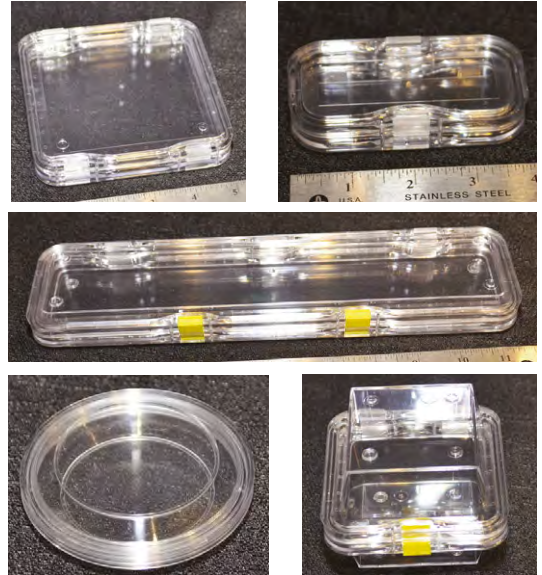
Our unique membrane storage boxes for the transfer, storage and shipping of many delicate items. Available in 5 different shapes and sizes these plastic containers, with a double elastic membrane on the top and bottom, offer security for all of your sensitive items. Once your item is placed in the box the elastic membrane conforms around the enclosed object and protects it from any movement.

ALL MEASUREMENTS ARE IN MILLIMETERS (mm)



Round Membrane Boxes

Cat. #	O.D, mm	I.D, mm	C	D	Qty
64304-20	82	54	20	40	each
64304-30	82	54	9	17	each



Cat. #	Overall Dimensions			Maximum Useful Area Dimensions			Capacity Weight	Qty	
	L, mm	W, mm	D, mm	L, mm	W, mm	D, mm			
Rectangular Boxes									
64304-27	250	200	212	162	18	—	—	each	
64304-28	250	200	204	154	40	—	—	each	
64304-29	100	50	67	20	20	—	—	each	
64304-36	100	50	16	67	17	9	8g	each	
64304-38	100	75	16	67	42	9	19g	each	
64304-39	100	75	25	62	37	18	31g	each	
64304-40	125	75	25	87	37	18	44gg	each	
64304-41	150	75	25	112	37	18	56g	each	
64304-42	150	125	25	112	87	18	132g	each	
64304-43	150	125	50	112	79	20	246g	each	
64304-44	250	200	100	188	138	60	1557g	each	
64304-45	250	200	200	157	—	—	3371g	each	
64304-46	300	150	16	267	117	9	211g	each	
64304-51	100	50	50	54	17	12	—	each	
<i>This box has no stackable feet.</i>									
64304-52	150	100	25	92	92	9	—	each	
64304-53	300	75	25	262	37	18	—	each	
64304-54	150	100	75	104	54	59	—	each	
64304-55	300	150	25	267	117	19	—	each	
64304-56	300	150	75	246	96	60	—	each	
64304-57	175	100	25	137	62	18	—	each	
64304-58	175	100	50	129	54	40	—	each	
64304-59	200	150	50	154	104	40	—	each	
Square Boxes									
64304-10	38	38	18	31	31	9	10g	12/pk	
64304-11	100	100	16	67	67	9	30g	each	
64304-12	100	100	25	62	62	18	52g	each	
64304-13	100	100	50	54	54	40	88g	each	
64304-14	125	125	16	92	92	9	57g	each	
64304-15	125	125	25	87	87	18	102g	each	
64304-16	125	125	50	79	79	40	187g	each	
64304-17	150	150	100	88	88	80	465g	each	
64304-18	125	125	75	92	92	60	—	each	
64304-19	150	150	25	112	112	18	—	each	
64304-21	150	150	75	104	104	60	—	each	
64304-22	100	100	75	—	—	—	—	each	
64304-23	175	175	25	137	137	18	—	each	
64304-24	175	175	50	129	129	40	—	each	
64304-25	200	200	25	162	162	18	—	each	
64304-26	200	200	50	154	154	40	—	each	
64304-50	150	150	50	104	104	40	324g	each	

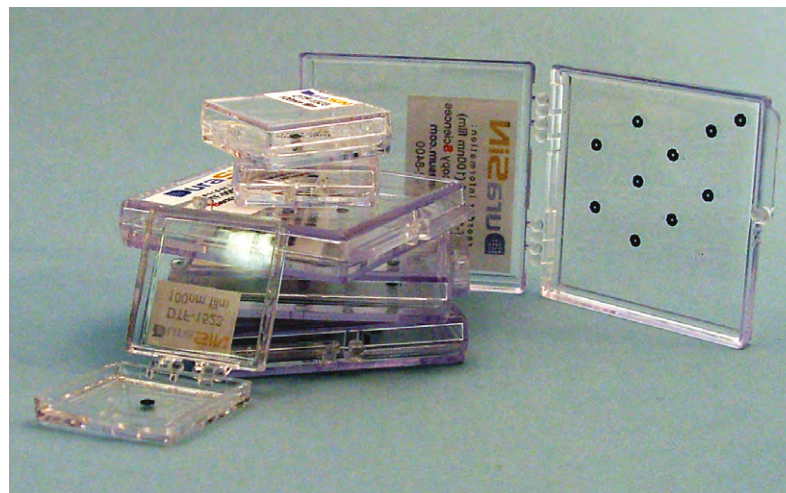
► **Gel-Pak® Storage/Carrier Box**

Patented gel technology – the innovative solutions for storage and carrying delicate materials

The traditional Gel-Box, Gel-Tray® and Gel-Slide Carriers are perfect for applications where devices are manually offloaded by tweezers or by hand.

- **Gel-Box (AD Series)** - Hinged plastic boxes coated with Gel in the bottom.
- **Gel-Tray® (BD Series)** - A removable 2" plastic tray coated with Gel and contained inside a hinged plastic box.
- **Gel-Slide (CD series)** - A removable 2" glass slide coated with Gel and contained inside a hinged plastic box.

(Gel-Pak® is a Division of Delphon Industries)



► **GEL-BOX (AD Carrier Boxes)**

Gel-Box AD Series Carriers owe their unique device-holding capabilities to a proprietary GEL coating applied directly to the bottom of a hinged box. Devices are held once contact is made with the GEL surface and will stay in place, even if the carrier is tilted or jarred. The carriers are designed for manual off-loading with tweezers or by hand. GEL-PAK AD series are ideal for handling devices where no direct contact with the top of the device is important.

The GEL-BOX Carriers may also be used for bare die handling, such as GaAs, PETs, laser diodes, and beam-lead devices where the die size is small (less than 1mm) and tweezers or other specialized techniques are used for off-handling.

FEATURES:

- No need for custom-molded containers for each device size.
- Ideal for handling subassemblies, hybrid models and packaged devices.
- Available in Transparent, Conductive and Anti-Static carriers in multiple sizes.
- Retention Level available: x0, x1, x2, x3, x4, x5, and x8 (the higher the number the more retention capability)

We offer standard retention level X4. Other retention levels are available with the order of 100 or more, and at least two weeks for delivery.

► **GEL-TRAY® (BD Series) And GEL-SLIDE (CD Series)**

Same as the Gel-Box, the Gel-Tray and Gel-Slide products are intended for manual applications in which the devices are loaded and unloaded using tweezers or by fingers. The Gel-Pak BD and CD series of pocketless trays are both configured as a 2" carrier stored in a protective plastic hinged box. The Gel coating is applied directly to the surface of the plastic tray (BD Series) or glass slide (CD Series).

These products offer the same functionality as the Gel-Box, however the plastic tray or glass slide can be easily removed from the box allowing for convenient handling when loading or unloading fixtures are being used.

The Gel-Slide (coated glass slides) is designed for higher temperature applications such as bonding and reflow where a plastic tray will not work. The CD slide has a temperature capability up to 220°C. The CD glass slides are also ideal for backside inspection due to their optical clarity.

Both the Gel-Tray and Gel-Slide products are available in the standard retention levels (X0, X4, X5, and X8) to accommodate variations in device size, weight, and surface roughness.

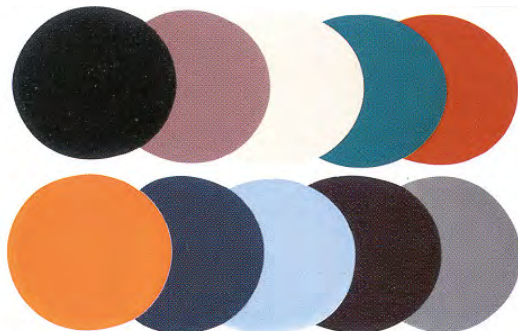
The protective 2" hinged boxes are available in transparent styrene (T), conductive black (C) and antistatic (AS) materials. The boxes, trays, and slides may be customized with a print pattern (grid) or company logo. Standard available Prints can be viewed at Gel-Tray/Gel-Slide Print options

Cat #	Description - Overall Box size	Qty
64900-x4	1"x1"x ¼" Transparent Hinged Box	50/pk
64901-x3	2" x 2" x 0.25" Antistatic Gel-Box	50/pk
64901-x4	2"x2"x¼" Conductive Hinged Box	50/pk
64902-x4	2"x2"x¼" Anti-Static Top & Conductive Hinged Box	50/pk
64903-x4	2"x2"x¼" Anti-Static Hinged Box	50/pk
64904-x4	2"x3"x¾" Conductive Hinged Box	50/pk
64905-x4	2"x3"x¾" Anti-Static & Conductive Hinged Box	50/pk
64906-x4	3.5"x4.5"x0.5" Conductive Hinged Box	50/pk
64908-X3	4.5" x 3.5" x 0.875" Conductive Base/Antistatic Lid Gel-Box	50/pk
64907-x4	3.5"x4.5"x7/8" Transparent Hinged Box	50/pk
64908-x4	3.5"x4.5"x7/8" Conductive Hinged Box	50/pk
64909-x4	2.5"x3.5"x0.5" Anti Static Top & Conductive Hinged Box	50/pk
64910-x3	6" x 4" x 0.5" Conductive Gel-Box	50/pk
64911-x3	6" x 4" x 0.5" Transparent Gel-Box	50/pk
64912-x3	7" x 5" x 1" Conductive Base/Antistatic Lid Gel-Box	50/pk
64913-x3	7" x 5" x 1" Conductive Gel-Box	50/pk
64914-x3	7.75" x 3.5" x 1" Conductive Gel-Box	50/pk
64915-x3	9.937" x 3.5" x 0.625" Transparent Gel-Box	50/pk

Cat #	Description	Qty
64900-10	2" x 2" Conductive BD Tray in Antistatic Hinged Box	50/pk
64900-11	2" x 2" Conductive BD Tray in Conductive Base/Antistatic Lid Hinged Box	50/pk
64900-12	2" x 2" Conductive BD Tray in Conductive Base/Transparent Lid Hinged Box	50/pk
64900-13	2" x 2" Conductive BD Tray in Conductive Hinged Box	50/pk
64900-14	2" x 2" Conductive BD Tray in Transparent Hinged Box	50/pk
64900-15	2" x 2" Conductive BD Tray in "High Clearance" Antistatic Hinged Box	50/pk
64900-16	2" x 2" Transparent BD Tray in Antistatic Hinged Box	50/pk
64900-17	2" x 2" Transparent BD Tray in Conductive Base/Antistatic Lid Hinged Box	50/pk
64900-18	2" x 2" Transparent BD Tray in Conductive Hinged Box	50/pk
64900-19	2" x 2" Transparent BD Tray in Transparent Hinged Box	50/pk
64900-20	2" x 2" Glass Slide in Transparent Hinged Box	50/pk
64900-21	2" x 2" Glass Slide in Conductive Hinged Box	50/pk
64900-22	2" x 2" Glass Slide in Antistatic Hinged Box	50/pk
64900-23	2" x 2" Glass Slide in MAG-40 Cassette	50/pk

► Polishing Cloths

We offer a wide range of polishing cloths which are ideally suited for the preparation of metallographic specimens and other materials needing an extremely fine finish. They are available in a Pressure Sensitive Adhesive (PSA) as well as Plain Backing (PB); with 2½" diameter hole on the center or No Hole (N/H).



► Billiard***

100% virgin wool sheared pile. Recommended for intermediate and final polishing steps.



Cat. #	Description	Pack
50300-10	Billiard, 10" x N/H, PB	5/pk
50300-08	Billiard, 8" x N/H, PSA	5/pk

► KemPad*

A non-woven textile cloth which is both oil and water resistant. Recommended for intermediate and final polishing with diamond abrasive compounds. Excellent flatness.



Cat. #	Description	Pack
50310-05	Kempad, 8" x N/H, PSA	5/pk
50310-15	Kempad, 8" x 2½", PSA	5/pk

► Glendur*

A fine stainless steel mesh on an aluminum foil polyethylene backing. Extremely durable material and, excellent removable rate when used with a diamond compound in the 45 to 60 micron range. Recommended for coarse and intermediate polishing.



Cat. #	Description	Pack
50332-05	Glendur, 8" x N/H, PSA	5/pk

► Nylon

A durable napless nylon weave. It provides excellent intermediate polishing on most materials



Cat. #	Description	Pack
50314-05	Nylon, 8" x N/H, PSA	5/pk
50314-15	Nylon, 8" x 2½", PSA	5/pk

* Available with PSA backing only

** Available with Plain backing only

*** Available with PSA and or Plain backing

► Glenco***

This flocked cloth is made by binding a rayon flock to a woven cotton backing; it is the most popular in our line. It is excellent for Final polishing when used in conjunction with diamond or alumina polishing compounds.



Cat. #	Description	Pack
50318-05	Glenco, 8" x N/H, PSA	5/pk
50318-15	Glenco, 8" x 2½", PSA	5/pk

► Spec-Cloth***

A long napped rayon flock with a plastic barrier. This is a finer version of our Glenco cloth especially designed for superior final polishing. For best results, use with our diamond polishing compound.



Cat. #	Description	Pack
50320-05	Spec-Cloth, 8" x N/H, PSA	5/pk
50320-15	Spec-Cloth, 8" x 2½", PSA	5/pk

► Silk**

100% pure woven silk for intermediate, final, or skid polishing on friable materials.



Cat. #	Description	Pack
50312-05	Silk, 10" x N/H, PB	5/pk

► Final B*

This cloth has been especially designed for long life. Made from a rayon flock on a cotton canvas backing. It is recommended for all final polishing.



Cat. #	Description	Pack
50334-05	Final B, 8" x N/H, PSA	5/pk
50334-15	Final B, 8" x 2½", PSA	5/pk

► Diamond Lapping Film

A selective diamond particle resin bonded to a uniform 3-mil polyester film backing.



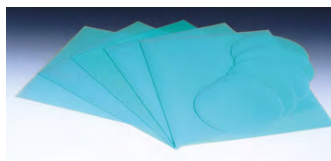
Excellent for polishing samples with differing hardness. Ideal for the preparation of cross sections for SEM/TEM analysis. Comes in 8" and 12" discs with a plain back (P/B) or pressure sensitive adhesive back (PSA).

Micron	Diamond Lapping Film				Pack
	8" x N/H P/B	8" x N/H PSA	12" x N/H P/B	12" x N/H PSA	
0.1	50350-01	50351-01	50354-01	50355-01	Each
0.25	50350-03	50351-03	50354-03	50355-03	Each
0.5	50350-05	50351-05	50354-05	50355-05	Each
1	50350-10	50351-10	50354-10	50355-10	Each
3	50350-15	50351-15	50354-15	50355-15	Each
6	50350-20	50351-20	50354-20	50355-20	Each
9	50350-25	50351-25	50354-25	50355-25	Each
15	50350-30	50351-30	50354-30	50355-30	Each
30	50350-35	50351-35	50354-35	50355-35	Each

➤ Final Finishing Film

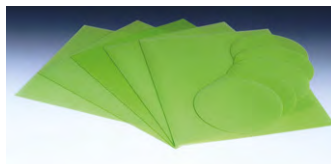
➤ True Blue™ Film

True Blue™ film is produced with a proprietary process combining a unique mixture of abrasive particle sizes and shapes that are bonded to a film backing which enable the film to produce finer surfaces than are commonly found in similarly graded micron films. True Blue™ film is typically used after the 1 micron diamond lapping film step and provides a flat, nearly scratch-free surface.



➤ Final Green™ Film

Final Green™ film is produced using a unique process, which is different from any other type of abrasive film. This process produces a film that is capable of removing even the finest scratches at the final stage of polishing. Final Green™ film is typically used after True Blue™ film and produces an ideal sample surface for analysis.



All films are 8" diameter, and available with either plain back (P/B) or pressure sensitive adhesive (PSA)

Final Finishing Film		
8" x P/B	8" x PSA	Qty
True Blue™ Film		
50336-PB	50336-PSA	each
Final Green™ Film		
50338-PB	50338-PSA	each

➤ Aluminum Oxide Abrasive Film Discs

Alumina is widely used in sample grinding and polishing. Our Aluminum Oxide Abrasive film with a PSA back or a plain back are ready to use in all sample polishing applications.



Micron/Color	8" Diameter Plain Back	8" Diameter PSA Back	Qty
0.05 - Pale Yellow	50357-05	50358-05	25/pk
0.3 - White	50357-03	50358-03	25/pk
1 - Purple	50357-1	50358-1	25/pk
3 - Mauve	50357-3	50358-3	25/pk
5 - Gray	50357-5	50358-5	25/pk
9 - Blue	50357-9	50358-9	25/pk
12 - Yellow Green	50357-12	50358-12	25/pk
20 - Tan	50357-20	50358-20	25/pk
30 - Green	50357-30	50358-30	25/pk

➤ Silicon Carbide Abrasive Film Discs

Micron	8" Diameter Plain Back	8" Diameter PSA Back	Qty
1	50257-1	50258-1	25/pk
3	50257-3	50258-3	25/pk
5	50257-5	50258-5	25/pk
9	50257-9	50258-9	25/pk
15	50257-15	50258-15	25/pk
30	50257-30	50258-30	25/pk
60	50257-60	50258-60	25/pk

➤ Polishing Materials

➤ Alumina Powder:

EMS's Alumina Powders are accurately controlled for all specs and particle size distribution, assuring you the best polishing results. The following micron sizes are available: 0.05, 0.3, and 1.0.



TYPICAL APPLICATIONS ARE:

- Precision Optics
- Silicon Wafers
- Acrylic lenses
- Metallographic Sections
- Ferrite Components
- Electro-Optical Crystals
- Gem Stones

Type DX Alumina Powder is specially treated to reduce the number of agglomerates (group of particles in each grade of manufactured alumina). The result is fast polishing and improved quality of the finished products.

Type N Alumina Powder is recommended when these improvements are not necessary.

Cat. #	Description	Size
50360-01	Type N, Alumina Powder, 0.05µm	1 lb
50360-05	Type N, Alumina Powder, 0.3µm	1 lb
50360-10	Type N, Alumina Powder, 1.0µm	1 lb
50361-01	Type DX, Alumina Powder, 0.05µm	1 lb
50361-05	Type DX, Alumina Powder, 0.3µm	1 lb
50361-10	Type DX, Alumina Powder, 1.0µm	1 lb

➤ Diamond Powder

Made from synthetic diamond.

Cat. #	Description	Qty
50375-01	Diamond Powder, 0.1µm	10 carats
50375-02	Diamond Powder, 0.25µm	10 carats
50375-05	Diamond Powder, 0.5µm	10 carats
50375-1	Diamond Powder, 1µm	10 carats
50375-3	Diamond Powder, 3µm	10 carats
50375-6	Diamond Powder, 6µm	10 carats
50375-9	Diamond Powder, 9µm	10 carats
50375-15	Diamond Powder, 15µm	10 carats
50375-30	Diamond Powder, 30µm	10 carats
50375-45	Diamond Powder, 45µm	10 carats

➤ Silicon Carbide Powder SiC

Dark gray 98% SiC. Hardness, Moh's scale 9.0; Knoop Scale 2500. Crystallography: hexagonal – alpha and beta phase.

Cat. #	Description	Qty
50260-8	Silicon Carbide Powder, 8µm	11b
50260-10	Silicon Carbide Powder, 10µm	11b
50260-14	Silicon Carbide Powder, 14µm	11b
50260-18	Silicon Carbide Powder, 18µm	11b
50260-23	Silicon Carbide Powder, 23µm	11b
50260-35	Silicon Carbide Powder, 35µm	11b
50260-42	Silicon Carbide Powder, 42µm	11b
50260-50	Silicon Carbide Powder, 50µm	11b

► Boron Carbide Powder (B₄C)

Boron Carbide is one of the hardest materials known, ranking third behind diamond and cubic boron nitride.

- Extreme hardness, (Knoop 100g: 2900-3580 kg/mm²)
- Good chemical resistance
- Good nuclear properties
- Low density (2.52 g/cm³)

Due to the hardness, boron carbide powder is used as an abrasive in polishing and lapping applications.



Cat. #	Description	Qty
50510-08	Boron Carbide Powder, 8µm	1 lb
50510-10	Boron Carbide Powder, 10µm	1 lb
50510-14	Boron Carbide Powder, 14µm	1 lb
50510-18	Boron Carbide Powder, 18µm	1 lb
50510-23	Boron Carbide Powder, 23µm	1 lb
50510-35	Boron Carbide Powder, 35µm	1 lb
50510-42	Boron Carbide Powder, 42µm	1 lb
50510-50	Boron Carbide Powder, 50µm	1 lb

► Aluminum Oxide Powder - Al₂O₃

These are abrasive powders that are prepared from aluminum oxide, offering excellent coarse and intermediate polishing, with fast results.

Cat. #	Description	Size
50362-03	Aluminum Oxide Powder, 3.0µm	1 lb
50362-05	Aluminum Oxide Powder, 5.0µm	1 lb
50362-09	Aluminum Oxide Powder, 9.0µm	1 lb
50362-15	Aluminum Oxide Powder, 15.0µm	1 lb

► Alumina Slurry

These suspensions are water-based and contain no additives, which may interfere with polishing or contaminate the sample. All slurries are very stable and alumina is evenly dispersed. Excellent for the finest finishes



Cat. #	Description	Size
50368-10	Alumina Slurry, 0.05µm	6 oz
50368-20	Alumina Slurry, 0.3µm	6 oz
50368-30	Alumina Slurry, 1.0µm	6 oz

► Colloidal Alumina

As an acidic dispersion, Colloidal Alumina is a chemical-mechanical action, that provides superior surfaces on germanium, silicon, gallium arsenide, zinc sulphide, fluorides, sapphire, ferrite's and silicon carbide. Low scatter finishes can be obtained on pure metals such as nickel, tungsten, copper, beryllium, steel and aluminum. Epoxy resin materials and plastics have also been successfully polished with this versatile colloidal dispersion.



Properties: pH: 3 - 3.5; solids: 20%; viscosity: thixotropic.

Application: Depending upon the application, Colloidal Alumina can be used full strength or diluted. Dilution up to 1:1 or higher with deionized water is recommended. Polyurethane and short nap cloths are recommended. However, most commonly used laps and pads are compatible with colloidal alumina.

50365-05	Colloidal Alumina	1 pt
50365-06	Colloidal Alumina	1 gal

► Colloidal Silica

This non-crystallizing Colloidal Silica is made to be user friendly. It eliminates the problems that are caused by drying or freezing that are associated with other colloidal silica products which are used for chemical/mechanical polishing.

Colloidal silica is a first choice silica dispersion for optimizing polishing results such as silicon, fused quartz, fused silica, lithium niobate, YAZ, GGG, alexandrite, sapphire and many others.

Properties: pH: 9.6 - 9.9; Particle size : 20-60 nm; Solids: 40%; Viscosity: 20-40 cp.

Application: Colloidal silica can be used full strength or diluted. Dilution to 1:1 or higher with deionized water is recommended. Polyurethane and short nap cloths can be used.

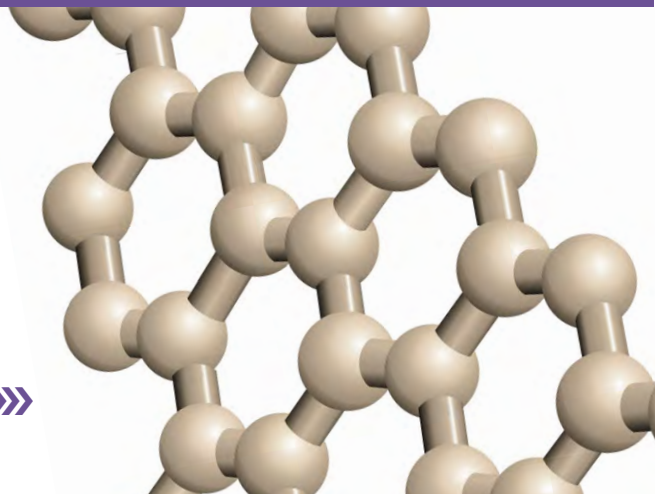
50366-05	Colloidal Silica	1 pt
50366-06	Colloidal Silica	1 gal

Check out our New and Exclusive Products...

Introducing Graphene, the ideal support film for electron microscopy.

Graphene is a single atomic layer of carbon atoms tightly packed in a two-dimensional honeycomb lattice. This novel material is atomically thin, chemically inert, consists of light atoms, and possesses a highly ordered structure. Graphene is electrically and thermally conductive, and is the strongest material ever measured.

For more information, see pages 140-141 >>>>



► Diamond Compounds

With great experience, technical knowledge, and modern facilities, we are able to manufacture superior diamond compounds and provide reliable service to every one.

Glennel® diamond products are specially formulated to help you prepare surfaces that are usually difficult to polish and require precision finish. To satisfy today's demand the diamond compounds must be complex with near perfect tolerances as is ours.



Types of Diamond:

We use three basic types of diamonds: natural monocrystalline, synthetic monocrystalline, and synthetic polycrystalline. Typical sizes range from 1/10µm to 60µm

MONOCRYSTALLINE diamonds provide a cost effective means for good stock removal and finish. The natural form has a blocky shape with a smooth surface. Synthetic diamonds have a slightly irregular shape with multiple edges. Precision grading and high quality standards guarantee consistent shape and size. This consistency and unique shape make this a popular diamond for many production-lapping applications.

POLYCRYSTALLINE diamonds are recommended for microscopy, materialography, and where surface finish is extremely critical. We use the highest quality polycrystalline diamonds, Dupont Mypolex(r). It has a uniform blocky shape with a rough surface. Precision micro fractures built into each particle provide uniform and consistent fracturing under stress.

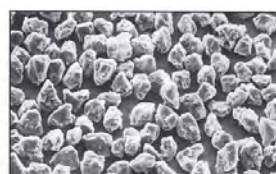
Ultra-Precision Grading and Shaping of all Micron Sizes



Virgin Natural – Monocrystalline



Synthetic – Monocrystalline



Synthetic – Polycrystalline

► 1. Diamond Paste

Glennel® UB Formulation is excellent for most applications where a diamond compound is desired. It is soluble in either water or oil and works with all common extenders. UB compound is recommended for polishing laboratory specimens and lapping of materials such as carbide, ceramic, sapphire, composites, ferrite, and silicon.

Glennel® UC Formulation is an oil soluble compound recommended for finishing wire dies, molds, cold heading dies, and general shop applications where diamond compounds are required. UC provides fast cutting action and superior finish. Meant to be used with our Formula C extender for maximum efficiency.

Glennel® OS Formulation is an oil soluble compound designed for lapping large areas of hard material. Use alone or with an extender it cleans up easily, provides aggressive stock removal and an outstanding finish.

Ordering: All Diamond Pastes are available as a standard in 5 g size dispensing tube UB or UC and UBS or UCS. 18 g sizes are available upon request.

Formulation Type:

Monocrystalline		Polycrystalline
UB.....	Water & Oil	.....UBS
UC.....	Oil	.....UCS
OS.....	Oil	.....OSS

UB - Water/Oil Soluble (Monocrystalline)

Cat. #	Paste Diamond Compound	Size
50370-10	0.1µm UB	5 g
50370-20	0.25µm UB	5 g
50370-30	0.5µm UB	5 g
50370-40	1.0µm UB	5 g
50370-50	3.0µm UB	5 g
50370-60	6.0µm UB	5 g
50370-70	9.0µm UB	5 g
50370-80	15.0µm UB	5 g

UC- Oil Soluble (Monocrystalline)

50371-10	0.1µm UC	5 g
50371-20	0.25µm UC	5 g
50371-30	0.5µm UC	5 g
50371-40	1.0µm UC	5 g
50371-50	3.0µm UC	5 g
50371-60	6.0µm UC	5 g
50371-70	9.0µm UC	5 g
50371-80	15.0µm UC	5 g

UBS - Water/Oil Soluble (Polycrystalline)

50370-11	0.1µm UBS	5 g
50370-21	0.25µm UBS	5 g
50370-31	0.5µm UBS	5 g
50370-41	1.0µm UBS	5 g
50370-51	3.0µm UBS	5 g
50370-61	6.0µm UBS	5 g
50370-71	9.0µm UBS	5 g
50370-81	15.0µm UBS	5 g
50370-91	30.0µm UBS	5 g

UCS- Oil Soluble (Polycrystalline)

50371-11	Please see 50370
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Recommended for Use	Micron Size	Micron Size Range	Approx. Mesh Equivalent
Finest finishes for work of the highest precision. Used for optical, metallographic, ferrite, laser rod, and semiconductor finishing.	0.1	0 - 0.2	240,000
	0.25	0 - 0.5	100,000
	0.5	0 - 1	60,000
	1	0 - 2	14,000
	2	1 - 3	11,000
Final finish for most applications: molds, dies, general flat lapping. Preparatory lapping. Intermediate finish to achieve dimensions.	3	2 - 4	8,000
	6	4 - 8	3,000
	9	8 - 12	1,800
	15	12 - 22	1,200
	30	22 - 36	600
Fast stock removal and roughing on hardest materials	45	36 - 54	325
	60	54 - 80	230/235
	Mesh	-	170/230

► Diamond Compounds (continued)

2. Diamond Suspension

Glennel® Diamond Suspension assures a consistent, uniform viscosity and dispersion of diamond without any shaking or stirring. The proprietary formulation guarantees that the particles will stay suspended indefinitely. It is ideal for automatic polishers and applications that require changing operators.



A versatile, water based suspension designed for most production applications. This special formulation provides:

- Excellent lubrication
- Uniform fast lapping action
- Maximum cutting action
- Compatible with all common extenders.

Ordering: All Diamond Suspensions are packed in 400g bottles and have Medium Concentration prepared with Premium Polycrystalline Diamond in either Propylene Glycol (Oil based) or Water based formulas

Diamond Particle Size	Oil Based Cat. #	Water Based Cat. #
0.01µm (240,000 mesh)	50372-10	50372-11
0.25µm (100,000 mesh)	50372-20	50372-21
0.5µm (60,000 mesh)	50372-30	50372-31
1.0µm (14,000 mesh)	50372-40	50372-41
3.0µm (8,000 mesh)	50372-60	50372-61
6.0µm (3,000 mesh)	50372-70	50372-71
9.0µm (100,000 mesh)	50372-80	50372-81
15.0µm (1,200 mesh)	50372-90	50372-91

3. Diamond Spray

Glennel® Diamond Aerosol Spray provides unsurpassed cutting action and finish. The inverted nozzle provides safe and easy access for difficult to reach areas while ensuring that every diamond particle is used. Special formulations allow the carrier to evaporate quickly, leaving a very uniform dispersion of diamond. This is especially useful when an operation requires a dry polishing cloth.



Ordering: Our Diamond Spray is available in 5 oz cans.

Diamond Particle Size	Polycrystalline Cat. #
0.25µm (100,000 mesh)	50374-06
1.0µm (14,000 mesh)	50374-11
3.0µm (8,000 mesh)	50374-16
6.0µm (3,000 mesh)	50374-21
9.0µm (1,800 mesh)	50374-26
15.0µm (1,200 mesh)	50374-31

4. Lapping Solutions

- **Glenoil Lube** - Lapping vehicle is the ideal lap oil for all Glennel® UB Compounds and Diamond Sprays. It assures continued separation of diamond particles and constant removal of lap debris.
- **Formula C** is made especially for oil soluble compounds, such as Glennel® UC and US listed above. This penetrating formula is specially designed to enhance cutting action and leave a superior finish

- **Formula B** is a universal lapping vehicle, compatible with both water and oil soluble compounds. It is ideal in an environment where materials change constantly. This very versatile formulation allows you to change materials and compounds and still provides excellent lubricity and cutting action.

50376-01	Glenoil Lube	16 oz
50376-05	Formula C Lube	16 oz
50376-10	Formula B Lube	16 oz

► Water Soluble Coolant

Use with a dilution 25:1 with water to cool saw blade or belt during cutting.

50378-01	Water Soluble Coolant	1 qt
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► SiC Dressing Stick

Made from silicon carbide. Use for cutting blade dressing.

50379-01	SiC Dressing Stick	1 stick
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► Premium Pregrinding Wet or Dry Abrasive Papers (Discs)

We offer the finest wet or dry abrasive discs for sample preparation with the following features:



- **Premium Resin Bonding System** for longer wear rates as well as for wet or dry operation.
- **Special adhesive on PSA*** backed discs that eliminates the need to transfer to plates.
- **Uniform mineral size.**
- **Pull tabs on all PSA backed discs** for easy use.
- **Large labels for easy product identification.**

* PSA: Pressure Sensitive Adhesive

Available in 9 different grit sizes, ranging from coarse to fine, on plain back or water resistant pressure sensitive adhesive back.

Available in 8" diameter discs as a standard, and 12" discs available upon request.

8" (203mm) Silicon Carbide Discs (SCD), Wet or Dry Plain Back		
50250-01	8" SCD, Plain Back, 60 Grit	25/Bx
50250-03	8" SCD, Plain Back, 120 Grit	25/bx
50250-04	8" SCD, Plain Back, 180 Grit	25/bx
50250-05	8" SCD, Plain Back, 240 Grit	25/bx
50250-06	8" SCD, Plain Back, 320 Grit	25/bx
50250-07	8" SCD, Plain Back, 400 Grit	25/bx
50250-08	8" SCD, Plain Back, 600 Grit	25/bx
50250-09	8" SCD, Plain Back, 800 Grit	25/bx
50250-10	8" SCD, Plain Back, 1200 Grit	25/bx

8" (203mm) Silicon Carbide Discs(SCD), Wet or Dry PSA Back		
50255-01	8" SCD, PSA Back, 60 Grit	25/bx
50255-03	8" SCD, PSA Back, 120 Grit	25/bx
50255-04	8" SCD, PSA Back, 180 Grit	25/bx
50255-05	8" SCD, PSA Back, 240 Grit	25/bx
50255-06	8" SCD, PSA Back, 320 Grit	25/bx
50255-07	8" SCD, PSA Back, 400 Grit	25/bx
50255-08	8" SCD, PSA Back, 600 Grit	25/bx
50255-09	8" SCD, PSA Back, 800 Grit	25/bx
50255-10	8" SCD, PSA Back, 1200 Grit	25/bx

► Diamond Discs

Dialok (Diamond Discs consists of a flat, stainless steel backing with sharp, blocky diamond particles electroformed onto the disc. The special hard nickel alloy that is used in Dialok is bonded rigidly and it locks the diamond particles in the disc thus providing fast cutting of all hard materials. The sharp particles cut cleanly with no edge rounding. The discs are supplied with pressure sensitive adhesive backing (PSA).

8" (203mm) (PSA) xN/H; Full Coat

50345-06	6 micron	each	50345-30	30 micron	each
50345-09	9 micron	each	50345-45	45 micron (280 mesh)	each
50345-15	15 micron	each	50345-75	75 micron (220 mesh)	each



► Sectioning:

► Premium Abrasive Cut-off Wheels for Sectioning

Aluminum Oxide and Silicon Carbide Abrasive Cut-Off Wheels are offered for long life, and are affordably priced for various sectioning requirements. All wheels are 9" (228.6mm) diameter ,0.062"(1.6mm) thick; 1¼" (31mm) arbor.

9" Diameter Cut-off Wheel

Cat. #	Description/ Application	Abrasive	Packed
50209-05	Hard Steel Rc 60+	Al ₂ O ₃	5/bx
50209-10	Medium Steel Rc 45-60	Al ₂ O ₃	5/bx
50209-15	Soft Steel Rc 30-45	Al ₂ O ₃	5/bx
50209-20	Hard Non-Ferrous, Titanium	SiC	5/bx
50209-25	Med Non-Ferrous, Titanium	SiC	5/bx
50209-30	Soft Non-Ferrous, Titanium	SiC	5/bx

For General Purpose, 5" Diameter Cut-Off Wheel

(Silicon/Carbide) is the most common disc.

50205-10	5" General Purpose Cut-Off Wheel	10/pk
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► Precision Diamond Wafering Blades

(Precision Diamond Cut-Off Wheels)

These bonded blades are constructed of an inner metal core and an outer rim, this rim is bonded with diamond particles. These blades come in high and low concentrations of diamond particles, to handle various sectioning requirements:

- High Concentration (H/C) for general laboratory use, either low or high saw's speed.
- Low concentration (L/C) for sectioning hard and brittle materials, such as ceramics, silicon, glass, minerals.



Cat. #	Diameter	Thickness	Diamond Size	Diamond Concentration	Packed
50265-FH3	3"	0.006"	Fine	High	each
50265-MH3	3"	0.006"	Medium	High	each
50265-ML3	3"	0.006"	Medium	Low	each
50266-MH3	3"	0.010"	Medium	High	each
50265-FH4	4"	0.012"	Fine	High	each
50265-MH4	4"	0.012"	Medium	High	each
50265-CH4	4"	0.012"	Coarse	High	each
50265-CL4	4"	0.012"	Coarse	Low	each
50266-FH4	4"	0.015"	Fine	High	each
50266-MH4	4"	0.015"	Medium	High	each
50266-CH4	4"	0.015"	Coarse	High	each

Cat. #	Diameter	Thickness	Diamond Size	Diamond Concentration	Packed
50267-FH4	4"	0.020"	Fine	High	each
50267-MH4	4"	0.020"	Medium	High	each
50267-CH4	4"	0.020"	Coarse	High	each
50265-MH5	5"	0.015"	Medium	High	each
50265-CH5	5"	0.015"	Coarse	High	each
50265-CL5	5"	0.015"	Coarse	Low	each
50265-CH6	6"	0.020"	Coarse	High	each
50265-CL6	6"	0.020"	Coarse	Low	each
50265-MH7	7"	0.020"	Medium	High	each
50265-CH7	7"	0.020"	Coarse	High	each
50266-CH7	7"	0.029"	Coarse	High	each
50266-CL7	7"	0.029"	Coarse	Low	each

► Diamond Wafering Blade

Cat. #	Diameter	Thickness	Packed
50265-04	4"	.14" W, .20"D	each
50265-05	5"	.14" W, .20"D	each
50265-06	6"	.14" W, .20"D	each
50265-07	7"	.25" W, .276"D	each
50266-04	4"	.20" W, .20"D	each
50266-05	5"	.20" W, .20"D	each
50266-06	6"	.20" W, .276"D	each
50266-07	7"	.32" W, .276"D	each
50267-06	6"	.32" W, .276"D	each

► Water Soluble Coolant

Use with a dilution 25:1 with water to cool saw blade or belt during cutting.

50378-01	Water Soluble Coolant	1 qt
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► SiC Dressing Stick

Made from silicon carbide. Use for cutting blade dressing.

50379-01	SiC Dressing Stick	1 stick
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► Tools

► Mini-Tools; Micro-Tools

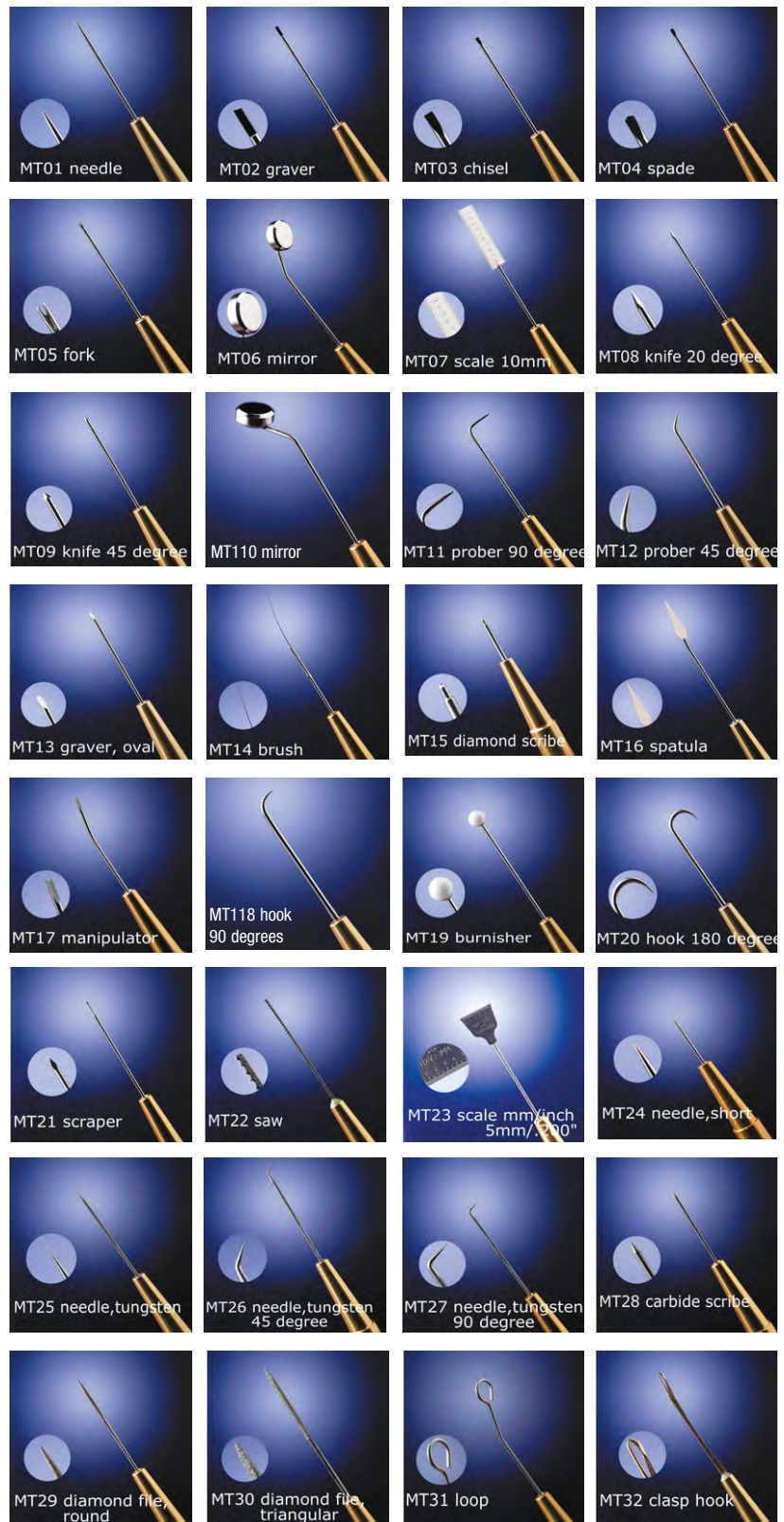
These tools are designed for anyone who is engaged in microscope work, miniature applications as well as specimen manipulation. Micro-Tools are the smallest known precision tools available for the laboratory and micro electronics industry. Micro-Tools are available in 32 different tip configurations with interchangeable handles. Micro-Tool consists of a threaded handle (MT1), and an interchangeable threaded base with tool tip. Tip material is hardened tool steel unless otherwise noted.

Ordering: Please specify Tip Size when ordering.

Cat.#	Description	Tip Availability			
		.025mm (.001")	.120mm (.005")	.25mm (.010")	.50mm (.020")
62091-01	Micro Needle	Yes	Yes	Yes	Yes
62091-02	Micro Graver	-	-	Yes	Yes
62091-03	Micro Chisel	Yes	Yes	Yes	Yes
62091-04	Micro Spade	Yes	Yes	Yes	Yes
62091-05	Micro Fork	-	-	Yes	Yes
62091-06	Micro Mirror	-	-	-	-
62091-07	Micro Scale	-	-	-	Yes
62091-08	Micro Knife 20°	Yes	Yes	Yes	Yes
62091-09	Micro Knife 45°	Yes	Yes	Yes	Yes
62091-10	Micro Mirror	-	-	-	-
62091-11	Micro Probe 90°	-	-	Yes	Yes
62091-12	Micro Probe 45°	-	-	Yes	Yes
62091-13	Micro Graver	Yes	Yes	Yes	Yes
62091-14	Micro Brush	-	-	-	-
62091-15	Micro Diamond	-	-	Yes	Yes
62091-16	Micro Spatula	-	-	-	Yes
62091-17	Micro Manipulator	-	-	-	Yes
62091-18	Micro Hook 90°	-	-	Yes	Yes
62091-19	Micro Burnisher	-	-	-	-
62091-20	Micro Hook 180°	-	-	-	Yes
62091-21	Micro Scraper	Yes	Yes	Yes	Yes
62091-22	Micro Saw	-	-	-	Yes
62091-23	Micro Scale	-	-	-	Yes
62091-24	Micro Needle	Yes	Yes	Yes	Yes
62091-25	Ultra Micro Needle	-	Yes	Yes	Yes
62091-26	Ultra Micro Needle	-	Yes	Yes	Yes
62091-27	Ultra Micro Needle	-	Yes	Yes	Yes
62091-28	Micro Carbide Scribe	Yes	Yes	Yes	Yes
62091-29	Micro Diamond File (round)	-	-	Yes	Yes
62091-30	Micro Diamond File (triangle)	-	-	-	Yes
62091-31	Micro Loop	-	-	-	Yes
62091-32	Micro Hook	-	-	-	Yes



62090-00 Micro-Tool Handle MT1 each



For more Micro-Tools, See Tweezers Section pages 837-845 >>>>

► Tools:

► Standard Micro-Tool Set - Assorted Sets

► A. Special Lab Set 6X

A special Minitool Laboratory set 6X contains all 32 standard micro-tools (0.5mm (0.020") nominal diameter) as well as other sizes (0.25mm or 0.12mm nominal diameters), 6 interchangeable MT-1 handles and one tool sharpening stone. Each set comes with a hand-milled finished case made from solid walnut. For safety and convenience, micro-tools are placed into individual PTFE bushings in a pivoted tool rack, which automatically swings into position when the lid is opened and retracts when closed. Six tool handles are rested in milled cavities.

62092-05 Micro-Tool Lab Set 6X, 0.5mm set

Select your own Micro-Tool Set

All standard micro-tools (0.50mm nominal diameter) as well as other sizes, 0.25mm or 0.12mm, can be selectively ordered to make up a set of your choice. Simply select the tools you desire, add the alderwood case (if the number of tools are equal or less than 8 tools) or solid walnut case (if the number of tools are more than 8 and up to 32).

If you chose the 0.25mm diameter, tools will be shipped in a special single tool container along with a storage case and handle.

► B. Standard Micro-Tool Sets (Tool size 0.5mm diameter)

Micro-Needle Probe Set

This set contains :

Tool #1	Micro-needle, long	Tool #11	Micro-needle, 90 degree
Tool #12	Micro-needle, 45 degree	Tool #18	Micro-hook, 90 degree
Tool #20	Micro-hook, 180 degree	Tool #24	Micro-needle, short
Tool #25	Ultra micro-needle, straight	Tool #15	Micro-diamond-scriber
MT-1	Micro-tool handle	MT-case	Micro-tool storage case

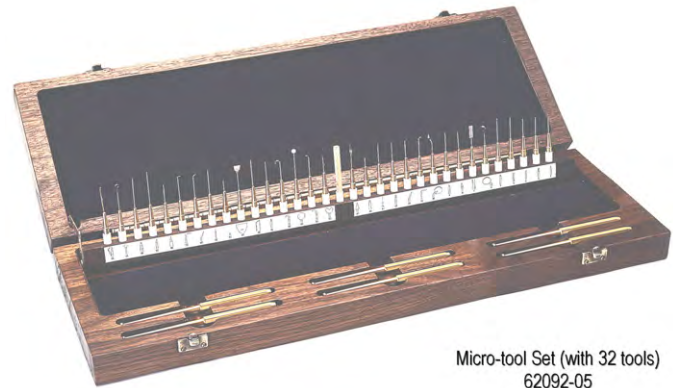
62093-01 Micro-Needle Probe Set set

Microscopist's Set

This set contains:

Tool #1	Micro-needle, long	Tool #3	Micro-chisel
Tool #8	Micro-knife, 20 degree	Tool #15	Micro-diamond-scriber
Tool #16	Micro-spatula, flexible	Tool #18	Micro-hook, 90 degree
Tool #23	Micro-scale, 2-sided: metric & inch	Tool #25	Ultra-micro-needle, straight
MT-1	Micro-tool handle	MT-case	Micro-tool storage case

62093-03 Microscopist's Tool Set set



Micro-tool Set (with 32 tools)
62092-05

Micro-Cutting Tool Set

This set contains:

Tool #2	Micro-graver, 3 sided	Tool #3	Micro-chisel
Tool #4	Micro-spade	Tool #8	Micro-knife, 20 degree
Tool #9	Micro Knife	Tool #13	Micro-graver, oval
Tool #21	Micro-scraper, triangular	Tool #28	Micro-scriber, carbide
MT-1	Micro-tool Handle	MT-case	Micro-tool storage case

62093-02 Micro-Cutting Tool Set set

Placement & Manipulating Set

This set contains:

Tool #5	Micro-fork	Tool #7	Micro-scale, 10mm
Tool #12	Micro-prober, 45-degree	Tool #14	Micro-brush
Tool #16	Micro-spatula	Tool #17	Micro-manipulator
Tool #18	Micro-hook, 90-degree	Tool #26	Ultra-micro-needle, 30 degree bent
MT-1	Micro-tool handle		
MT-case	Micro-tool storage case		

62093-04 Placement & Manipulating Tool Set set

► Hardwood Tool Case Only

A solid walnut hand-milled finished case. Designed to store 32 tools and 6 handles.

62092-CS Hardwood 32-Tool Case only each

► Alderwood Tool Case Only

Designed to hold 8 or less micro-tools and one MT handle.

62093-CS Alderwood 8 -Tool Case only each



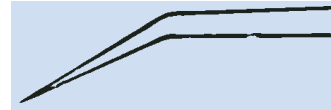
► Tools:

► Stainless Steel Micro Tools

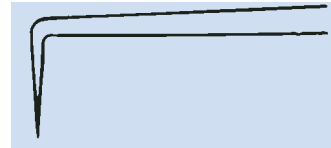
All tools are forged from the finest quality stainless steel and are precision hand ground, lapped, and polished. These tools are well suited for most applications in the field of microscopic science which demands the ultimate in precision miniature tools. Each tool may be ordered separately or in a set consisting of all 8 tools with mounted tips, one MT handle and one alderwood storage case.



62096-01



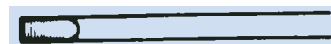
62096-02



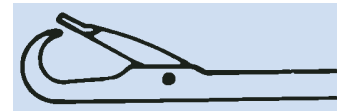
62096-03



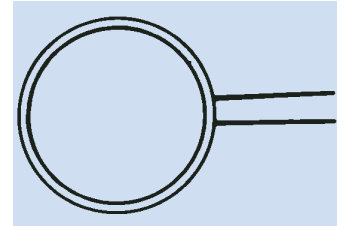
62096-04



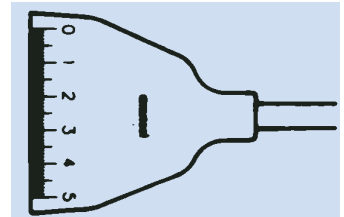
62096-05



62096-06



62096-07



62096-08

62096-00	Complete Tool Set (8 Tools, Handle, Case) Case Tools are 0.02" (0.5mm)	set
62096-01	Micro Needle, straight Tapered from .5mm to a sharp tip	each
62096-02	Micro-Needle, bent 45 degree Bent section is 0.5mm long, sharp tip	each
62096-03	Micro-Needle, bent 90 degree Bent section is 0.5mm long, sharp tip	each
62096-04	Micro Knife, 20 degree Slanted design, 1.3mm cutting edge	each
62096-05	Micro-Chisel 0.5mm cutting width, sharp edge	each
62096-06	Micro-Hook. Guarded type, anti-snag guard, 0.3mm. ID, 1mm OD including clasp	each
62096-07	Micro Mirror. Polished stainless steel, 4.7mm diameter, 0.5mm stainless steel handle	each
62096-08	Micro-Ruler. Precision etched stainless steel with 0.5mm handle. Available in Metric or English	each

► Carbide Micro Cutting Tools

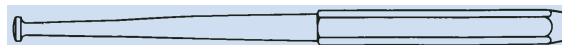
These unique micro cutting tools are made using the latest grinding and polishing technology producing the highest quality tool on the market today. Tools are available in solid carbide with the following tip sizes: 0.5mm (.020"), 0.25mm (0.010") and 0.12mm (.005") diameter. Tool Handles are inter-changeable in tool handle MT1. Each of the tool tips and handle can be ordered separately or in sets. Standard sets come with hardwood instrument cases and include the eight tool tips listed and one handle MT1.

Ordering:

Description	TIP SIZES				Qty.
	0.12mm	0.25mm	0.5mm	1mm	
Micro-Needle	62094-01-12	62094-01-25	62094-01-50	62094-01-100	each
Micro-Graver, 3-sided	62094-02-12	62094-02-25	62094-02-50	62094-02-100	each
Micro-Chisel	62094-03-12	62094-03-25	62094-03-50	62094-03-100	each
Micro-Spade	62094-04-12	62094-04-25	62094-04-50	62094-04-100	each
Micro-Knife 20°	62094-08-12	62094-08-25	62094-08-50	62094-08-100	each
Micro-Knife 45°	62094-09-12	62094-09-25	62094-09-50	62094-09-100	each
Micro-Graver Oval	62094-13-12	62094-13-25	62094-13-50	62094-13-100	each
Micro-Scraper	62094-21-12	62094-21-25	62094-21-50	62094-21-100	each

► Tool Handle Mt-79

Stainless Steel Micro-Tool Handle, Made from stainless steel, 120mm long, for use with above tools.



62096-HD Instrument Handle, MT- 79 each

TOOL #1 MICRO-NEEDLE	
TOOL #2 MICRO-GRAVER 3-SIDED	
TOOL #3 MICRO-CHISEL	
TOOL #4 MICRO-SPADE	
TOOL #8 MICRO-KNIFE 20°	
TOOL #9 MICRO-KNIFE 45°	
TOOL #13 MICRO-GRAVER, OVAL	
TOOL #21 MICRO-SCRAPER	

► Tools:

► Assorted Carbide Tool Sets

Each set comes with a MT-1 Handle, instrument case, and 8 tips listed above.

62095-12	Carbide Micro-Tool Set 0.12mm	set
62095-25	Carbide Micro-Tool Set 0.25mm	set
62095-50	Carbide Micro-Tool Set 0.5mm	set

The following tip sizes .025mm (.001") and 1.0mm (.040") are available in a set only.

62095-02	Carbide Micro-Tool Set .025mm	set
62095-10	Carbide Micro-Tool Set 1.0mm	set



Note: The Carbide tool size 0.025mm is very fragile. The set contains only 7 tools (no tool #2) and these tools need to be stored only in the individual protection tubes – no storage box

► Needle Probe Set

Set consists of one lightweight precision handle and four interchangeable tools. Can be used for manipulating micro samples, scribing, spring assembly, and probing. The handle is finely balanced, non-rolling gold anodized with split collet and a knurled lock nut. The length is 120mm (4.7"). Precision forged and ground tools are hardened and nickel plated tool steel with sharp tips.



62130-00	Needle Probe Set	set
62130-01	Replacement Probe #1	each
62130-02	Replacement Probe #2	each
62130-03	Replacement Probe #3	each
62130-04	Replacement Probe #4	each
62130-HD	Probe Handle	each

► Miniature Measuring Scales

These unit measuring scales may be used directly under a microscope or magnifier for quick measuring of small specimens, parts, grooves, slots, line widths, holes, chambers, etc. Precision fabricated from stainless steel, the scales are welded to bendable stainless steel shafts and mounted in color coded, non-rolling handles. Each scale is individually packed in a plastic tube. Overall length of the scale is 83mm (3¼"), including handle.



1. Scale #1: Calibrated to 0.1mm, 5mm total measurement		
62135-01	Mini Scale #1	each
2. Scale #2: Calibrated to 0.005", 0.2 inch total measurement		
62135-02	Mini Scale #2	each
3. Scale #3: Calibrated to 0.1mm, 10mm total measurement		
62135-03	Mini Scale #3	each

► Mini -Tool Set

► 1. Mini Tool Set A

5 piece set includes scriber, chisel, knife, triangular scraper and oval graver - each razor sharp. Hexagonal anodized aluminum handles, 140mm (5.5") long. Hardened tool steel tips, 1.5mm (1/16") diameter, are easily sharpened or pointed. Comes with a protective plastic case.



62097-10	Mini Tool Set A	set
62097-11	Replacement Scriber	3/pk
62097-12	Replacement Chisel	3/pk
62097-13	Replacement Knife	3/pk
62097-14	Replacement Triangular Scraper	3/pk
62097-15	Replacement Oval Graver	3/pk

► 2. Mini Tool Set B

Contains eight tool tips with integrated, color-coded handles which are light-weight, non rolling and well balanced. Overall tool length is approximately 127mm (5"). Tip size is 0.8mm (.030"). Tip material is hardened tool steel, nickel plated.

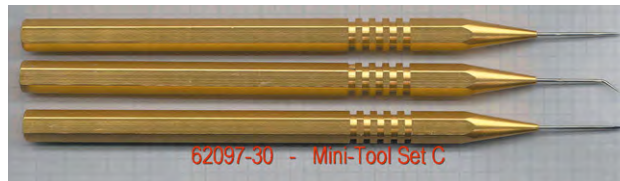


Set contains: Straight Micro-Prober, 30° Micro-Prober, 90° Micro-Prober, Micro-Chisel, Micro-Knife, Micro-Graver, Micro-Diamond Scriber and, Micro-Measuring Scale.

62097-20	Mini Tool Set B	set
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► 3. Mini Tool Set C

Consists of three different tools: Straight Scriber with sharp tip, Sharp Triangular Scraper, Bent Prober with sharp tip - all with integrated hexagonal aluminum handles. Tip material is hardened steel, nickel plated. Tip size is 0.8mm by 25mm long. Overall length of tools is approximately 140mm (5.5")



62097-30	Mini Tool Set C	set
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For Our Entire Selection of Micro Tweezers, Forceps and Tools, See Tweezer section, pages 813-819 >>>>

► Diamond Tip Scribers/Scribers

Sturdy scribers are in wide use throughout the laboratory. It leaves a permanent marking on virtually any surface, including metal, glass, or plastic. Each Scriber features a hexagonal aluminum pencil shaped body, mill finish, natural diamond tip and protective cap. Different styles are available to fit all of your needs.



► A. Straight Head:

Overall length 6", Shank Length 1/8", Handle 1/4" x 5 1/2", 60° tip finish.

70030	Straight Tip Scriber	each
70031	Straight Tip Scriber	6/lot



► B. Angled Head:

Overall Length 6 1/2", Shank 1/6" Dia. x 1/4" Long, Handle 1/8" x 6" Long, 75° tip finish.

70032	Angle Tip Scriber	each
70033	Angle Tip Scriber	6/lot



► C. Retractable Scriber:

This is a high quality chrome pen that features appearance as well as utility. The diamond is mounted in a stainless steel tip and refills are available. The tip is finished at a 60° angle.

70036	Retractable Scriber	each
70037	Retractable Scriber Refill	each

► High Precision Fine Diamond Scriber

This diamond scriber is the ultimate scribing instrument offering the most precision for the most delicate applications. It is available in straight or bent configurations.

APPLICATIONS INCLUDE:

- Fine scribing under the microscope - for silicon wafers and glass coverslips
- Precision scribing and repairing - for thin film circuits and microcircuits, etc.



These diamond mountings are 0.8mm diameter with a reduced shank size of 0.5mm or 0.25mm diameter, which holds the diamond stylus. The natural diamond has a 60° included angle and a 0.12mm tip radius. The integrated 6.35mm anodized hexagonal (non-rolling) aluminum handle has a positive finger grip in the form of grooves for easy control and non-slippage. Each diamond scriber is packaged in a protective plastic tube.

Cat. #	Configuration and Shank Size
62107-ST	Straight Mounting, 0.5mm diameter
62107-BT	Bent Mounting, 0.5mm diameter
62108-ST	Straight Mounting, 0.25mm diameter
62108-BT	Bent Mounting, 0.25mm diameter

► EMS Engraving Tool

Permanently be able to mark all of your important tools and samples. The Engraver comes with a Battery Pack and is operated on two "AA" Batteries

Our EMS Engraver Engraves Test Tubes, Bottles, Racks, Keys etc as well as anything made from glass, metal, stone as well as bone. Engravings are permanent and will not disappear in the presence of chemicals and solvents. The Engraver is 7" in Height (17.8cm)

We offer a Stand for the EMS Engraver that is made from polypropylene and it measures (3 1/2" x 3 3/4").

Cat. #	Description	Qty.
72096-01	EMS Engraver	Kit
72096-02	EMS Engraver Tool Stand	Kit



► The Glascribe® Pen

The Glascribe® Pen, with retractable tungsten carbide tip, lets you inscribe on glass, ceramics, and plastic. The pen has a pocket clip, so it is always handy when needed.

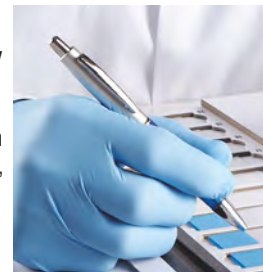


Cat. #	Description	Qty.
72151	Glascribe® Pen	each

► Tungsten Point Lab Pen

Permanently mark Glass Slides and all glass labware

These unique EMS pens have a sharp tungsten carbide tip which is able to etch glass, ceramic, and even plastic. The tip retracts for safe storage and it measures 9.8mm in diameter and the pen is 137mm long.



Cat. #	Description	Qty.
41148	Tungsten-Point Lab Pen	each

► Rotary Diamond Micro-Engraver Pen

An amazing tool that may be used to mark samples, engrave tools, indicate a sample area for finding in the SEM, deburring and so much more.

Easy to handle and control, this micro engraver is ideal for detailed engraving on almost any surface--wood, metal, ceramic, glass and more! The micro engraver features a contoured grip for comfort and control and a precision-ground stainless steel bit with a diamond point tip. This diamond-tipped ballpoint micro engraver is also as small as a pen, so it easily fits in your pocket or purse for easy transport.

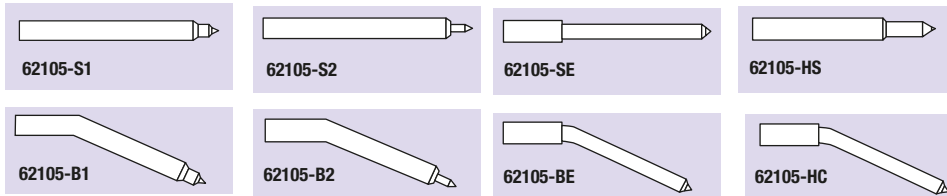
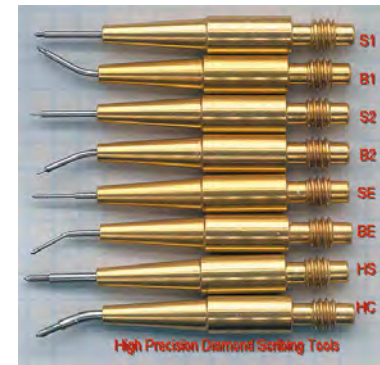
- Contoured grip for comfort and control
 - Pen-type design fits in a shirt pocket or purse and goes anywhere
 - Precision-ground stainless steel bit with diamond point tip
 - Requires two AAA batteries, included
- Measures: 6 1/4" Product Weight 1.86 lbs.

Cat. #	Description	Qty.
50465-15	Rotary Diamond Micro-Engraver Pen	each



► High Precision Diamond Scribing Tools

A newly designed diamond scribing tool set containing eight precision natural diamond scribes in various sizes and configurations. This set is perfect for precision work in microscopy. The set consists of eight diamond tips, 3 mm in diameter and are mounted in interchangeable tool cones and an MT-1 tool handle. The tool and handle are all housed in a hardwood instrument case. Individual scribers can be purchased separately.

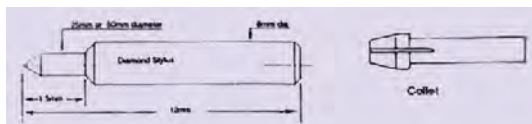


62105-S1	Straight tip, .02" (.50mm) dia. by .06" (1.5mm) tip length	each
62105-B1	Bent tip, .02" (.50mm) dia. by .60" (1.5mm) tip length	each
62105-S2	Straight tip, .01" (.25mm) dia. by .06" (1.5mm) tip length	each
62105-B2	Bent tip, .01" (.25mm) dia. by .06" (1.5mm) tip length	each
62105-SE	Straight extended tip, .02" (.5mm) dia. by .2" (5.0mm) tip length. Good for tight areas	each
62105-BE	Bent extended tip, .02" (.5mm) dia. by .2" (5.0mm) tip length. Good for hard to reach areas	each
62105-HS	Straight, heavy duty tip, .03" (.8mm) dia. by .12" (3.1mm) tip length	each
62105-HC	Bent, heavy duty tip, .03" (.8mm) dia. by .12" (3.1mm) tip length	each
62090-00	MT-1 Tool Handle, 4.75" (112mm) long, gold anodized	each
62105-00	High Precision Diamond Scribing Tools, (8 tools & handle)	set

► Precision Pin Vise Handle and Diamond Stylus

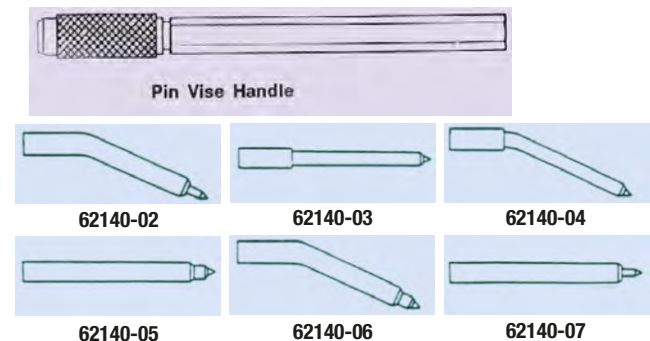
This high precision pin vise handle is machined from the finest material, non-rolling gold-anodized aluminum, which makes it lightweight and versatile. It comes complete with a precision drawbar for positive collets chuck clamping. It features an 8mm (0.31") hexagonal barrel dimension by 100mm (4") long (overall length is 115mm fully assembled) and it has a knurled finger-grip for positive precision control for handling and tool manipulation.

The vice is supplied with a standard collet chuck opening of 2mm (0.78") diameter and will hold a selection of our specially designed tools - and collets adapter 0.8mm (0.003") for diamond stylus chucking.



Cat. #	Description	
62140-00	Precision Pin Vise & Collets	each
62140-50	Diamond Stylus, 0.5mm	each
62140-25	Diamond Stylus, 0.25mm	each

Following are Diamond Scribing Tools, with a 0.80mm (0.003") diameter mounting shank, for use with above Precision Pin Vise and Collets:



Cat. #	Description and Configuration	
62140-02	Bent tip scriber, 0.010" (0.25mm) Diameter. 1.5mm tip length	each
62140-03	Straight extended tip scriber, 0.020" (0.50mm) diameter by 0.200" (5.0mm) tip length. This tool is a must for reaching into and in between high density components.	each
62140-04	Bent extender tip scriber, 0.020" (0.50mm) diameter by 0.200" (5mm) tip length. Use for tight places	each
62140-05	Straight tip scriber 0.020" (0.50mm) diameter by 0.60" (1.5mm) tip length.	each
62140-06	Bent tip scriber, 0.020" (0.50mm) diameter by 0.60" (1.5mm) tip length	each
62140-07	Straight tip scriber, 0.010" (0.25mm) by 0.60" (1.5mm) tip length	each
62140-60	Set of 6 Diamond Scribing Tools and Pin Vise	set

► Tools:



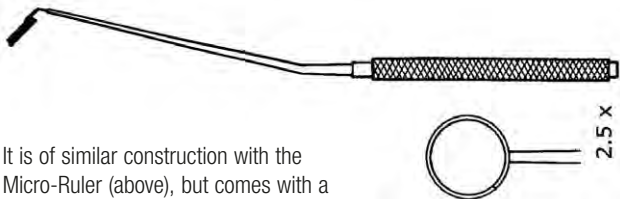
► Micro Ruler: Extended Reach

FEATURES:

- Precision etched, non-glare ruler made from surgical stainless steel, only 3 mm wide. The ruler is calibrated in 0.1 mm graduations, 10 mm total range.
- Stainless steel handle 230 mm long. Balanced and angled for the ultimate in flexibility able to reach into areas which are impossible for other measuring devices.
- Available with or without a stainless steel autoclave case. Total weight of the ruler is 26 g.
- Applications include microscopy, chemistry and anywhere precise measurement in clean and very confined areas are of critical importance.

Cat. #	Description	Pack
62136-ER	Ext. Reach Micro Ruler only	each
62136-ERC	Ext. Reach Micro Ruler w/ Case	each

► Micro Mirror - Extended Reach



It is of similar construction with the Micro-Ruler (above), but comes with a 2.5x magnify Mirror - made from polished stainless steel, 4.8 mm diameter. Overall length is 230mm

Autoclavable Case is available as an option.

Cat #	Description	Pack
62136-M	Extended Reach Mirror	each
62136-MC	Extended Mirror With Case	each

► Adjustable Saw Frame

A Swiss made saw frame lightweight and perfectly balanced. Its ergonomic wooden handle reduces fatigue and provides greater dexterity. Patented blade-lock design eases blade insertion and maintains perfect alignment which eliminates wobble and reduces blade loss during use. It measures 2¼ (70mm) deep and accepts saw blades up to 1.2mm diameter and 130mm long.

This Saw Frame may be used ideally with the Diamond Wire and Spiral Saw Blades listed on page 302.

Cat. #	Description	Qty.
72009	Deluxe Saw Frame	each
72009-10	Diamond Wire	10/pk

For our Complete line of tools, See our Tool Section, pages 756-852. >>>>>

► Micro Sieve Set

This micro-sieve set consists of a stack of four interchangeable screen-holding sections, a catch pan, and a friction-fit cover. The entire unit is molded from polypropylene. All of the parts of the set are very easy to take apart for changing the mesh insert or for cleaning. Complete with the unit are phosphor-bronzed mesh inserts in the following sizes: 25, 35, 45, 60, 80, 120, 170, and 230 mesh. The holding sections are 2" (51mm) IDx6" (152mm)H.



50110-00	Micro Sieve Set	set
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Replacement Mesh Inserts

A set of 8 phosphor-bronzed screen inserts in the following sizes: 25, 35, 45, 60, 80, 120, 170, and 230 mesh.

50111-00	Replacement Mesh Inserts	8/set
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Vernier Caliper, Dial Types See Tweezers and Tools section, page 829 >>>>

Tweezers, pages 756-852. >>>>

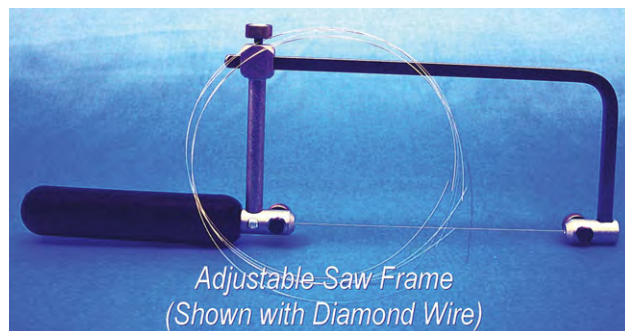
Wafer Tweezers, pages 770-771. >>>>

Demagnetizer See Tweezers, Tools and Gadgets, page 846. >>>>

Caliper, Vernier See Tweezers, Tools and Gadgets, page 829. >>>>

For the Handling of Wafers, Please refer to page 150 for our Pen-Vac and Vacuum Pickup System. >>>>

Tools for MicroSamples, Manipulation, Measurement, & Crystallography, see pages 840-843. >>>>



► Tools:

► Arkansas Sharpening Stones

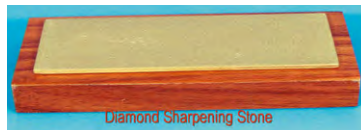
These stones are natural with close density oil-tones, and excellent qualities that make them the stone unequaled for sharpening tools such as gravers, knives, etc. Comes in a cedar wood box and they are available in two types: translucent (extra fine); and hard (fine).



Catalog #	Description	
62082-00	Arkansas Sharpening Stone, Translucent, Size 4" x 2"x½" (102 x 51 x12.7mm)	each
62082-10	Arkansas Sharpening Stone, Hard (Fine), Size 6" x 2"x½" (152 x 51 x12.7mm)	each

► Diamond Sharpening Stone

This patented process of heat treatment which bonds the highest quality industrial grade diamond particles in a stainless alloy to a precision matched metal substrate, has been imitated, but has never come close to being duplicated. Our stone which is set on a walnut pedestal with a cover is available in 3 grades: F- fine grit (600); M - medium grit (270), and C - coarse grit (180). Stone size is 2"x6" (51mmx152mm)



62082-50	Diamond Stone, Fine Grit	each
62082-51	Diamond Stone, Medium Grit	each

► Optical Fiber Cleaving Tools



These precision hand held tools can be used for scoring and cleaving all types of optical fibers.

► 1. Carbide Cleaver Tool

Made from a solid carbide rod. It has two angled sides which intersects into a very sharp cutting edge of about 4mm (0.160") in length. The third angle is lapped on the very tip to prevent breakage. The carbide shank is mounted into a non-rolling hexagon shaped anodized aluminum holder. The carbide part is 2.0mm dia x 10.0mm long. Overall: 120mm long

► 2. Retractable Diamond Cleaver Tool

A ground and polished natural diamond which has a v90 degree included angle with a relief angle of 30 degrees. The cleaver is retained in a quality metal pen like casing with a pocket clasp. The diamond part is 1.5mm wide x 3.0mm long. The overall length is 133mm.

► 3. Retractable Sapphire Cleaver Tool

Ground and polished natural sapphire wedge with a 60 degree included angle. The cleaver is retained in a quality metal pen like casing with pocket clasp. The sapphire part is 2.0mm wide x 3.0mm long. The overall length is 133mm

62165-CC	Carbide Cleaver Tool	each
62165-DC	Diamond Cleaver Tool	each
62165-SC	Sapphire Cleaver Tool	each

► Precision Stainless Steel Tubing

EMS's new special precision stainless steel tubing has been developed to be used as a support and connector ferrules for optical fiber. Other applications include wire feeding, miniature sensor shielding, fluid mechanics, and miniature tool holding and fine instrument work.

Hole sizes are as small as 100µm (0.0039") – 300:1 length to hole diameter ratio. Hole sizes are available from 100µm to 1200µm. Standard outside diameter is 1.46mm (0.058"), standard length is 300mm (1.2")

TOLERANCES:

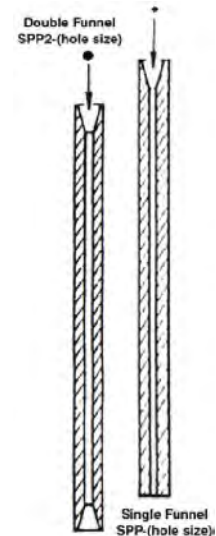
Outside Diameter: ± 0.02mm
Hole Diameter: ± 0.01µm
Length: ±0.1mm

Eccentricity Inside to Outside Diameter, within 0.01µm Concentricity Funnel to Bore Diameter less than 0.02mm Funnel Angle is 45 degree.

The following are available in Single Funnel (SF) and Double Funnel (DF), 1/pk

Ordering Information:

Cat. SF	Cat. DF	Bore Size	Qty.
62170-10	62171-10	100µm	each
62170-13	62171-13	130µm	each
62170-14	62171-14	140µm	each
62170-15	62171-15	150µm	each
62170-16	62171-16	160µm	each
62170-18	62171-18	180µm	each
62170-20	62171-20	200µm	each
62170-30	62171-30	300µm	each
62170-40	62171-40	400µm	each
62170-50	62171-50	500µm	each
62170-60	62171-60	600µm	each
62170-70	62171-70	700µm	each
62170-80	62171-80	800µm	each
62170-90	62171-90	900µm	each
62170-100	62171-100	1000µm	each
62170-110	62171-110	1100µm	each
62170-120	62171-120	1200µm	each



Electron Microscopy Sciences offers a full range of equipment used in materials preparation for a variety of technological fields. Electron microscopy, metallography, wafer lapping and polishing, failure analysis, crystal orientation, plasma processing, MEMS and many other applications are facilitated by our equipment. Please contact us or see our comprehensive website, which includes our complete line.

INSTRUMENTATION

► Professional Manual Micro Manipulator FX-117

This three axis micro-manipulator provides safe and efficient positioning of microtools.

All three vernier readings are graduated in 0.1mm increments. The X-axis, which holds the tool clamp with microtool, has an additional fine movement with 0.001mm graduations.

The FX117 employs rack and pinion drive, V-shaped guide ways and cross bearings, so movement is precise and repeatable. Contact parts are milled from hardened steel for optimum performance and long life. Design employs in-line control knobs clustered within a 8cm area in a single vertical plane resulting in quick and precise hand manipulation.

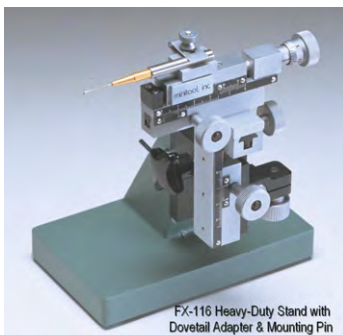
The stand, the FX117-01 has a dovetail adapter and mounting post. The optional adapter FX115-03 (Microtool holder) can also be used.

Specifications:

Movements:	X axis fine	10mm travel	0.01mm graduations
	X axis	37mm travel	0.10mm graduations
	Y axis	20mm travel	0.10mm graduations
	Z axis	25mm travel	0.10mm graduations

Weight: 1.8 lbs (6.1 lbs with stand)

Dimensions: H 140mm (220mm with stand)
W 100mm (145mm with stand)
D 60mm (165mm with stand)



FX-116 Heavy-Duty Stand with Dovetail Adapter & Mounting Pin

62100-15 Micro Manipulator FX-117 w/Stand each

► Disc Punch

The EMS 310 Disc Punch is designed to prepare ductile metals and soft materials for TEM without mechanical distortion. Its solid construction and high tolerance design allows a maximum force to be used with difficult materials while maintaining specimen quality. A specimen alignment tool is included which guarantees maximum specimen yield and precise specimen location. After the disc is punched it is automatically selected from the die and collected in an easily removable tray.



FEATURES:

- Preparation of TEM samples without distortion
- Alignment fixture included for maximum yield and precise specimen location
- Solid construction for long term use without loss of precision
- Dimensions: 8"(W) x 8"(H) x 2.5"(D); Weight: 5 lb. Disc size: 3.0mm

50125-10	Disc Punch Set	set
Replacement parts and products that are available for Disc Punch:		
50125-50	Specimen Holder Base	each
50125-51	Specimen Holder	each
50125-52	Knurled Screw (to hold specimen holder to holder base)	each
50125-54	Specimen Tray	each

► Micro-Mill® Grinder

For fast, high-speed grinding of small samples from 20 to 50mm ($\frac{3}{4}$ " to 2"). The unit comes with a stainless steel or hard-faced blade which rotates at speeds up to 12,000 rpm and will successfully grind bauxite, bone, ceramics, coal, Devorda's alloy, fertilizer, filter paper, fly ash, frozen tissue, glass, grain, kaolinites, leaves, limestone, muscle tissue, pharmaceuticals, pigment blends, plastics, rocks, roots, seeds, slags, soil, teeth, wood, etc. The grinding chamber measures 2 $\frac{1}{2}$ " dia.x1" deep (54x25mm). Its overall dimensions are 5 $\frac{1}{2}$ "x7"x11"(H) (14x18x28cm). It comes with a 6 FT. (1.8m) 3-wire cord and grounded plug. Power: 115V, 60Hz or 220V, 60Hz.



FEATURES:

- The grinder operates only when the cover is latched and in place. This provides safety and prevents sample loss.
- The temperature of the grinding chamber can be maintained by means of built-in heat exchangers. $\frac{1}{4}$ " (6.4mm) tubing connections on the cover and housing accept tubes for circulating water, methanol/dry ice liquid, or liquid nitrogen.
- The cover, grinding assembly, and milling blade head are removable for easy cleaning.
- The aluminum housing has an epoxy finish and non-skid rubber feet.
- The control panel has an overload protection reset button and a pilot light.
- The 1/5 horsepower (150 watts) motor develops a torque of 30-ounce-inches (2.2 Kg-cm) at 12,000 rpm.

Ordering Information:

Micro-Mill® 1, with stainless steel blade, 0-5 minutes electrical timer with an ON position for continuous operation.

Micro-Mill® 2, with hard, stellate faced blade, with a momentary hold-down switch.

50100-01	Micro-Mill® Grinder 1, 115 V	each
50100-02	Micro-Mill® Grinder 1, 220 V	each
50101-01	Micro-Mill® Grinder 2, 115 V	each
50101-02	Micro-Mill® Grinder 2, 220 V	each
50104-01	Replacement Stainless Steel Blade	each
50104-04	Replacement Stellate-Faced Blade	each

► Microdrilling Systems

► 1. The Model L Microdrilling Machine

The Model L machine represents a new approach to efficient, low cost precision microdrilling. The L model employs standard spiral HSS micro-drills from 0.03mm to 0.50mm (0.0012" to 0.020") and solid carbide micro-drills from 0.10mm to 0.50mm (0.0039" to 0.020") diameter (and larger). These drills can be used for work on most metals and plastics.

The drill has a carbide faced interchangeable V-bearing frame in which the drill is held. A precision set-screw-type-pulley and an endless belt, together with the inclined drive motor design assure positive return of the drill to the "up" position.

Employing the V-bearing principle, the drill acts as its own spindle but will run much truer than in other holding devices such as collets or chucks. Micro-dial with a zero setting friction clutch provides 0.0075mm (0.0003") incremental feed. A returnable in-feed plunger is gently pressed for each increment set on the dial.

The Model L is available with optional equipment such as x-y positioning tables, vacuum chucks etc.

■ **Positioning Table, Model MD 025** travels 25mm and 50mm in x, y.

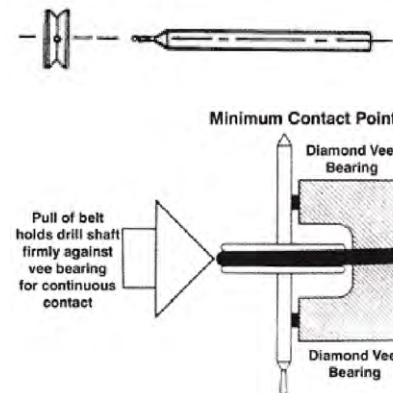
Supplied with 2 micrometers in mm or inches

■ **Vacuum chuck, Model MDC 040** assures positive holding

and accurate repeated placement of glass substrates by mean of 3 locating pins.

Specification:

- Machine Housing and Base:** Special alloy casting, table-balanced ground
- Machine Column:** 28.6mm dia (1 1/8") x 279mm (11") hardened & ground
- Drive Motor:** 24 VAC precision servo type
- Speed Control:** Variable 0 – 3500rpm, solid state (in machine base)
- Power requirement:** 115/230 VAC 45-400 Hz
- Vee Bearing Mount:** Two in-line vee-construction, frame with carbide bearing, interchangeable
- Drill Advancement:** Micro-dial and contact plunger, hand controlled
- Drill In feed:** Smallest increment 0.0075mm (0.0003")
- Total Drill Stroke:** 5mm (0.197")
- Drive Belt:** Special cast urethane, endless
- Drill Drive Pulley:** Drill drive pulley #2000-36
- Overall Dimensions:** 305mm x 457mm x 339mm (12" x 18" x 13")
- Shipping Weight:** 11 kg (25 lbs) domestic, 13.5 kg (30 lbs) foreign.



62088-L	Model L Micro Drilling Machine	each	62088-55	Vee-Bearing for L Model	each
62088-50	X-Y Portioning Table, MD 025	each	62088-56	Drive Belt Replacement for L Model	each
62088-54	Vacuum Chuck, MDC 040	each	62088-57	Drive Pulley for 1-254 Drill Bits	each

► 2. Micro Drill Bits – Series 1-254

A newly introduced sub-micron Grade spiral HSS Micro Drills – contains 9.5% cobalt for excellent cutting and minimum wear - designed for drilling very small holes with excellent chip removal properties, and for use with the Model L Drill Press above. These Drill Bits are available in small sizes of 0.03mm (30µm = 0.0012") diameter up to 0.50mm (500µm = 0.020") diameter, in increments of 0.01mm (10 µm = 0.004")

- Specifications:**
- 1mm (0.040") diameter shanks
 - 25mm (1.0") overall length
 - +/- 0.0005 (0.0002") shank & tip diameter tolerances



All catalog numbers are for each.

Cat. #	Dia, mm/"	Cat. #	Dia, mm/"	Cat. #	Dia, mm/"	Cat. #	Dia, mm/"	Cat. #	Dia, mm/"
62089-06	0.06/0.0024	62089-36	0.36/0.0144	62089-22	0.22/0.0088	62089-05	0.05/0.0020	62089-35	0.35/0.0140
62089-09	0.09/0.0036	62089-39	0.39/0.0156	62089-25	0.25/0.0100	62089-08	0.08/0.0032	62089-38	0.38/0.0152
62089-12	0.12/0.0048	62089-42	0.42/0.0168	62089-28	0.28/0.0112	62089-11	0.11/0.0044	62089-41	0.41/0.0164
62089-15	0.15/0.0060	62089-45	0.45/0.0180	62089-31	0.31/0.0124	62089-14	0.14/0.0056	62089-44	0.44/0.0176
62089-18	0.18/0.0072	62089-48	0.48/0.0192	62089-34	0.34/0.0136	62089-17	0.17/0.0068	62089-47	0.47/0.0188
62089-21	0.21/0.0084	62089-07	0.07/0.0028	62089-37	0.37/0.0148	62089-20	0.20/0.0080	62089-50	0.50/0.0200
62089-24	0.24/0.0096	62089-10	0.10/0.0040	62089-40	0.40/0.0160	62089-23	0.23/0.0092		
62089-27	0.27/0.0108	62089-13	0.11/0.0052	62089-43	0.43/0.0172	62089-26	0.26/0.0104		
62089-30	0.30/0.0120	62089-16	0.16/0.0064	62089-46	0.46/0.0184	62089-29	0.29/0.0116		
62089-33	0.33/0.0132	62089-19	0.19/0.0076	62089-49	0.49/0.0196	62089-32	0.32/0.0128		

INSTRUMENTATION

► MultiLap™ Fish Otolith Polishing Tool - Model 195

In many materials preparation laboratories the need for high specimen throughput and precision made specimen preparation tools is a difficult bottleneck to correct. The Model 195 MultiLap™ is designed to grind and polish multiple specimens with precise control over each individual specimen. The fixture



incorporates up to 6 separate pistons which are used for holding the specimen during preparation and controlling the amount of material to be removed. The piston assemblies allow for specimens of up to 1" diameter to be polished in 10-micron increments. The specimen mounts also provide a means for viewing the specimen in transmitted light, enhancing detection of features that require a light transparent specimen. Wear resistant Delrin plastic legs provide support and are very gentle on many types of abrasive films and media. Overall, the Model 195 is a versatile and precise instrument for performing any precision lapping processes and is an excellent addition to any specimen preparation lab.

FEATURES:

- Tungsten carbide base resists wear and maintains sample planarity.
- Wide base ensures stability thereby minimizing sample damage and edge rounding.
- Wear ring is replaceable, on some fixtures, which extends the life of the fixture.
- Can be mounted in the Model 920 Lapping & Polishing Machine for semi-automatic processing.
- Micrometer depth control allows precise control over sample thickness.
- Precisely crafted stainless steel construction ensures long life and high precision.

Model 195 - 6 Position MultiLap™ Fixture includes:

- 1 x 6 Position MultiLap Base, (#50168-01)
- 6 x Piston Assembly, (#50168-02)
- 6 x Sample Holder Ring Mounts (#50168-03)
- 6 x Delrin Feet (#50168-04)

50168-95 6-Position MultiLap Fixture, Model 195 each

► Spare Parts and Accessories

Catalog Number	Description	Pack
50168-02	Piston Assembly	each
50168-10	6-Position Alignment Fixture	each
50168-03	Sample Holder Ring Mounts	each
50168-04	Delrin Foot for Model 195	each

► MicroPol Model Mc 2 Specimen Grinder/Polisher

MicroPol™ is compact, versatile, electrically controlled, precise mechanical specimen grinder/polisher, designed for planar grinding, thinning and polishing of specimen in the fields of nanotechnology, semiconductors, and materials science. The parameters of polishing (speed, load time, etc) can be matched according to the properties of the specimen. High quality samples are prepared with minimal efforts by the operator.



FEATURES

- Rugged, corrosion proof construction
- Variable speed control for precision polishing
- Quick change bayonet mount bowls
- Maximum sample size is about 10-15mm in diameter
- Timer for automatic operation
- 2 precision TEM sample holders included
- Extremely light load for fragile TEM samples

Application

While the MicroPol™ MC 2 is well suited for metallographic polishing, it has been specially designed for precision TEM polishing applications. Two specially designed TEM holders are provided with each unit that makes it ideal for the preparation of both planar and dimpled samples, respectively.

Operation

MicroPol polishes by the action of an arm that moves the specimen along a semi-random geometric pattern gently pressing it to the bottom of a bowl containing suitable abrasive material. The abrasive material can be grinding paper or suspensions of polishing compound deposited on polishing cloth.

Specifications

Mains voltage:100 – 240 VAC
 Temperature range:+5 – 35°C
 Frequency:50 – 60 Hz
 Power consumption:85 W maximum
 Moving speed of the arm:30 – 60 scans/min,
electronically adjustable
 Timing:1s – 60 min, electronically adjustable
 Load:0 – 5 N, mechanically adjustable
 Moved mass:150 g maximum
 Dimensions:251 x 220 x 181 mm

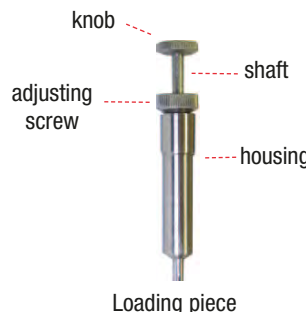
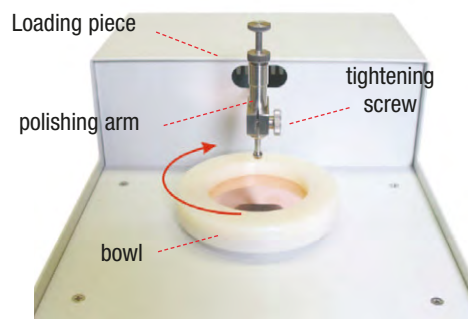
► Consumables Necessary for Operation of MicroPol™ Polisher:

- Abrasive papers (in about 300-800 grit sizes),
- Polishing cloth (e.g. PELLON type),
- Abrasive diamond paste or abrasive suspensions (diamond, Al₂O₃, SiC) in grain sizes of 1 and 10 mm for polishing,
- Transparent thermoplastic wax solidifying below 135°C for fixing the specimen to the steel stub of specimen holder (e.g. mounting wax, dental wax, or similar).

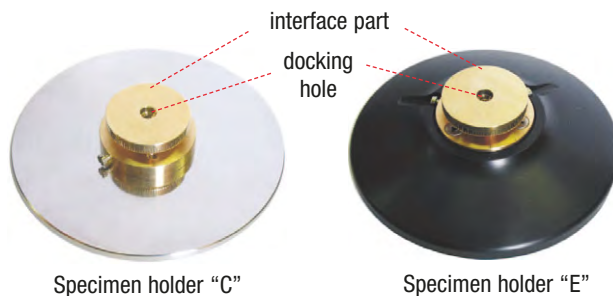
50174-MC2 Micro Pol™ MC 2 Grinder/Polisher Main Unit each

➤ Micropol Model Mc 2 Specimen Grinder/Polisher (continued)

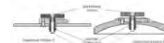
Locking of the bowl on the bayonet lock.
(Locking direction indicated by arrow)



scale for polishing thickness control



Section showing the sample holder rod and the correct position of the sample



Accessories shipped with the equipment:

MC-PBC Polishing Bowl "C"	MC-LPC Loading piece	Specimen Holders (including steel rods)	MC-TDS Thickness Measuring Unit
 <p>Flat plastic bowl: plastic disc coated with Cu foil on both sides; 4 pcs</p>		 <p>MC-SHC Specimen holder "C"</p>  <p>MC-SHE Specimen holder "E"</p>	
<p>MC-PBE Polishing Bowl "E"</p> <p>Spherical bowls for dimpling, 1 pc each;</p>  <p>Plastic Lining</p>  <p>Empty Bowl</p>  <p>Cu Lining</p>  <p>Al Lining</p>		<p>Starting Kit of Consumables</p> <p>Contains all the consumables necessary for operation of MicroPol™ Polisher:</p> <ul style="list-style-type: none"> • Abrasive papers small discs cut in the size of the polishing bowls (in 320 and 800 grit sizes) – 2 pcs each, • Polishing cloth (PELLON type) small disc cut in the size of the polishing bowls – 2 pcs, • Samples of abrasive diamond pastes in grain sizes of 1 and 10m for polishing – 1 sample each. • Sample piece of thermoplastic wax 	

INSTRUMENTATION

► Spark Cutter – Model EE4 (*Electroerosion*)

Please Note: This version replaces the old version (Model TLSC2 Spark Cutter, #55100-SC2) which is no longer available.

The EE 4 Spark Cutter (Electroerosion Unit) is designed for drilling holes, slots and discs of virtually any profile in hard metals. The cutting speed will, of course, vary depending on the sample size and material. As an example, a hole can be drilled in titanium sheet of 0.3 mm thick in about 20 – 60 minutes depending on the surface quality required.

Application

Because of the basic operating principle of the Spark Cutter, it is advised that the device can only be used for high-conductivity materials (with the exception of aluminum). The work piece holder accessory can hold 5 mm wide metal bands. Work piece of different size require modification of the holder.

Operation

Operation of the device is based on an electrochemical process. The drilling tool and work-piece are connected to the power supply: the positive pole to the work-piece, and the drill through an electromagnetic coil to the negative pole. By switching on the power supply, electric current flows through the circuit consisting of the work-piece, the electromagnetic coil and the drill. When the electric current exceeds a certain limit, the magnetic field of the coil lifts up the drill and the current is cut off. The drill is then forced back to the work-piece by a spring in the head unit, and the cycle starts again. The drilling is effected by the electrochemical process taking place at the moment that the electric circuit is stopped.

Specifications**Power Supply Unit**

Power input100 – 120 VAC, 50/60 Hz 1 A, or
220 – 240 VAC, 50/60 Hz, 0.5A
 Power outputapprox. 1.5 – 20 VDC, 2 A (average)
 Dimensions100 x 170 x 235 mm

Head Unit

Power inputapprox. 1.5 – 20 VDC, 2 A(average)
 Dimensions140 x 260 x 290 mm

System Configuration

Power Supply Unit

Head Unit including drilling tool in diameter of 3 mm

Option

Drill tool of 1 mm in diameter.

Cat. #	Description	Qty
55110-EE4	Spark Cutter, Model EE 4	each
55110-H4	Drill Tool for 1mm Dia	each



► MicroSaw – Model MS 3

A Circular Diamond Saw for Precision Cutting under Stereo Microscope

Please Note: This version replaces the old version (MS 2, #55150-MS2) which is no longer available.

Application

MicroSaw is a small, versatile diamond wheel saw, to be mounted under a standard laboratory microscope. The precision offered by such an optical alignment makes MicroSaw ideal for cutting and sectioning required during the TEM specimen preparation. The compact design and easy operation, MicroSaw allows the user cut almost any solid material with precisely and reproducibly prior to thinning for TEM. Thin ceramic, semiconductor material, hard metals can be further sectioned with 0.01mm accuracy!

Operation

The Model MS 3 MicroSaw is driven by an electric motor through a helical transmission. The 12 V DC is provided by the power supply subunit. The speed at which the wheel turns is continuously adjustable. Adjustment of the specimen position, arm contact point, arm tension and the down-stop control mechanism is possible. Two adjustment screws at the bottom of the instrument allow positioning of the stand, and leveling the MicroSaw underneath of the stereomicroscope for precision sectioning.

Specifications

Power input12 VDC
 Power consumption15 W
 Dimensions260 x 150 x 80 mm
 Diamond wheeltype AC32 63/50, 50mm diameter,
 0.15mm thick
 Max. sample size~10 x 10 mm
 Min. slice thickness~100 microns

System Configuration

Switching power supply 100 – 240 VAC, 50/60 Hz

MicroSaw Model MS 3 comes with 1 diamond wheel (#55150-10)

Cat. #	Description	Qty
55150-MS3	MicroSaw, Model MS 3	each
55150-10	Replacement diamond wheel	each



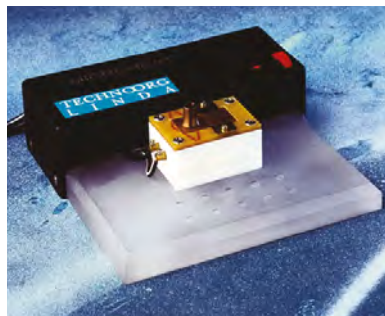
► **MicroHeat – Model MH 2**

Thermoplastic gluing under stereo microscope

- Heat stabilized
- Small
- Ideal for thermoplastic gluing

Application

MicroHeat is a heat-stabilizes, combined with power supply, designed for embedding samples and for thermoplastic gluing under stereoptical microscope. The MicroHeat was developed to make the embedding procedure easier.



Because of MicroHeat is small dimensions, it is can be easily placed on the specimen table of the stereoptical microscope, and with the help of the microscope, the gluing faults can be avoided, this result is very important in case of sample requiring bubble-free sticking (e.g. cross section samples for EM).

With all of these features, MicroHeat is useful in the fields of material research, geology, semiconductors and optical industry for investigation of multilayer system, semiconductors and high Tc superconductors, diamond, composite materials, ceramics, glasses, rocks and minerals.

Operation

Model MH 2 is relatively simple to operate. The temperature of the hot plate can be adjusted continuously in a wide range and is kept constant by the built-in electronic. A control circuit maintains the temperature of the heated surface within $\pm 5^{\circ}\text{C}$. The temperature of the heated surface usually reaches the preset temperature within 1 – 3 minutes. However, it is recommended that to use the hot plate at least 5 minutes after the unit was on.

Specifications

Power input.....	12V DC, 1.2 A
Power consumption	14 W
Temperature range	50 - 180°C
Dimensions	100 x 100 x 30 mm

System Configuration

Main power supply 100 – 240 VAC, 50/60 Hz
MicroHeat unit.

Cat. #	Description	Qty
55110-MH2	MicroHeat, Model MH 2	each

► **HSS Tool Kit**

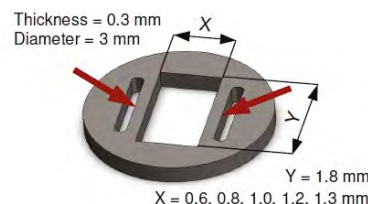
The mechanical sample preparation prior to thinning requires custom made mechanical hand tools. Containing six handy, reliable pieces, this kit has been designed on the basis of practical experience of many users. Some of the tools are suitable for adjusting the sample pieces into the Ti discs, others for removing the excess glue and cutting, or adjusting the seat plate of the sample holder.

55110-HSS	Tool Kit	each
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► **Ti Disc Embedding Ring for TEM Sample Preparation**

The most difficult step of cross-sectional thinning is the mechanical preparation of the sample, i.e. cutting a cross section and then embedding it into an appropriately designed ring.

We know offer a convenient, specially designed embedding ring for cross-sectional samples, shown schematically in Figure 1.



Using this ring, embedding cross sections is greatly simplified, since the samples do not need to be glued together prior to embedding. In order to fix the sample(s) in the ring it is deformed mechanically by an appropriate tool at the two points marked by the arrows. This deformation will both hold the sample in the ring and press both sample pieces together before gluing.

Ti disc is also offered for embedding bulk samples of brittle material for plan-view TEM investigations. The rings come in 5 sizes-0.6, 0.8 1.0, 1.2, 1.3 mm.

55110-TIR	Ti Disc Embedding Rings	5/pk
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► **XTEM TEM Sample Preparation Kit**

EMS offers this kit specifically for the preparation of cross-sectional TEM (XTEM) specimens.

For the study of interfaces (such as semiconductor devices, thin film layers, etc.) by transmission electron microscope (TEM) it is critical to use TEM samples of ultimate quality (perfectly embedded, mechanically pretreated and ion milled ones). EMS offers a complete technology and product range for preparing cross-sectional samples of these quality including specially designed mechanical sample preparation tools and embedding ring. The EMS-XTEMprep Preparation Kit offers all the tools and materials that help to prepare high-quality cross-sectional TEM specimens:

THE KIT INCLUDES:

- Microsaw sectioning tool
- Micropol grinder and polisher
- Microheat embedding tool
- Embedding rings ("Ti disc") – 5 of each size
- Ion beam resistant glue
- Special purpose mechanical tools (HSS) for embedding
- LEIT-C conductive carbon cement
- Thermoplastic transparent glue
- Diamond paste

Ordering Information:

50110-XTEM	XTEM Preparation Kit	kit
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Each Item May be ordered separately as well:

55150-MS3	MicroSaw MS3	each
55110-MH2	MicroHeat MH2	each
50174-MC2	MicroPol MC2	each
55110-TIR	TI Embedding Rings	5/pk
55110-HSS	Mechanical Tool Kit	kit
55110-AT1	Ion Beam Resistant Glue	each
12667	Leit C Plast Adhesive	each
55110-MW	Transparent Glut	each
50370-40	Diamond Paste 1 Micron	each

INSTRUMENTATION

► Rotary Disc Cutter – Model 360

Model 360 Rotary Disc Cutter is a precision instrument, which is designed to precisely align and cut discs or drill holes from a wide range of materials using either a tube shaped brass tool with an abrasive slurry or a diamond tipped tool. The Model 360's rotating tool is continually lowered into the specimen using an easily adjustable counterbalancing weight. The most common application for the instrument is to cut 2.3mm and 3.0mm discs for TEM, although discs as small as 1.25mm and as large as 50mm have been cut. The model 360 includes everything necessary to operate the unit.



► UltraSonic Cutter - Model 380

The UltraCut™ 380 Ultrasonic Cutter is a specialized cutting instrument which utilizes abrasive powders and high speed, vibratory motion to cut discs, holes, cylinder, squares and others shapes from hard, brittle materials.

The high speed motion is developed using an ultrasonic transducer oscillating at 26kHz. Boron carbide slurry is applied to the sample and the tool is lowered onto the specimen. The particles under the vibrating tool impact the sample and erode the material in the shape of the tool.

For complete information on this model, see our interactive web site @ www.emsdiasum.com



Model 36001 Alignment Microscope

If very precise alignment is required, it is recommended to use the Model 36001 Alignment Microscope. Three locating pins on the Alignment Microscope correspond to the three locating pins on the sample stage of the SoniCut™ 380 to ensure precise positioning.

Ordering:

55170-360 Rotary Disc Cutter – Model 360 each

Parts that are included with the Model 360

55172-94	Metric Tool Kit (9 sizes: 2.3 – 9mm), #36094	each
55172-95	English Tool Kit (6 sizes: 1/8"–3/16"), #36095	each
55170-1	Magnetic Base	each
55170-2	Magnetic Plate	each
55170-3	Magnetic Slurry Ring	each
55170-4	Specimen Mounting Plate, magnetic	each
55170-5	1" Work Table	each
55170-6	2" Work Table	each
55170-7	Plastic Splash Guard	each
55170-8	Bottle (x2)	each
55170-9	Graphite Mounting Plate 0.87" x 0.87" (x4)	each
55170-10	Graphite Mounting Plate 1.87" x 1.87" (x4)	each
55170-11	Aluminum Mounting Plate 1.5" x 1.0" (x2)	each
55170-12	Aluminum Mounting Plate 2.0" x 2.0" (x2)	each
55170-13	Hex Wrench Set	each
55170-14	14µ Silicon Carbide Powder, 50 g	each
55170-15	14µ Boron Carbide Powder, 25 g	each
16550-100	Glycerin, 100ml	each
55170-16	Wrench, Open End, 0.5" Opening	each
55170-17	Wrench, Open End, 0.75" Opening	each

Accessories

55172-01 Microscope Alignment Assembly, Model 36001

Consumables

Metric Tools		English Tool		Diamond Tools		Pkg.
Cat. #	Metric ID*	Cat. #	English ID*	Cat. #	Diamond ID*	
55173-03	3.0mm	55174-01	1/8"	55175-02	2.3mm	each
55173-04	4.0mm	55174-02	3/16"	55175-03	3.0mm	each
55173-05	5.0mm	55174-03	1/4"	*OD is 2mm larger than ID		each
55173-06	6.0mm	55174-04	5/16"			each
55173-07	7.0mm	55174-05	3/8"			each
55173-08	8.0mm	55174-06	7/16"			each
55173-09	9.0mm	*OD is 1/4" larger than ID				each
55173-10	10.0mm					each
55173-15	15.0mm					each
55173-20	20.0mm					each
55173-25	25.0mm					each
55173-30	30.0mm					each

*OD is 1mm larger than ID

Ordering:

55180-380 UltraSonic Cutter – Model 380 each

Parts that are included with the Model 380

55172-01	Alignment Microscope, Model 36001	each
55180-12	Metric Tool Kit (9 sizes: 2 – 10mm)	each
55180-1	Specimen Mounting Plate	each
55180-2	Magnetic Plate Assembly	each
55180-3	Magnetic Slurry Ring	each
55180-4	3/8" Open End Box Wrench	each
55180-5	Spare Lamp	each
55180-6	0.5A SB Fuse (spare) for 220 volt	each
55180-7	1A SB Fuse (spare) for 115 volt	each
55180-8	Copper Flat Washer (10 spares)	each
55180-9	Syringe	each
55180-10	23µm Boron Carbide Powder, 25g	each
55180-11	14µm Boron Carbide Powder, 25g	each

Accessories (option)

55182-01	Cross Sectioning Kit - Includes all accessories needed for creating XTEM stacks for dimpling and ion milling	each
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Consumables

55183-1	2.0mm ID Cutting Tool, Stainless Steel	each
55183-2	2.3mm ID Cutting Tool, Stainless Steel	each
55183-3	3.0mm ID Cutting Tool, Stainless Steel	each
55183-4	4.0mm ID Cutting Tool, Stainless Steel	each
55183-5	5.0mm ID Cutting Tool, Stainless Steel	each
55183-6	6.0mm ID Cutting Tool, Stainless Steel	each
55183-8	8.0mm ID Cutting Tool, Stainless Steel	each
55183-9	9.0mm ID Cutting Tool, Stainless Steel	each
55183-10	10.0mm ID Cutting Tool, Stainless Steel	each
55183-?	Special Size up to 20mm ID Cutting Tool	each
55183-50	2mm x 3mm Cutting Tool Stainless Steel	each
55183-51	4mm x 5mm Cutting Tool Stainless Steel	each
55183-XX	Special size up to 10x10mm Square Cutting Tool, Stainless Steel	each
55183-55	Specimen Mount	each
55183-56	Magnet Mounting Plate Assembly	each
55183-57	Lamp	each
55183-58	0.5A SB Fuse (220 volt unit)	each
55183-59	1A SB Fuse (115 volt unit)	each
55183-61C	Copper Flat Washer for use between tool/horn	each
55183-61	Syringe	each

► **Single Vertical Jet Electropolisher – Model 550D**



The model 550D single Vertical Jet Electropolisher is designed to perform dislocation free thinning of materials for subsequent analysis in a Transmission Electron Microscope. This extremely versatile instrument can be used to thin materials and alloys electrolytically with corrosive electrolytes; or to thin non-metals and semiconductors such as gallium or arsenide, chemically, using nitric hydrofluoric or bromide-methanol solutions. A new non-acid electrolyte has been developed to thin such materials as $YBa_2Cu_3O_x$ high Tc superconductors, gold and other traditionally difficult materials. Its high sensitivity is capable of routinely detecting perforations less than $10\mu m$ in diameter and its smooth polishing action yields large usable thin areas.

For complete information on this model, see our interactive web site @ www.emsdiasum.com

Accessories

Model 55001 Automatic Timer and Rinser (optional)

The Model 55001 consists of a reservoir that mounts on top of the Model 550D head assembly and an electronics box that can be placed on top of the Model 550D electronics. The Model 55001 offers 3 basic functions:

It measures elapsed time in minutes and seconds using an LED digital display and stops automatically when the system triggers off.

A predetermined amount of time can be set to automatically shut off the system. This is particularly useful for thinning to a specific depth in a sample.

The rinsing system can be used in either automatic or manual mode. In automatic mode, the sample will be rinsed with water or alcohol immediately after the system triggers off. The manual mode can be used if additional rinsing is desired.

Model 55095 2.3 mm Electrolytic Conversion Kit (optional)

This kit is used to convert the Model 550D chemical unit into an electrolytic unit using 2.3mm specimens. Conversion time is less than 30 minutes.

Model 55096 3.0mm Electrolytic Conversion Kit (optional)

This kit is used to convert the Model 550D chemical unit into an electrolytic unit using 3.0mm specimens. Conversion time is less than 30 minutes.

Model 55097 Chemical Conversion Kit (optional)

This kit is used to convert the Model 550D electrolytic unit into a chemical unit. Conversion time is less than 30 minutes.

Specifications:

Dimensions

Electronics:	10" W x 6" H x 7" D
Head Assembly:	7" W x 11" H x 6" D
Timer:	7" W x 4" H x 6" D
Rinser:	3" W x 4" H x 3" D
Net Weight	
Electronics:	12 Lbs.
Head Assembly:	3 Lbs.
Timer:	2 Lbs.
Rinser:	1 Lb.
Power Supply Output:	300V DC, 150Ma
Electrical Input:	95-120 VAC 50/60 Hz
	200-240 VAC 50/60 Hz

Ordering Information

► **Model 550DE – Electrolytic Jet Thinning Instrument**

55190-550DE Electrolytic Jet Thinning– Model 550DE each

Parts included with Model 550DE:

Cat. #	Description	Pkg.
55192-02	Head Assembly, Electrolytic, Model 55002	each
55190-1	Electronic Power Supply	each
55190-2	Jet Nozzle, Stainless Steel, 1mm hole	each
55190-3	Diaphragm Holder Assembly	each
55190-4	Diaphragms, 0.0015" thick for 3mm Samples (x25)	each
55190-5	Splash Shield Assembly, with Magnifier	each
55190-6	3mm Stainless Steel Pedestal Assembly	each
55190-7	Pyrex Jar, 6" diameter (reservoir for electrolyte)	each
55190-8	Nalgene Tub (for cooling with dry ice)	each
55190-9	Specimen Screen (used when not using diaphragm)	each
55190-10	Allen Wrench Set	each

► **Model 550DC – Chemical Jet Thinning Instrument**

The model 550DC includes everything necessary to operate.

55190-550DC Chemical Jet Thinning– Model 550DC each

Parts that are included with this Model 550DC

55192-03	Head Assembly, Electrolytic, Model 55003	each
55190-1	Electronic Power Supply	each
55190-52	PVC Pedestal Assembly	each
55190-53	PVC Jet Nozzle, 1.5mm Hole	each
55190-5	Splash Shield Assembly, with Magnifier	each
55190-56	Mylar Discs for holding Sample with Wax (x100)	each
55190-57	6" Dia Poly Propylene Jar (Reservoir for Acid)	each
55190-58	Polyethylene Cover for 6" Jar	each

Accessories

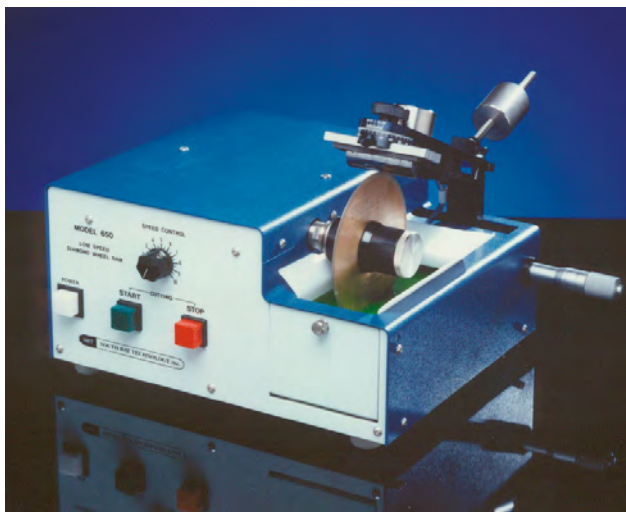
55192-01	Automatic Timer and Riser, Model 55001	each
55192-02	Electrolytic Thinning Head Assembly, Model 55002	each
55192-03	Chemical Thinning Head Assembly, Model 55003	each
55192-96	Electrolytic Conversion Kit (to Convert a Chemical Thinning System to Electrolytic), Model 55096	each
55192-97	Chemical Conversion Kit (to Convert an Electrolytic Thinning System to Chemical), Model 55097	each
55192-11	Jet Nozzle, Stainless Steel, 1.0mm Hole	each
55192-12	Jet Nozzle, Stainless Steel, 1.5mm Hole	each
55192-13	Jet Nozzle, Stainless Steel, 3.0mm Hole	each
55192-21	Jet Nozzle, PVC, 1.0mm Hole	each
55192-22	Jet Nozzle, PVC, 1.5mm Hole	each
55192-23	Jet Nozzle, PVC, 3.0mm Hole	each
55192-32	PVC Holding Cap, 2.3mm Diameter Hole	each
55192-33	PVC Holding Cap, 3.0mm Diameter Hole	each
55192-42	Pedestal Assembly, Stainless Steel, 2.3mm (for use #55192-32, Holding Cap)	each
55192-43	Pedestal Assembly, Stainless Steel, 3.0mm (for use #33192-33, Holding Cap)	each
55192-52	Pedestal Assembly, Stainless Steel w/Pt Tip, 2.3mm (for use #55192-32, Holding Cap)	each
55192-53	Pedestal Assembly, Stainless Steel w/Pt Tip, 3.0mm (for use #33192-33, Holding Cap)	each
55192-63	Pedestal Assembly, PVC, 3.0mm	each
55192-65	Pedestal Assembly, PVC, Large Sample Holder (Holding sample up to 16mm diameter)	each
55192-70	Pedestal Assembly, PTFE	each

Consumables

55193-2	Diaphragms, 0.0015" thick for 2.3mm Samples(x25)	each
55193-3	Diaphragms, 0.0015" thick for 3.0mm samples (x25)	each
55193-4	Mylar Discs for Holding Sample with Wax, (x100)	each
55193-5	PVC Plates for Holding Sample with Wax (used on #55192-65 Pedestal)	each
55193-6	'O' Ring Replacement Kit	each

INSTRUMENTATION

► Low Speed Diamond Wheel Saw – Model 650



The Model 650 Low Speed Diamond Wheel Saw is a compact, multipurpose, precision saw designed to cut a wide variety of materials with minimal substrate damage. Its low speed makes it possible to cut fragile materials that would otherwise fracture and soft materials that would load the diamond wheel on a higher speed saw. A variety of sample holders provides a means for mounting any shape sample while the goniometer adaptability simplifies cutting oriented crystals.

For complete information on this model, see our interactive web site @ www.emsdiasum.com

Special Features

- Belt drive system eliminates gear breakage which is common with less reliable fiber gear driven designs.
- Coolant reservoir is lowered and easily removed by opening an access door located on the front panel.
- Both coarse and fine sample position adjustments allow rapid and accurate sample positioning.
- Polyethylene coolant reservoir enables the use of both water soluble and oil based coolants.
- Automatic termination of the cutting process is controlled by an electromechanical downstop which minimizes supervision.
- Cutting arm pivots on a set of precision bearings rather than on the micrometer shaft which ensures accurate and repeatable sample positioning.
- Multiple diamond wheels can be used to gang slice materials up to 2" in length.
- Utilizes a high torque 1/15 HP DC motor to provide sufficient power for difficult materials.
- The 3 standard sample holders allow mounting of virtually any shape sample.
- 2-Axis Goniometer can be transferred from an x-ray track for cutting precisely oriented crystals.
- It's small size and simple operation make it ideal for glove box or hot cell adaption.

Ordering

55200-650	Low Speed Diamond Wheel Saw – Model 650	each
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Parts included with the Model 650:

55202-01	Model 65001-Single Axis Goniometer (includes sample mount plate #55200-11)	each
55202-03	Double Clamp Holder, Model 65003	each
55200-2	Diamond Wheel (4" Diameter)	each
55200-3	Abrasive Wheel (Aluminum Oxide, 4" Diameter)	each
55200-4	Abrasive Wheel (Silicone Carbide, 3" Diameter)	each
50378-01	Water Soluble Coolant, 1 qt	each
55200-6	Silicon Carbide Dressing Stick	each
55210-ST	Mounting Wax Sample	each
55200-8	Cutting Weight, 200g	each
55200-9	Cutting Weight, 100g (mounted on unit)	each
55200-10	Allen Wrench Set, 1/16 – 3/16	each
55200-11	Specimen Mounting Plate Kit #1	each
55200-12	Plastic Splash Guard	each
55200-13	2.40" Support Collars (x 2)	each
55200-14	1.87" Support Collars (x 2)	each
55200-15	1.37" Support Collars (x 2)	each
55200-16	'O' Ring, 1.484 ID x 1.762 OD x .139 thick (x2)	each
55200-17	Spacer, wheel, .75" (mounted on unit)	each
55200-18	Lock, Work Table (mounted on unit)	each
55200-19	Lock, Blade Holder (mounted on unit)	each

► Model 650HC Low Speed Diamond Wheel Saw

For Use in Hot Cell

Ordering

55200-HC	Low Speed Diamond Wheel Saw – Model 650HC (Includes everything necessary to operate)	each
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Parts included with Model 650HC

55202-44	Gear Drive Belt, Model 65044 – Option	each
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(Does not include covers to provide better access to instrument; use gear and chain drives to replace O-ring drive belts; includes additional changes to simplify remote operation)

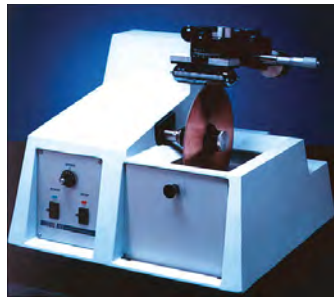
Accessories

55202-04	Petrographic Sample Holder, Model 65004	each
50180-05	2-Axis Goniometer, Model 65005	each
55202-11	x-Ray Track Mount for Model 65005, Model 65011	each
55202-06	Vise Holder, Model 65006	each
55202-07	Right Angle Holder, Model 65007	each
55202-08	Ball Joint Holder, Model 65008	each
55202-12	Dressing Stick Holder, Model 65012	each

Accessories (continued)

55202-14	Sample Rotation System, Model 65014	each
55202-16	Ball Joint Work Arm Model 65016	each
55202-17	Bone Chuck Holder, Model 65017 (for holding irregular parts)	each
55202-18	Right Angle Bone Chuck Holder, Model 65018 (for holding irregular shape parts)	each
55202-19	Adjustable Right Angle Bone Chuck Holder, Model 65019 (for holding irregular parts)	each
55202-40	Alignment Microscope, Model 65040	each
55202-99	Starter Kit, Model 65099, Kit includes: One 3"x.006" & one 4" x.12" diamond wheel, one 4"x.015" Al ₂ O ₃ wheel, one 3"x.010" SiC wheel, 1.87" & 1.37" support collars, 1qt of coolant, 4 dressing sticks, 2 spare drive belts & mounting wax	each
55203-01	Support Table (table saw attachment)	each

► The Model 660 Low Speed Diamond Wheel Saw



The Model 660 is designed to be a multipurpose precision saw using diamond wheels up to 7" in diameter. Its low speed allows it to cut all materials traditionally cut with a high speed diamond wheel while also cutting very fragile and soft materials with minimal subsurface damage. A variety of sample holders provides a means to mount any shape sample while goniometer adaptability simplifies the cutting of orienting crystals.

Special Features

- An internal optic sensor and belt drive system eliminate broken gears and sample damage by terminating the cutting process when wheel rotation is impeded.
- Coolant reservoir is lowered and easily removed by opening an access door located on the front panel. Both coarse and fine sample position adjustments allow rapid and accurate sample positioning.
- Polyethylene coolant reservoir enables the use of both water soluble and oil based coolants.
- Automatic termination of the cutting process is controlled by an electromechanical downstop which minimizes supervision.
- Cutting arm pivots on a set of precision bearings rather than on the micrometer shaft which ensures accurate and repeatable sample positioning.
- Multiple diamond wheels can be used to gang slice materials up to 2" in length.
- Sturdy aluminum casting provides durability in the lab and stability during specimen preparation

For complete information on this model, see our interactive website @ www.emsdiasum.com

50180-60	Model 660 Diamond Wheel Saw	each
50180-01	Single Axis Goniometer Model 66001	each
50180-04	Petrographic Sample Holder Model 66004	each
50180-05	2-Axis Goniometer, Model 65005	each
50180-06	Vise Holder Model 66006	each
50180-07	Right Angle Holder 66007	each
50180-08	Ball Joint Holder 66008	each
50180-11	Model 66011 Track Mount (for 3.625"-4"H)	each
50180-12	Dressing Stick Holder #66012	each
50180-13	Reservoir Adapter Model 66103	each
50181-01	Arbor Bearing	each
50181-02	Motor	each
50181-03	Drive Belt(1 Required)	each
50181-04	Drive Belt(2 Required)	each
50181-05	Drive Belt	each
50181-06	Arbor spacer (1.00")	each
50181-07	Arbor spacer (0.125")	each
50181-08	Arbor spacer (0.5")	each
50181-09	Arbor spacer (1.5")	each
50181-10	Support Collars (2.4")	each
50181-11	Support Collars (1.87")	each
50181-12	Support Collars (1.37")	each
50181-13	Arbor End Screw	each
50181-14	Mounting Block Kit	each
50181-20	Coolant Reservoir	each

All Cutting Weights, see page 423 (50155-01 - 50155-10) >>>>

► Diamond Band Saw - Model 865

Constructed from a high impact polymer, the lightweight Model 865 Diamond Band Saw is designed for medium precision, with efficient cutting of hard and brittle materials. However, the saw is rugged enough to cut through materials such as soft metals and polymers as well. Samples can be safely hand fed into the blade with or without the standard specimen guide. The diamond plated steel core blades are designed to last long under normal conditions. Easy blade access and replacement make occasional saw maintenance extremely simple. Coolant is contained in a reservoir at the base of the saw.



FEATURES:

- Small, lab bench size.
- Quick adjustable blade guide keeps the blade tracking properly.
- Rugged, corrosion-proof construction.
- Powerful motor cuts fast, won't bog down under load.
- Minimum coolant splash for clean cutting.
- Easy access coolant tray for fast and easy clean up.
- Large table for cutting bulk samples.
- Sample guide for straight, flat surfaces.
- Economically priced.

Specifications:

Dimension:	12" (W) x 14"(D) x 18"(H)
Weight:	15 lbs
Maximum Sample Dia:	3.25" (82.55mm)
Cutting Table Dimensions:	12"(W) x 13"(D)
Standard Blade Thickness:	0.022"
Electrical:	115VAC 50/60Hz

Ordering

Model 865 (115VAC only) includes:
1 x Diamond Band Saw Blade (#50182-01)
3 x Blade Guide (#50182-08)

50182-65	Model 865 Diamond Band Saw	each
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► Spare Parts and accessories

Description	Cat.#	Qty.
Diamond Band Saw Blade	50182-01	each
Top Friction Belt	50182-05	each
Bottom Friction Belt	50182-06	each
Blade Guide	50182-08	each
Lower Adjustment Screw	50182-10	each
Locking Nuts	50182-11	each
Plastic Arm	50182-14	each
Lower Shaft Assembly	50182-15	each
Lower Drive Wheel	50182-16	each
Upper Drive Wheel	50182-17	each
Lower Drive Wheel Bushing Assembly	50182-18	each
Water Coolant, 1qt (dilute 25:1 w/ water)	50378-01	each
SiC Dressing Stick (for blade dressing)	50379-01	each

INSTRUMENTATION

► UltraSlice Precision Slicing Machine

Advanced slicing for most component sizes & shapes

Ultimate Versatility – the ULTRASLICE platform provides:

- Work-holding and machine variables to enable most cutting jobs.
- Long-cuts and dicing modes also possible
- Motorized table provides unattended operation
- Provides 'end of the line' capability for manufacturers / labs already with larger production units
- Intuitive and easy to use

Developed to facilitate precision sectioning applications in Industry and Research, ULTRASLICE Precision Saw provides the user with a unique combination of features:

Versatile Sample Holding

The system may be readily converted to handle sample cutting requirements of most shapes, sizes, and applications – e.g. transverse and longitudinal slicing, right through to dicing.

Cutting Accuracy

The use of precision lead screws on all sample feed mechanisms mean that cuts can be positioned accurately. The inbuilt 'Z-spindle' provides the ability to set the blade height 'on the fly'.

Reproducible Results

All-metal construction and an accurately calibrated and damped spindle movement assures low transmission of vibration to the workpiece. This gives reproducibility of performance for cutting materials of widely varying mechanical properties; from the hardest steels and non-metals down to delicate crystal materials.

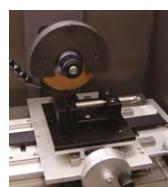
Versatile Controls

ULTRASLICE has the power and range of blade speeds to achieve higher cutting rates when necessary.

The system features an integral coolant recirculation system which extends blade life and clears cutting debris to improve cutting rate and surface quality.

ULTRASLICE can handle sample cutting requirements of all shapes, sizes and applications. Samples may be presented to the blade with table attachments (X, Y, W, and Z direction accessories).

The system accepts a wide range of O.D. diamond and abrasive blades for standard cutting, and is readily adaptable to accept



Vise for ULTRASLICE, Cat No. 3575.1

A vise attachment that mounts onto the ULTRASLICE saw by means of a standard set of dowels and two mounting screws.

The Vise Attachment holds a large variety of sample types and sizes.



Lamp, Cat No. 1301.A

A Convenient incandescent lamp for illuminating the work area.

- 60W Max bulb
- Illuminates Work area
- Gooseneck for control of illumination area



Specifications

Power Requirements.....	110 - 240V, 50 / 60 Hz
Spindle Speed	Fully variable up to 6,000 rpm
Spindle Size	0.5 inches (12.7 mm)
Standard Stages.....	Motorized Y, lead screw-fed X (indexing) and Z-spindle (blade height)
Cutting Modes	Preset Constant Speed
Footprint	25 inches (wide) x 18 inches (high) x 25 inches (length)
Unit Weight	110 lbs (45 kg)

Ordering Information

Cat. No.	Description	Qty
8560.3	ULTRASLICE Diamond Saw - 110V-240V	each
System package includes: Saw Base Unit, 6000rpm max spindle speed (with tachometer, ammeter), 3582.2 X Stage for traveling table, Y axis motorized traveling table (with automatic cut-out), Z-spindle Stage, Recirculating Coolant System & Splash Guard, One 4" diamond blade (7412.1), Pair 2" dia. flanges (cheek plates)		
6004.1	Theta Stage	each
3541.8	Table Mounting Plate, with Quick Release interface	each
3575.1	Vise (for samples up to 2" dia.)	each
1301.5	Lamp	each

Standard Blades for a wide range of sample types:

7412.1	4 inch o.d., 0.5 inch arbor, 0.012" inches (over diamond) thickness – premium metalbond blade	each
7312.1	3 inch o.d., 0.5 inch arbor, 0.012" inches (over diamond) thickness – premium metalbond blade	each



► **UltraSlice Compact**

Versatile Precision Saw for small workspaces & small budgets

For the user who wants all the functionality and unique control of cutting parameters offered by a high end saw, while working on a tight budget or with limited lab space, ULTRASLICE Compact provides the answer.

The system features an integral coolant recirculation system which extends blade life and clears cutting debris to improve cutting rate and surface quality.

Work is fed into the blade by several different methods, by use of table attachments.

A wide range of workholders can be held by the saw. This method allows the workpiece to be mounted rapidly and conveniently without the need for mounting waxes or cements.

A fully splashguard enclosure is provided which may be opened to allow front panel access or be completely swung away from the cutting area.

For Industrial and research operations, ULTRASLICE Compact saw offers an unparalleled combination of cut quality, accuracy, versatility, and affordability.

Product Highlights

Versatility

The system may be readily converted to handle sample cutting requirements of most shapes, sizes and applications.

Cutting Accuracy

The use of precision lead screws on all sample feeds means cuts may be positioned accurately

Long Cuts & Dicing

The large work-table and layout of the machine allows for long cuts to be achieved - perfect for failure analysis, and QA applications such as longitudinal sectioning of components. Sectioned workpieces may be an end in themselves, or the starting point for lapping and polishing

Most Blade Types

The system accepts a wide range of O.D. diamond and abrasive blades for standard cutting, and is readily adaptable to accept special 'dicing' blades for the smallest kerf.



Vise attachment, Cat No. 3575.2



Compact Table with Substrate holder



Lamp, Cat No. 1301.A

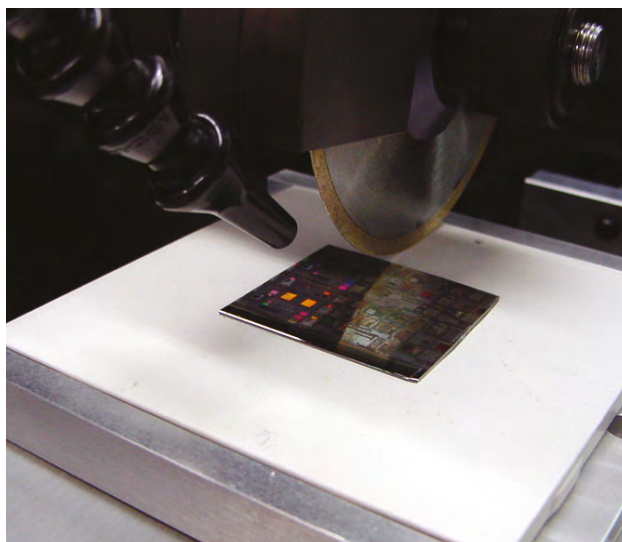
A Convenient incandescent lamp for illuminating the work area.

- 60W Max bulb
- Illuminates Work area
- Gooseneck for control of illumination area



Automatic Cut-out Switch Assembly Cat No. 3632.1

Allows for unattended machine operation



Ordering Information

Cat. No.	Description	Qty
8520.3	ULTRASLICE Compact	each
System package includes: Saw Base Unit (2000 max rpm spindle speed), 3582.C X Stage for traveling table, Y axis motorized traveling table, Recirculating Coolant System & Splash Guard, One 4" diamond blade (7412.1), Pair 2" dia. flanges (cheek plates), 100-240V Operation.		
3518.4	Substrate Holder -- table mount	each
3575.2	Vise -- table mount	each
1301.5	Lamp	each
3632.1	Automatic Cut-out Switch and Assembly, for unattended operation	each

INSTRUMENTATION

► UltraSlice Precision Macrotome

Precise sectioning of hard tissue & other materials

ULTRASLICE Macrotome precision diamond saw, is a quiet, direct drive design for smooth, chatter free slicing system for important and fragile industrial, biological and related specimens.

The system suits Fish & Game applications, such as Otolith and Stalolith samples. Specimens can be oriented to ensure a flat surface is parallel to the desired section plane such as sagittal, frontal or transverse.

MACROTOME can also be used in many other industrial applications where the best price/performance ratio is required.

The wheel (spindle) rotation is variable speed, to allow for optimized cut quality. An easy access coolant reservoir, allows for quick efficient coolant changes.

Product Highlights

- Suits Low Budgets
- Z-Spindle
- Manual Crank Table Feed, with motor option
- For otoliths and related specimens
- Fish & Game



Ordering Information

Cat. No.	Description	Qty
8550.1	ULTRASLICE Macrotome Saw	each
8555.1	Table Autofeed	each
3541.8	Table Mounting Plate, with Quick Release interface	each
3575.1	Vise (for samples up to 2" dia.)	each
1301.5	Lamp	each

Standard Blades for a wide range of sample types:

7412.1	4 inch o.d., 0.5 inch arbor, 0.012" inches (over diamond) thickness – premium metalbond blade	each
7312.1	3 inch o.d., 0.5 inch arbor, 0.012" inches (over diamond) thickness – premium metalbond blade	each

► UltraTrim Diamond Saw

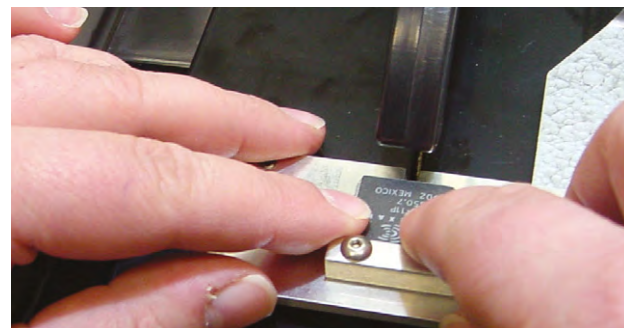
A refreshing idea for sample preparation

ULTRATRIM is a low cost, entry-level, precision sawing machine for producing rapid cross-sections for microscopy and QC checks.

The saw includes a straightforward coolant reservoir, the saw blade dips into the reservoir for effective cooling and lubrication of the sawing process. An intelligently designed manually fed cutting table, makes slicing fast and easy. The saw has a fully variable spindle speed and a small footprint.

Product Highlights

- Accepts 4 inch o.d. blades, with standard 0.5 inch spindle
- Quiet, powerful motor with speed control
- Manual Table-fed cutting for fast, convenient sample prep
- Convenient reservoir for blade coolant and lubrication
- Economical



Ordering Information

Cat. No.	Description	Qty
8505.1	ULTRATRIM Saw with 0.5 inch arbor spindle, 0.25 hp motor, integral coolant reservoir, manual table feed, one 4" o.d. blade, 110V operation only	each
8505.2	ULTRATRIM Saw with 0.5 inch arbor spindle, 0.25 hp motor, integral coolant reservoir, manual table feed, one 4" o.d. blade, 220 - 240V operation	each
7412-1	Spare 4" diameter blade, 0.012" thick	each
7312-1	Spare 3" diameter blade, 0.012" thick	each

► Wire Saw – Model 810

The Model 810 – Wire Saw offers the gentlest mechanical method for cutting virtually any material using either a diamond impregnated wire blade or a plain wire plate with abrasive slurry. In addition to traditional mechanical cutting, the saw can also be used as a string saw to cut water soluble crystals. It is most useful for cutting fragile crystals, substrates with delicate layers or any material that would be damaged when using diamond wheel saw. Very brittle materials will cut the fastest, but even soft materials can be cut since there is not the problem of loading the blade that is inherent with diamond or abrasive wheels. The Wire Saw has sample holders available to hold virtually any shape sample including a goniometer to simplify the cutting of oriented crystals.

For complete information on this model, see our interactive web site @ www.emsdiasum.com



Special Features

- Self contained recirculating system requires only a few cc's of slurry which makes it economical to use diamond slurries and minimizes clean up when cutting toxic materials.
- Wire tension gauge simplifies the process of selecting the proper tension for each diameter wire.
- Easy to replace continuous loop wire blade.
- Micrometer cross-feed mechanism provides precise sample positioning.
- Automatic termination of the cutting process is controlled by an electromechanical downstop which minimizes supervision.
- All sample holders can be rotated 360° and are interchangeable with the Model 650 Low Speed Diamond Wheel Saw.
- 2-Axis Goniometer can be transferred directly from an x-ray or optical track for cutting oriented crystals.
- Compact size and simple operation makes it ideal for use in glove boxes, fume hoods and hot cells.
- Integrated recirculating system makes it ideal for cutting water soluble crystals.
- Counterbalanced arm allows for fine adjustments in cutting pressures.

Ordering:

55210-810	Wire Saw – Model 810	each
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Parts included with the Model 810

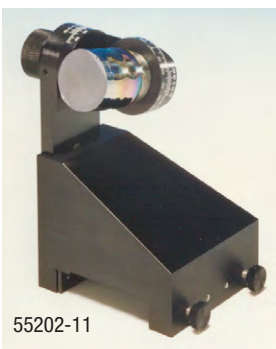
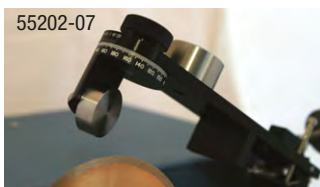
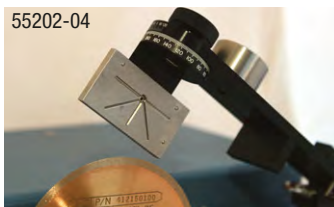
55202-01	Model 65001-Single Axis Goniometer	each
55202-03	Double Clamp Holder, Model 65003	each
55210-2	Aluminum Mounting Plate (x2)	each
55210-3	Aluminum Mounting Plate (x2)	each
55210-4	Graphite Mounting Plate (x4)	each
55210-5	Graphite Mounting Plate (x4)	each
55210-51	Mounting Wax Sample Kit	each
55210-6	Work Arm Assembly	each
55210-8	Micrometer Head, 25mm Travel	each
55210-9	Micrometer Adapter, metric	each
55210-90	Bottles with Closing Spout (x2)	each
55213-10	Stainless Steel Wire Blades, 0.005" Dia (10/pk)	each
55214-10	Stainless Steel Wire Blades, 0.010" Dia (10/pk)	each
55216-05	Diamond Impregnated Wire Blades, 0.010" (5/pk)	each
50260-14	14µm Silicon Carbide Powder, 50g	each
50510-14	14µm Boron Carbide Powder, 25g	each
16550-100	Glycerin, 100ml	each
55210-17	Drip Glue	each
55210-18	Funnel	each
55210-19	Drip Pan	each

Accessories

55202-04	Petrographic Sample Holder, Model 65004	each
50180-05	2-Axis Goniometer, Model 65005	each
55202-11	x-Ray Track Mount for Model 65005, Model 65011	each
55202-06	Vise Holder, Model 65006	each
55202-07	Right Angle Holder, Model 65007	each
55202-17	Bone Chuck Holder, Model 65017 (for holding irregular parts)	each
55202-18	Right Angle Bone Chuck Holder, Model 65018 (for holding irregular shape parts)	each
55202-19	Adjustable Right Angle Bone Chuck Holder, Model 65019 (for holding irregular parts)	each

Consumables

55213-10	0.005" Dia, Stainless Steel Wire Blades, 10/pk	each
55213-50	0.005" Dia, Stainless Steel Wire Blades, 50/pk	each
55213-100	0.005" Dia, Stainless Steel Wire Blades, 100/pk	each
55214-10	0.010" Dia, Stainless Steel Wire Blade, 10/pk	each
55214-50	0.010" Dia, Stainless Steel Wire Blades, 50/pk	each
55214-100	0.010" Dia, Stainless Steel Wire Blades, 100/pk	each
55215-10	0.015" Dia, Stainless Steel Wire Blades, 10/pk	each
55215-50	0.015" Dia, Stainless Steel Wire Blades, 50/pk	each
55215-100	0.015" Dia, Stainless Steel Wire Blades, 100/pk	each
55216-5	0.010" Dia, Diamond Wire Blades, 5/pk	each
55216-25	0.010" Dia, Diamond Wire Blades, 25/pk	each
55215-100	0.010" Dia, Diamond Wire Blades, 100/pk	each
55217-5	0.015" Dia, Diamond Wire Blades, 5/pk	each
55217-25	0.015" Dia, Diamond Wire Blades, 25/pk	each
55217-100	0.015" Dia, Diamond Wire Blades, 100/pk	each



INSTRUMENTATION

► Wire Saw – Model 850

The Wire Saw 850 offers the gentlest mechanical method for cutting virtually any material using either a diamond impregnated wire blades or a plain wire blade with abrasive slurry. In addition to traditional mechanical cutting, the saw can also be used as a string saw to cut water soluble crystals. It is most useful for cutting fragile crystals, substrate with delicate layers of any materials that would be damaged when using diamond wheel saw. Very brittle materials will cut the fastest, but even soft materials can be cut since there is not the problem of loading the blade that is inherent with diamond or abrasive wheels. The Wire Saw has sample holders available to hold virtually any shape sample including a goniometer to simplify the cutting of oriented crystals

Operation

When used as an Abrasive Slurry Wire Saw the Model 850 offers the most gentle mechanical method for cutting a material. A sample is mounted to a sample holder and attached to a work table on the base of the saw. An appropriate load is applied by adjusting the counterbalancing weight and the mechanical downstop is set. The sample is then positioned in any starting position relative to the wire blade and then a micrometer is used for precise sample positioning. With the wire rotating, the arm is gently lowered until the wire blade touches the sample. Abrasive slurry is applied by hand from a drip bottle or automatically with the Model 85030 Abrasive Recirculating System. The cutting is accomplished by directing the abrasive slurry to the point of contact between the moving wire blade and the sample. The excess slurry will drain off the contoured base of the saw into a reservoir. Cutting will continue until the mechanical downstop is reached.

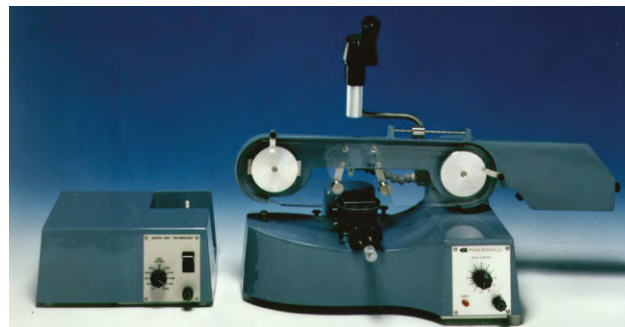
When used as a Diamond Wire Saw the Model 850 uses a diamond impregnated wire blade and a water coolant in place of the abrasive slurry. Diamond wire cutting is used for cutting hard materials or when contamination from an abrasive slurry is undesirable.

When used as a string saw the Model 850 can cut water soluble crystals such as sodium chloride, by having a water soaked wick rub against a standard wire blade. The water is carried on the wire blade to the sample and cuts by dissolving its way through the crystal.

Special Features

- Variable speed abrasive slurry pump and reservoir with mixing motor keeps abrasive in suspension and ensures that fresh abrasive is constantly applied to the cutting area.
- Easy to replace continuous loop wire blade.
- Micrometer cross-feed mechanism provides precise sample positioning.
- 2 or 3-Axis Goniometers can be transferred directly from an x-ray or optical track for cutting oriented crystals.
- Counterbalanced arm allows for fine adjustments in cutting pressures.
- Optional microscope provides a capability for precise sample alignment.

For complete information on this model, see our interactive web site @ www.emsdiasum.com

**Specifications**

Dimensions (850 only):	.....28" W x 18" H x 9" D
Dimensions (850 with reservoir):	.....28" W x 18" H x 14" D
Dimensions (pump only):	.....11" W x 5" H x 10" D
Net Weight (Model 850):	.....19 Lbs.
Net Weight (Model 850 220V):	.....24 Lbs.
Net Weight (Model 85030):	.....17 Lbs.
Wire Speed:	.....1200 SFM
Wire Types/Diameters	
Stainless Steel:	......005", .010", & .015"
Diamond:	......010" & .015"
Max Sample Diameters:	......3"
Motor:	.....1/25 HP AC/DC
Cross Feed Range (max):	......2" total (1" coarse + 1" micrometer)
Micrometer Feed:	.....0 - 1.000", .001 increments
	.....or 0 - 25mm, 0.01 mm increments
Electrical Input:90-120 VAC 50/60 Hz
200-240 VAC 50/60 Hz

Ordering

55220-850	Wire Saw – Model 850	each
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Parts included with the Model 850 Wire Saw

55222-15	Work Table, Model 85015 (includes 1" & 2" work tables, mounting blocks, graphite plates, splash cover)	each
55222-22	Metric Cross Feed Stage, Model 85022M (An English micrometer can be substituted)	each
55222-50	Abrasive Slurry Recirculating System, Model 85050 (Includes slurry pump, slurry container & slurry mixer)	each
55213-10	Stainless Steel Wire Blades, 0.005", 10/pk	each
55214-10	Stainless Steel Wire Blades, 0.010", 10/pk	each
55216-05	Diamond Impregnated Wire Blades, 0.01", 5/pk	each
55210-51	Mounting Wax Sample Kit	each
55220-10	Plastic Bottles, 125ml (x2)	each
50260-14S	14µm Silicon Carbide Powder, 250g	each
50510-14	14µm Boron Carbide Powder, 125g	each
16550	Glycerin, 2x450ml	each
55220-11	Hex Wrench Set	each

Accessories

55222-40	Alignment Microscope, Model 85040	each
55222-14	Vise Sample Holder Worktable, Model 85014	each
55222-16	Indexing Sample Holder Worktable, Model 85016	each
50176-60	3-Axis Goniometer, Model 260	each
50176-50	2-Axis Goniometer, Model 250	each
55222-09	Mounting System for Model 250 Goniometer, (includes: Model 85011 Goniometer mount, Model 85013 Worktable, and Splash Guard)	each
50176-51	Model 25002, x-Ray Track Mount for Model 250	each
50176-52	Model 25005, x-Ray Track Mount for Model 250	each
55222-21	Cross-Feed, Model 85021	each
55222-24	Angular Goniometer Mount, Model 85024	each

► **Dimpler – Model D 500i**

The Model D500i Dimpler has become an indispensable tool for TEM specimen preparation. The dimpling technique, which is applicable to a myriad of material types, yields a higher quality specimen with a broader, near electron transparent area which reduces ion milling times. The Model D500i automates the dimpling technique so that the most demanding specimen can be dimpled to < 10 microns routinely and repeatedly. Real time measurement of tool height, specimen thickness, and tool run out allow the user to precisely control the dimpling process. With the proper tooling and parameter adjustment, the dimpling technique with the D500i can be completed with ease.

For complete information on this model, see our interactive web site @ www.emsdiasum.com



Specifications

Tolerances	
Z Offset:	Accuracy: .....1 micron Range: .....2000 microns
Z Termination Accuracy:	Tools 1i/3i:< +/- 1 micron Tools 2i/4i:< +/- 2 microns
Tool Force:	Range: .....1 - 200 grams.....1 gram steps
Balance:	Sensitivity: .....1 gram Range: .....50 grams
Tool Speed:	.....100 - 600 RPM
Specimen Platen Speed:	.....10 RPM
Tool Shaft:	.....0.5 micron TIR
Tools:	Tools 1i/2i:+/- 1 micron TIR Tools 3i/4i:+/- 2 micron TIR< 0.5 micron TIR
Platen Surface:	
Dimensions:	Length: .....68.6 cm Width: .....35.6 cm Height: .....33 cm Weight: .....32 kg
Electrical:120 VAC / 60 Hz240 VAC / 60 Hz



Ordering:

50170-500i	Dimpler – Model D500i	each
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Parts included with the Model D500i

50170-01	Quick Release Platen Assembly	each
50170-03	Slurry Ring	each
50170-04	MEP Centering Stand (for use with magnetic base)	each
50170-05	Standard Specimen Platen Assembly	each
50170-06	Sapphire Flat (x2), size 3/4" Dia. x 0.53mm	each
50170-07	Specimen Mounting Jig Assembly	each
50170-08	Tool 1i Flatting	each
50170-09	Tool 2iM Flat Polishing	each
50170-10	Tool 2iT Flat Polishing	each
50170-11	Tool 3i Dimpling	each
50170-12	Tool 4iM Dimple Polishing	each
50170-13	Tool 4iT Dimpling Polishing	each
50170-14	3µm Diamond Suspension, 2 oz	each
50170-15	1µm Diamond Suspension – Poly, 2 oz	each
50170-16	Lapping Vehicle, 4 oz	each
50419-20	Mounting Wax, QuickStick135	each
50170-17	Specimen Vise (for X-sectional prep with PTFE jaws)	each
50170-18	Shim Control Lapping Fixture	each
50170-19	Knob Thumb Screw	each
50170-20	Allen Wrench Set (1/16 – 3/16)	each

Accessories

50172-01	Standard Specimen Platen Assembly	each
50172-02	Quick Release Platen Assembly (used with one of four bases listed below)	each
50172-03	Fixed Base (for standard tools)	each
50172-04	Magnetic Base (for standard tool)	each
50172-05	Fixed Base for Large Area Tools	each
50172-06	Magnetic Base for Large Area Tools	each
50172-07	MEP Centering Stand (for use w/magnetic base)	each
50172-08	MicroSaw – includes diamond cutting wheel and support collar assembly	each

Consumables

50170-06	Sapphire Flat	each
50170-08	Tool 1i Flat	each
50170-09	Tool 2iM Flat Polishing	each
50170-10	Tool 2iT Flat Polishing	each
50170-11	Tool 3i Dimpling	each
50170-12	Tool 4iM Dimple Polishing	each
50170-13	Tool 4iT Dimple Polishing	each
50173-08	Tool 3i Dimpling Cooper	each
50173-09	Tool 1iD - 15µm Diamond Flatting	each
50173-10	Tool 1iD - 9µm Diamond Flatting	each
50173-11	Tool 1iD - 6µm Diamond Flatting	each
50173-12	Tool 1iD - 3µm Diamond Flatting	each
50173-13	Tool 3iD - 3µm Diamond Flatting	each
50173-14	Tool 3iD - 1µm Diamond Flatting	each
50173-15	Tool 3iD - 0.25µm Diamond Flatting	each

Place this item in the same place with Tri-Pod Polisher 50115-series

INSTRUMENTATION

► Model 590 Tripod Polisher-TEM/SEM Sample Preparation

A Tripod Polisher was designed by scientists at IBM, which is used to prepare accurately micro sizes of TEM and SEM samples. For TEM samples, the Tripod Polisher has been used successfully to limit ion milling times to less than 15 minutes, and in some cases, has eliminated the need for ion milling. It can be used to prepare both plan-view and cross-sections from a variety of sample materials, such as ceramics, composites, metals and, geological specimens.

ADVANTAGES:

- Limited ion milling requirements reduce preferential thinning, radiation damage, and heating of the sample.
- No strong chemicals are used to prepare the specimen.
- The same sample can be studied with both SEM and TEM.
- Reduces sample preparation.
- Samples can be prepared for TEM without ion milling.

► Tripod Polisher® Accessories:

The Tripod Polisher® Base (#50116-05): holds the micrometer and has two captive screws that hold the L-Brackets or the Parallel Polishing Mount in position when polishing the samples.

The Precision Locking Micrometers (#50116-10): have special larger diameter locking rings for easy locking and are graduated in one micron increments with 13mm travel. Non-coating Micrometers also available, but not recommended.

The Delrin Feet (#50116-15): are applied to the tip of each micrometer and are designed to protect the micrometer as well as the lapping from damage when polishing TEM samples

The Plain L-Brackets (#50116-20): Can be used in place of the other 'L' bracket to polish the edge of the samples to the area of interest prior to polishing the wedge.

The Screw Clamp L-Bracket (#50116-25): can be used with the Pyrex Insert for Wedge Polishing (#50116-60), the SEM Stub (#50116-65) or the Wedge Polishing Mount (#50116-61). It can be used for polishing the edge of the sample to the area of interest for SEM evaluation or for preparation to do the final wedge polishing for TEM.

The Slotted L-Bracket (#50116-30): is used in exactly the same way as the Screw Clamp L-Bracket. The difference is the method of clamping. With the Screw Clamp L-Bracket, the Pyrex Insert, SEM Stub is held with two setscrews. With the Slotted L-Bracket they are held with a form fix clamp that is tightened with a single screw. The Inserts are held tightly with a good thermal contact for mounting samples when the L-Bracket is heated on a hot plate. When examining the mounted sample under a microscope it can be lit from the bottom as well as the side.

X-Section L-Bracket (#50116-31): is used to mechanically clamp a sample (such as an IC Package) on the side of an L-Bracket for optimal SEM cross sectioning.

The Parallel Polishing Mount (#50116-35): is mounted in the center of the Tripod Polisher(r) Base in place of the L-Bracket and is used for parallel polishing by adjusting the 3 micrometer feet.

The Planarizing Tool (#50116-40): is used to lap the three delrin feet to be coplanar in preparation for preparing samples with Parallel Polishing Mount.



50115-series

The Microscope Stand (#50116-55): is used to hold Model 590 Tripod Polisher(r) with sample facing up for viewing under a microscope or serve to protect the sample.

The Heater Block (#50116-50): is designed to hold any of the L-Brackets while they are being heated on a hot plate prior to mounting sample melted wax. This provides a slow, uniform temperature gradient, which minimizes thermal shock.

The Pyrex Insert for Wedge Polishing (#50116-60): is used with the Screw Clamp and Slotted L-Bracket for mounting sample for the TEM

The Wedge Polishing Mount (#50116-61): includes a Wedge Polishing Clamp (#50116-62) and 5 of Pyrex Wedge Polishing Rod (#50116-63). This holder is used for TEM Wedge Polishing and provides a small sample mounting area allowing for maximum adjustment range of the sample.

The Pyrex Wedge Polishing Rod (#50116-63): is a replacement part used with the model #50116-35 Wedge Polishing Mount.

The Pyrex Wedge Polishing Stub (#50116-64): is mounted to a Pyrex Insert (#50116-60) to produce a similar effect as is accomplished with the model #50116-61.

The SEM Stub (#50116-65): is used for mounting samples for SEM and can be transferred directly to the SEM or to the special holder for use in mil.

The Glass Leveling Slide (#50116-70): is used for leveling the 3 micrometer's feet or 2 of the feet and the sample.

The Tool Kit: contains 2 hex drivers (#50116-71 & #50116-72) and torque handle for use with the Model 590 Tripod Polisher® in addition to wrench (#50116-73) for micrometer repair.

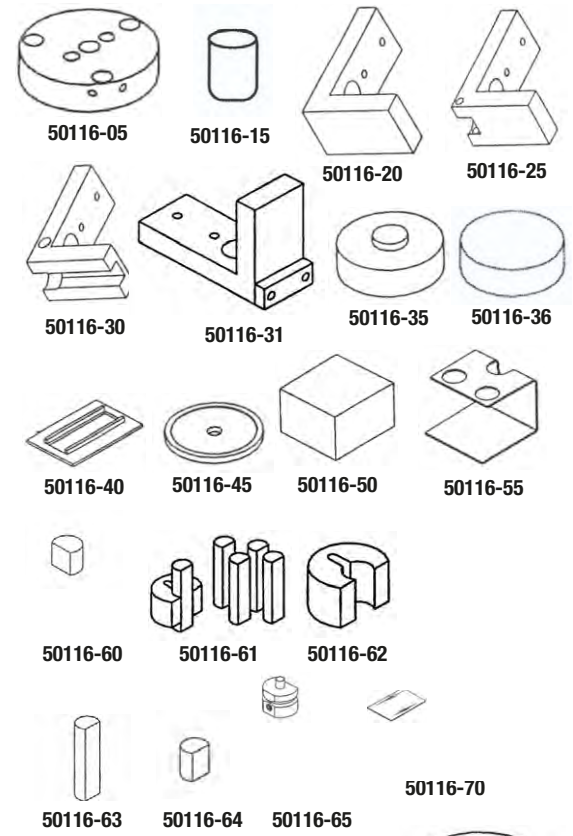
INSTRUMENTATION

Ordering Information:

Parts Included with various Wedge Tripod Polisher®+

Part Description	Catalog Number	Model 590TEM	Model 590SEM	Model 590TS (SEM+TEM)
Tripod Polisher Base	50116-05	Included	Included	Included
Precision Micrometer	50116-10	Included x 3	Included x 2	Included x 3
Delrin Micrometer Feet	50116-15	Included x 3	Included x 2	Included x 3
Plain L Bracket	50116-20	Included	-----	Included
Screw Clamp L Bracket	50116-25	-----	Included	Included
Slotted L Bracket	50116-30	Included	-----	Included
Cross Section L Bracket	50116-31	Optional	Optional	Optional
Parallel Polishing Mount (plastic)	50116-35	Optional	Optional	Optional
Parallel Polishing Mount (S. Steel)	50116-36	Optional	Optional	Optional
Planarizing Tool	50116-40	Optional	Optional	Optional
Support Collars	50116-45	-----	-----	-----
Heater Block	50116-50	Included	-----	Included
Microscope Stand	50116-55	Included	Included	Included
Pyrex Insert - Large	50116-60	Included	-----	Included
Wedge Polishing Mount	50116-61	Optional	Optional	Optional
Wedge Polishing Clamp	50116-62	Included	-----	Included
Pyrex Wedge Polishing Rod	50116-63	Included x 4	-----	Included x 4
Pyrex Wedge Polishing Stub	50116-64	Included	-----	Included
SEM Stub	50116-65	-----	Included x 4	Included x 4
Glass Leveling Slide	50116-70	Included	Included	Included

Catalog#	Description	Pack
50115-10	Tripod Polisher Model 590 TEM	Set
50115-20	Tripod Polisher Model 590 SEM	Set
50115-30	Tripod Polisher Model 590TS (SEM+TEM)	Set

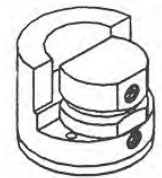


► **Accessories for Tripod Polishers**

► **1. Ion Mill Stage, Model 59001**

The Ion Mill Stage is designed to accept the special SEM stub used with the Tripod Polisher. The SEM stub is mounted to the Ion Mill Stage and the samples are briefly ion milled in order to remove fine scratches, polishing debris and to give the surface topography prior to SEM analysis.

50118-01	Ion Mill Stage, Model 59001	each
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50118-01

► **Starter Kit:**

This starter kit is designed to provide all of the necessary supplies needed for sample preparation in use with the Tripod Polishers.

Cat.#	Description	Pack
50118-05	Kit includes: Set of Diamond Lapping Film (1 each of 0.5, 1, 3, 6, 15, and 30 back); Multitex Polishing Cloth; 8" Glass Plate; 0.05µm Colloidal Silica; Mounting Wax; Squeegee; Slotted TEM Grids, Sample Cleaner; Cotton Swab 50/pk); Petri Dish, Filter Paper, Tweezers set, and Scotch Pad	each

Check out our Most Revolutionary Products...

Introducing DuraSiN™, revolutionizing the way samples are prepared and analyzed in the transmission electron microscope.

DuraSiN™ Film and Mesh products are affordably-priced, durable, nonorganic, low scatter support grids for quantitative TEM and X-ray analysis. Unlike other support films and grids, DuraSiN™ Film and Mesh products can withstand harsh chemical and temperature environments.

For more information, see page 152-157. >>>>



SEM image of a DuraSiN™ Film (taken from the back side)



SEM image of a DuraSiN™ Mesh (taken from the back side)

INSTRUMENTATION

▶ ASAP-1 IPS Digital Selected Area Preparation System

Product Highlights

- Suits all sizes of die - package, wafer and board-level
- Real Time Video Monitor with system parameter
- Touchscreen control with physical joystick & controls
- Rigidized Table Assembly and closed-loop, high-torque, motor control enhances the machining of tough and hard materials
- X, Y and Z axes all have deep sub-micron accuracy
- Accurately decaps, then thins substrate and polishes
- Patented Floating Head provides a true polishing action -- yields polishing quality & high survivability
- Intuitive menus provide a powerful, easy to use, system
- USB Flash Drive interface for preparation recipe storage
- Short set-up and process times
- Accurate die-tilt adjustment 'on the fly'
- Bench-top & Quiet in Operation



Since product launch, ASAP-1® hardware has become the standard piece of preparation equipment that engineers involved in disciplines such as failure analysis, yield enhancement, radiation testing, and competitive analysis have come to rely on for backside preparation. ULTRA TEC has produced leading solutions for backside preparation since 1999. With over 300 ASAP-1 units installed in Semiconductor industry labs throughout the world, we are proud to introduce the ASAP-1® IPS.

Enabling The Next Generation Of Failure Analysis

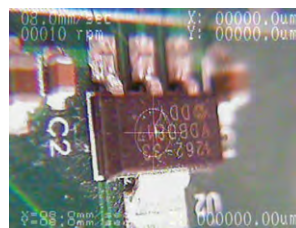
Ever since the inception of the ASAP-1 Project, ULTRA TEC's goal has been to offer both user-friendly and sample-friendly tools. The ASAP-1® analog systems offer elegant, intuitive controls which have enabled all labs to achieve quality results for subsequent analysis with Photon emission microscopes, laser/ thermal stimulus microscopes and FIB's. The user-friendly intuitive nature of the analog units has been carried forward, and expanded with ASAP-1® IPS.

Digital Control... Done Right!

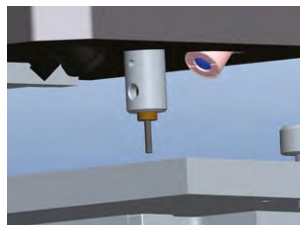
ASAP-1® IPS offers deep sub-micron control on X, Y and Z axes, making it 'hands-down' the most accurate system ever seen in the market.

Much More Than A Mill

ASAP-1® IPS enhances the market-leading attributes of our legacy products with the latest digital technology. It is now possible to grind substrates thinner, polish flatter and de-process even more accurately. ASAP-1® IPS introduces a suite of features that automate many aspects of the process – from analyzing the part to be processed, to writing intuitive programmable recipes, to reading in-situ end-stop indicators that ensure each important sample is prepared correctly. The patented 'float down' polishing head design is retained, and enhanced with the use of force feedback. to achieve the quality of final polish demanded by customers for backside microscopy, Laser scan, FIB and SIL.



IPS real time monitor shows X, Y & Z Positions, speeds feeds & tool diameter



Machine vision, laser scan, & illumination provide feedback of system parameters

Improved System Controls

The dedicated machine-vision monitor provides an 'always on' realtime view of the part, overlaid with current system coordinates and parameter. Now you can see the part as it is being processed!

A touchscreen interface, a physical joystick and encoders -- alongside a suite of intuitive software and hardware features -- empowers the FA technician & engineering professional for the next generation of failure analysis.



The Touchscreen offers a powerful user interface - enhanced by physical controls

Specifications

- Z-Vertical Direction Precision:** 0.04 microns (40 nanometers)
- Table Precision (X& Y Travel):** 0.2 microns (200 nanometers)
- Table Travel Amplitude:** 100mm x 100mm
- Polishing Method:** Patented ASAP-1 Float-down head, with Z-lock, enhanced with electronic sensors and tool patterns
- Video:** Real-time machine vision with 6.5 inch video monitor. External Video Output (NTSC)
- Programming Input Method:** Touchscreen with joystick and 3 physical rotary encoders
- Machine Encoder:** Real-time Video of overlaid with stage and process variables.
- Tilt Control:** Computer-aided 2-circle tilt control, ULTRACOLLIMATOR Measurement (option)
- Force Control:** 1000grams (max) with 1 gram precision. Overall accuracy +/- 10 grams
- Recipe Load & Save:** USB Port, for removable flash drive (up to 2Gb) Z Position Touch-off Method Mechanical Positioning with Force-feedback (option) sensors.
- X & Y Position:** LASER Targeting
- Power Consumption:** 300 Watts Maximum in use
- Power Requirements:** Universal: 100-120VAC; 200-240VAC
- Footprint:** 19 inches (480mm) Width x 25 inches (635 mm) Depth x 22 Inches (560mm) Height

► ASAP-1 IPS Digital Selected Area Preparation System (continued)

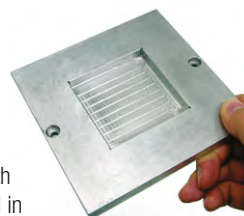
Accessories

Wax-In Plate

Holds difficult packages

The Wax-in plate allows for packages with long vertical leads ("dead bug") or those with 'difficult' or non-standard shapes to be held in position for Selected Area Preparation.

- Works with paraffin wax or similar adhesives
- Holds dead-bug type packages



XYBOVE Re-application Tool

Re-mounting station for Xybove final polishing tips. The XYBOVE Re-Application Tool makes replacing XYBOVE Tips straightforward and rapid -- especially on smaller 1mm and 2mm diameter tools.

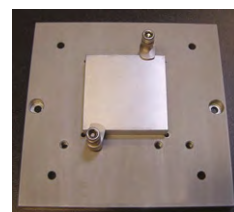


- Make Replacement XYBOVE Tips when required
- Save on buying new tools
- Fast and Convenient to use, especially on small diameter tools

Flip-over Workholder

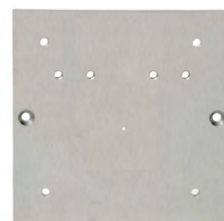
Allows optical alignment of non-optically-accessible parts

Re-mounting station for Xybove final polishing tips. The XYBOVE Re-Application Tool makes replacing XYBOVE Tips straightforward and rapid -- especially on smaller 1mm and 2mm diameter tools.



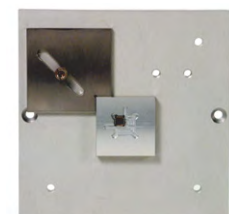
ASAP-1 Standard Mounting Plate

Standard Mounting Plate for ASAP-1 systems. Mounts on to the system with four corner dowel holes and screw holes for even stronger mounting, if required. Includes flat, ground and lapped anodized aluminum surfaces, with a center optical alignment for use with the ULTRACOLLIMATOR. Tapped holes are include for mechanical mounting with wafer clamps or similar.



ASAP-1 Repeat Positioning Holders

Holders that work with the Standard Mounting Plate for ASAP-1 systems. Repeat Holders -- namely the Corner Square and the Small wax-in holder -- allow for many of the same part to be sequentially processed, without the need for re-centering or recalibration of the ASAP-1© system.



Particulate Vacuum Pump

- Used with ASAP-1© IPS
- Provides the safest working conditions, particularly when dry grinding encapsulants and electronic components
- Quiet and Efficient
- HEPA filter
- Allows best viewing in machine vision mode
- Driven by ASAP-1© IPS Software



Ordering Information

Cat No.	Description	Qty
6760.1	ASAP-1© IPS with Optical Control DIGITAL Selected Area Preparation System, 100-240V, 50/60Hz. Includes: X-Y table, tool spindle drive with deep sub-micron micron Z-resolution, compound sine tilt-table, touchscreen programming unit, ULTRACOLLIMATOR optical alignment, integrated real-time machine vision, 6.5 inch lcd monitor, set of 2mm and 3mm tools.	each
6760.2	ASAP-1© IPS DIGITAL Selected Area Preparation System, 100-240V, 50/60Hz. Includes: X-Y table, tool spindle drive with deep sub-micron micron Z-resolution, tilt-table, touchscreen programming unit, integrated real-time machine vision, 6.5 inch lcd monitor, set of 2mm and 3mm tools.	each
6715.1	High torque Motor (upgrade) 3X Torque motor. Suits aggressive material requirements such as removal of thick heat-sinks, removal of metals.	each
6389.1	Force Feedback Module System upgrade to add force feedback software for preparing delicate samples and dice for exhibiting in-package curvature.	each

3D Upgrade Modules

6394.1	Curvature Correction Adds sample curvature definition -- Suits decapsulation, thinning, and polishing of packaged dice showing warpage or non-flat conditions. Independent X & Y Axis Correction, AUTOCURVE Mode. Also adds Stage AUTOTILT function	each
6366.1	Thermal Relaxation Stage Adds thermal relaxation capability for warped die. Peltier-based heating plate with 1C accuracy. Hot Plate mode for convenient sample mount/demount. Includes stage, cable, two custom mounting plates with nylon retention screws	each

Characterization Modules

6368.1	End-Point Module High impedance / small capacitance based -- Hardware and Software Upgrade to add end-pointing for enhancement of decap, deprocessing, and polishing.	each
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Accessories

6373.1	Wax-in Mounting Plate	each
6316.1	XYBOVE Re-Application Tool. Supplied with 3 sheets of Xybove and tools for manufacture of 1mm, 2mm, 3mm and 5mm Xybove tips.	each
6388.1	Flip-over Sample Holder Allows for ULTRACOLLIMATOR alignment of packages and samples that have no access for 'opposite-side' alignment.	each
6371.1	Standard Mounting Plate for ASAP-1	each
6386.1	Repeat part Corner Square	each
6327.1	Small Wax-in Mounting Plate	each
6780.1	Particulate Vacuum Pump for ASAP-1© IPS Supplied with collection hose hardware -- 110V only	each
6780.2	Particulate Vacuum Pump for ASAP-1© IPS Supplied with collection hose hardware for -- 220 to 240V only	each

INSTRUMENTATION

Model 900 - Grinding and Polishing Machine

This light weight, bench top Grinding/Polishing model is ideal for surface preparation of small metallographic specimens. It is adjustable in speed from 0 to 1725 RPM, and has 1/3 HP and it is fully grounded. The coolant is applied to the wheel through an adjustable flow control goose-neck spout. The unit comes complete with a removable rubber splash guard for cleaning and a compression fitting for an easy connection into the existing coolant supply. Measures: 13" x 15.25 x 9.5" (H); Weight 35 lb. 110 volt, 60Hz

Model 900 Includes: Aluminum lapping plate, Lapping plate removal wrench, Metal splash guard, Metal holding band (for plain back paper) and Rubber splash guard

50120-10	Model 900	each
50120-20	Model 900CE (converted to comply with CE)	each

Accessories and Spare Parts

50120-40	Manual Work Arm for the Model 900 (must be factory installed)	each
50120-50	8" Aluminum Lapping Plate	each
50120-51	8" Glass Lapping Plate (used with plain back lapping film)	each
50120-60	Metal Holding Band	each
50120-61	Rubber Splash Guard	each
50120-62	Metal Splash Guard	each
50120-70	Motor Controller, 110 VAC	each
50120-72	Motor Controller, 220 VAC	each

**► Model 910 - Lapping and Polishing Machine**

This model 910 is specially designed to provide all of the features required to obtain outstanding results using the EMS Polisher. The Polisher is designed for SEM cross sectioning and also for TEM wedge polishing preparation. For instance, TEM wedge polishing requires that the polishing wheel rotates at a constant speed with high torque at a very low rpm. This combination of features is not found in standard grinders. Our model 910 provides all of the requirements that a Tripod Polisher needs. This includes the use of diamond lapping films and either colloidal silica or colloidal alumina suspensions. Plain backed diamond lapping film adhered to a glass plate by surface tension, and is easily removed for storage and re-use. Model 910 is also designed for ease of cleaning and disposal of abrasive debris.

FEATURES:

- Variable speed from 8 - 600 RPM
- Solid, cast aluminum construction
- Low speed, high torque rotation (makes it ideal for Tripod Polishing)
- Vibration free, quiet operation
- Stylish, tabletop design

Specifications:

Dimensions: 21" x 13" x 11"
Net weight: 60 lb (27kg)
Motor: 1/20 HP
Wheel Diameter: 8"
Electrical: 90-120VAC; 5-/60Hz or 200-240 VAC, 50/60Hz

Model 910 includes: Water and slurry delivery system, Aluminum lapping plate (includes O-ring #50122-30 for metal holding band), Metal holding band (for holding abrasive papers and polishing cloth, #50122-31), Glass plate, Dust cover, Hex wrench set

50122-10	Lapping and Polishing Model 910	each
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Accessories and Spare Parts

50122-14	Workstation Post	
50122-15	8" Dia Glass Plate (must mounted to 50122-16, which is included with the Model 910)	each
50122-16	8" Dia Aluminum Lapping Plate	each
50122-17	8" Dia Cast Iron Lapping Plate	each
50122-18	8" Dia Cast Iron Lapping Plate, Concentric Grooves	each
50122-19	8" Dia Cast Iron Lapping Plate, Spiral Grooves	each
50122-24	8" Dia Cast Iron Lapping Plate, Radical Grooves	each
50122-25	Cast Iron Conditioning Ring (for use with cast iron plate only)	each
50122-26	8" Dia Copper Composite Lapping Plate	each
50122-27	Diamond Conditioning Ring (for use with copper composite plate only)	each
50122-40	Manual Yoke, Left side (includes post #01-02262-01)	each
50122-41	Manual Yoke, right side (include post #01-02262-01)	each
50122-42	Lapping Plate Flatness measuring kit (includes: granite leveling plate and flatness gauge #02-02134-01)	each



Electron Microscopy Sciences offers a full range of equipment used in materials preparation for a variety of technological fields. Electron microscopy, metallography, wafer lapping and polishing, failure analysis, crystal orientation, plasma processing, MEMS and many other applications are facilitated by our equipment. Please contact us or see our comprehensive website, which includes our complete line.

► **Model 920 - Lapping and Polishing Machine**

The model 920 is the first in a new generation of multi-purpose lapping machines designed for accurately lapping and polishing a wide range of materials. The 920 can be used as a standard metallurgical grinder/polisher utilizing abrasive papers, abrasive films, diamond discs, polishing cloths, etc., or it can be used as a high precision free abrasive lapping machine for flat polishing of optical and semiconductor materials.

When used as a free abrasive lapping machine, the 920 can accommodate most of our Lapping Fixtures for precise sample orientation and maximum flatness. The precision fixtures and the self turning lap ensure samples of the highest quality. In addition to flat lapping, we offer 2 fixtures for polishing oriented crystals. The crystals can be oriented and subsequently polished while maintaining their orientation.

The Model 920 is also available with two optional workstations. These independently controlled workstations rotate polishing fixtures automatically, thereby simplifying the polishing process and minimizing operator supervision. The 920 is ideal for high precision polishing in both R & D and production environments.

FEATURES:

- Variable Speed, 10 - 600 RPM
- Solid, Cast Aluminum Construction
- Quick exchange of worn-out disc
- Optional workstations for semi-automatic polishing
- Stylish, Tabletop design
- Vibration free, quiet operation

Model 920 includes: Model 920 is pre-wired for two workstation accessories and includes a water and a slurry deliver system. The aluminum plate #50122-16 (include 50122-30 O-ring for metal holding band). Metal holding band #50122-31 (for holding abrasive papers and polishing cloths). Glass plate #50122-15 (for use with abrasive film). Dust cover

50124-20R Lapping and Polishing Machine Model 920 each

Model 920L includes: Model 920 Lapping and Polishing Machine, Standard Motorized Yoke Assembly, Right Side (Model 92034L), Drive Motor Assembly, Right Side (Model 92012R)

50124-20L Lapping and Polishing Machine Model 920L each

Model 920LR includes: Model 920 Lapping and Polishing Machine, Standard Motorized Yoke Assembly, Left Side, (Model 92034L), Drive Motor Assembly, Left Side (Model 92012L), Standard Motorized Yoke Assembly, Right Side, (Model 92034R), Drive Motor Assembly, Right Side, (Model 92012R)

50124-20LR Lapping and Polishing Machine Model 920LR each



Accessories and Spare Parts

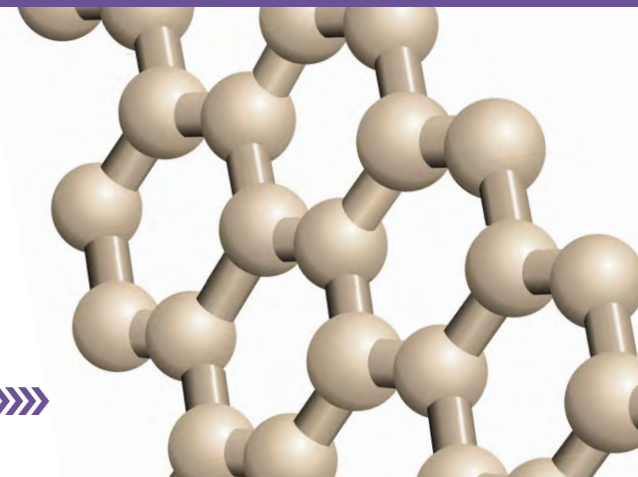
550124-50	Standard yoke assembly, left side, used with Model 92012L	each
50124-51	Standard Motorized post Assembly, Left Side	each
50124-52	Standard yoke assembly, right side, used with Model 92012R	each
50124-53	Standard drive motor post assembly, right side	each
50124-54	Yoke sweep mechanism, with motor drive, left side	each
50124-55	Yoke sweep mechanism, with motor drive, right side	each
50124-56	Digital RPM meter	each
50122-42	Lapping plate flatness measuring kit	each
50124-14	Tri-holder specimen mount (for metallographic mounts up to 38mm diameter)	each
50124-15	Quad-holder specimen mount (for metallographic mounts 25-32mm diameter)	each
50122-15	Glass Lapping plate, 8"	each
50122-16	Aluminum lapping plate, 8"	each
50122-17	Cast iron lapping plate, 8"	each
50122-18	Cast iron lapping plate, concentric grooves, 8"	each
50122-19	Cast iron lapping plate, spiral grooves, 8"	each
50122-25	Cast iron conditioning ring (for use with cast iron lapping plates only)	each
50122-26	Copper composite lapping plate, 8"	each
50122-27	Diamond conditioning ring (for use with copper composite lapping plate only)	each

Check out our New and Exclusive Products...

Introducing Graphene, the ideal suport film for electron microscopy.

Graphene is a single atomic layer of carbon atoms tightly packed in a two-dimensional honeycomb lattice. This novel material is atomically thin, chemically inert, consists of light atoms, and possesses a highly ordered structure. Graphene is electrically and thermally conductive, and is the strongest material ever measured.

For more information, see pages 140-141 >>>>



INSTRUMENTATION

► MULTIPOL Precision Lapping & Polishing Machines

Product Highlights

- Versatility – all polishing methods can be used including, abrasive, diamond, slurry, CMP and etch polishing
- Optical quality polishing
- Easy to clean -All parts which could cause cause contamination can be easily detached. This means downtime is minimized.
- All lapping and polishing techniques can be accommodated
- Tight control of all process variables allows superior performance on most materials
- Bench-top and quiet in operation



MULTIPOL 8 and 10 are versatile lapping and polishing systems capable of preparing the most demanding specimens required by Research and Industry. Primarily designed for failure analysis, research and pilot-scale production applications, they allow for many methods of sample holding - producing a high versatility which is extended by the availability of a range of accessories and polishing plates.

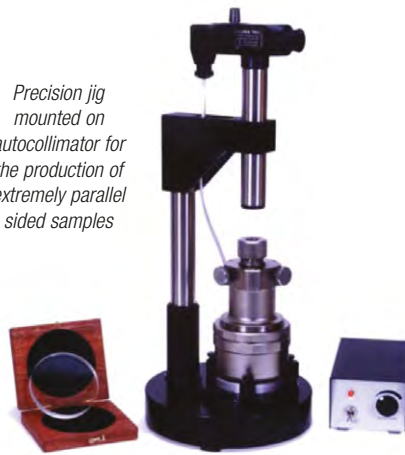
Optical Standards of finish can be achieved with the use of the system's reciprocating sweep mechanism. This control allows maintenance of surface parallelism and flatness. Sample loading is fully variable, as are the sweep and rotation speeds.

All parts that come into contact with polishing media are produced from either stainless steel or heavy duty plastic and are quickly detachable for ease of cleaning and avoiding cross contamination. A spindle lock allows plates to be changed conveniently.

The fully-controllable reciprocating arm mechanism allows maintenance of plate flatness. This means that samples of the highest optical standards of flatness and parallelism may be prepared.

The exceptional degree of control which is available for all preparation parameters means that MULTIPOL's may be configured for hard, soft, and friable materials, and suits preparations of expensive and unique research materials.

Precision jig mounted on autocollimator for the production of extremely parallel sided samples



Specifications

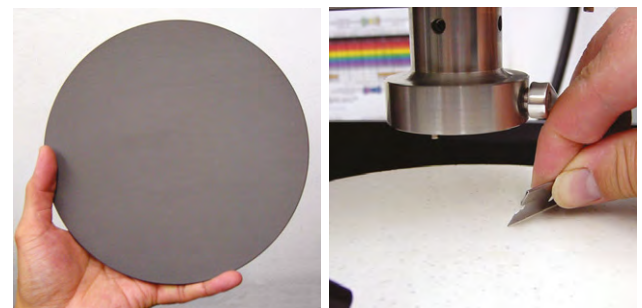
Spindle Speed	0 to 90 rpm
Sweep Stroke	Variable +/- 8 degrees
Footprint	21 inches (53cm) wide
.....	x 18 inches (46cm) deep
.....	x 8 Inches (20cm) high
Unit Weight	40 kg (100 lbs)
Electrical	110 to 240V, 50 to 60 Hz

Ordering Information

Cat No.	Description	Qty
6108.1	MULTIPOL 8	each
6110.1	MULTIPOL 10	each

Accessories

6166.2	Precision Polishing Jig Kit for maximum 2 inch diameter samples	each
6166.3	Precision Polishing Jig Kit for maximum 3 inch diameter samples	each
6166.4	Precision Polishing Jig Kit for maximum 4 inch diameter samples	each
6158.1	Recirculating slurry pump	each
6230.1	Slurry containment tray	each



Lapping and Polishing Plates

Cat No.	Diameter	Surface	Application	Qty.
6191.8	8 inch			
6191.1	10 inch	Cast Iron scrolled	Initial lapping with loose abrasives, polishing very hard materials	each
6193.8	8 inch			
6193.1	10 inch	Copper-faced scrolled	Polishing hard materials	each
6195.8	8 inch			
6195.1	10 inch	Solder-faced scrolled	Polishing medium-hard materials	each
6197.8	8 inch			
6197.1	10 inch	Cast-iron plain	Preparing brittle and very small samples	each
6199.8	8 inch			
6199.1	10 inch	Stainless steel plain	General purpose, covered with films, cloths, papers and pads	each
6206.8	8 inch			
6206.1	10 inch	Polyurethane-faced plain	Polishing with slurries, used in CMP processes with colloidal silica and alumina suspensions	each

► **ULTRAPOL End & Edge Polisher**

Flat and angled preparation of optical and electronic components

Product Highlights

- Fully Angle adjustable Quick Release Interface allow for fast and repeatable mounting and demounting.
- Holders available for most components
- Fast process times
- Low run-out lap for flat optical polishes

ULTRAPOL End & Edge Polisher has been designed to provide accurate lapping and polishing for most research and industrial applications.

Key to the high quality performance of the unit is the calibration of the polishing base and the advanced angular control provided by the polishing head.

Built-in features such as tachometer, process end-indicator, timer, and head oscillation provide assurance the finest surface production.

The specific workholder for an application is held firmly and repeatably with the system's quick release interface. Standard holders are available for most applications, including:

- Capillary / glass ferrule polishing
- Planar Waveguide polishing
- Bare fiber polishing - flat and angle polishing
- Integrated optics
- Die Cross-sectioning
- SEM and TEM sample preparation
- IC Wafer and package-level backside preparation
- Encapsulated mount polishing

Custom workholders can also be designed to your specific needs.

ULTRAPOL End & Edge Polisher uses 8 inch diameter diamond lapping films which are easily changed for maximized output.



Specifications

Angular accuracy	0.1 degrees
Angular Range	0 to 12 degrees
Footprint	22 inches (55 cm) wide
.....	x 12 inches (30 cm) deep
.....	x 19 Inches (48 cm) high
System Weight	27 kg (60 lbs)

Ordering Information

Cat No.	Description	Qty
6390.1	ULTRAPOL End & Edge Polishing System	each
Configured for 100-220/240V. Includes advanced base unit with timer, tachometer, solenoid coolant system, speed control and process-end indicator. Micropositioner head includes, advanced angular control, low inertial mass loading system with auxiliary weight kit, oscillation control, 1 micron Z-control and "Quick Release" workholder mounting system.		

Accessories

2239.1	8" (200mm) anodized lapping plate	
1301.5	Lamp	
1503.1	Disc Holding Band	

Workholders

4079.1	Thin plate edge polishing holder – holds plates up to 2.5cm long	each
4079.2	Thin plate edge polishing holder – holds plates up to 5cm long	each
2707.1	Bare fiber holder (with 125 micron replaceable ferrule) – 1 position	each
2707.4	Bare fiber holder (with 125 micron replaceable ferrule) – 4 positions	each
2745.1	Bare fiber holder – holds 5-8 fibers – for fibers > 400 micron (specify fiber size when ordering)	each
3552.1	Saddle Clamp – holds endoscopes, glass rods etc	each
3547.1	V-clamp – holds large fiber bundles and rods (16mm to 34mm diameter)	each
2727.1	Capillary / glass ferrule workholder (1.25 to 2.5mm diameter) – 12 positions	each
2726.1	Capillary setting stand – works with 2727.1	each
2024.1	Encapsulated mount workholder – (holds mounts 0.5 to 1.5 inch diameter)	each
4065.1	Single die edge x-section / SEM Stub holder	each



INSTRUMENTATION

► ULTRAPOL Basic Manual Polisher

Manual polishing tools remain important to the lab needing good delayering and/or cross-sectioning results on a very tight budget. ULTRA TEC is proud to be associated with the polishing experts at Accelerated Analysis, and to offer their advanced manual tools for use with our ULTRAPOL Basic polisher.

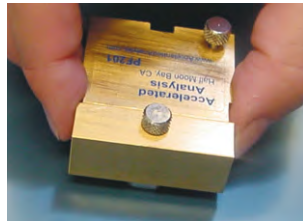


Product Highlights

- Works with all 8" (200mm) surfaces
- Small footprint
- Speed Control and high torque motor
- Coolant speed control



UPF101 Accelerated Analysis Manual Cross Section Fixture



UPF201 Accelerated Analysis Manual Parallel Polish Fixture



Disc Holding Band

Our Disc Holding band works with ULTRAPOL 8" machines and many other 8" machines on the market. It holds down the lapping film or surface and can also stop splash.

Cat No.	Description	Qty
1209.1	ULTRAPOL Basic Polisher Configured for 100-220/240V operation. 0-500 RPM. Includes 8 inch (200mm) polishing system with speed control and solenoid-controlled coolant system	each
UPF101	Accelerated Analysis Manual Cross Section Fixture Includes 5 aluminum and 5 stainless steel sample mounts	each
UPF201	Accelerated Analysis Manual Parallel Polish Fixture Includes alignment mirror and 3 parallel polish sample mounts.	each
1503.1	Disc Holding Band	each
2239.1	ULTRAPOL Spare 8" (200mm) anodized aluminum plate	each

► UltraPol Manual Polishing Station

For quick, simple hand lapping applications, the manual lapping station has a smooth 8" glass surface to support precision lapping films. The fluid containment tray underneath the plate collects water run-off from the lapping surface for later disposal, keeping the polishing process area clean and contained. A Plexiglas lid protects the lapping surface when not in use and is an ideal, safe place to store lapping films flat. The manual station is ideal for short hand polishing processes and includes the glass plate and protective cover.



Cat No.	Description	Qty
1201.1	ULTRAPOL Manual Polishing Station includes fluid containment tray and 8 inch (203mm) aluminum polishing surface. Can be used with films, pads or glass surfaces.	each
1228.1	Plexiglass Lid for ULTRAPOL Manual Polishing Systems	each

Keeps films, fluids and surfaces safe and maintains moisture overnight

► Ultratool Manual Polishing Tool

ULTRATOOL was designed for manual polishing of fibers, either supported (connectorized) or unsupported (bare fibers). The tool uses various replaceable modules which are available for all types of connectors -- if needed, custom modules can be designed and manufactured by ULTRA TEC.

Key to ULTRATOOL's performance is a height adjust feature that is controlled by a fine pitch micrometer screw thread.

Flat, PC & APC polishes can be performed on all standard connector types. Another common use is bare-fiber polishing applications (flat and angled). ULTRATOOL is capable of holding bare fibers of the full size range and many other materials such as small wafer sections (for planar or edge polishes).



Cat No.	Description	Qty
1101.6	ULTRATOOLKIT package includes 1101.1 tool in carrying case with: 8x spare wear stops, 4 connector inserts (for ST, FC, SC and LC), locking tool, 1 oz bottle of ULTRAPOL B suspension	each
2240.1	Glass lapping plate, for manual polishing	each
1101.1	ULTRATOOL spare manual tool	each

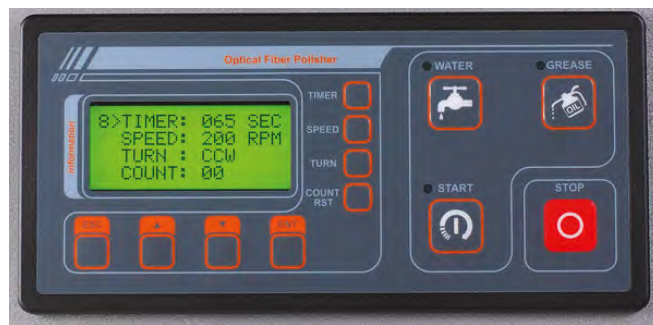
► **FIBERTEC Mass Production Fiber Polisher**

Product Highlights

- LCD screen for storing up to nine different polishing recipes and process information
- Platen torque remains fixed even when speed is varied
- Air and water are kept separated inside of housing to ensure safe operation
- Adjustable weight allows for proper polishing force
- Anti-vibration feet allow for precise leveling - more consistent results

ULTRA TEC is proud to introduce a new mass-production connector polisher. FIBERTEC can polish between 10 and 24 connectors at a time.

Drawing on ULTRA TEC's unique legacy and in-depth knowledge of the fiber polishing process, the new FIBERTEC offers market-leading features that make polishing simple and productive for the operator. The system's LCD screen makes process control and great connector polishing results easier than ever to achieve. Pressure and platen speed are controlled for ultimate consistency and performance.



Recipe and process conditions can be saved

Industry-standard polishes are readily achieved due to a robust design and system build along with using the latest techniques.



Specifications

Footprint220mm Wide x 420mm
 Net Weight26Kg
 Power110VAC 60Hz or 220VAC 50Hz - 85w
 Air consumption3 kgf/cm (squared)
 Polishing Disk OD112mm (accepts 5 inch dia. polishing film)
 Polishing Plate Speed30 – 300 RPM
 Timer1 to 999 seconds



Ordering Information

Cat No.	Description	Qty
9812.1	FIBERTEC Polisher (110V version) Includes advanced programmable fiber connector polishing system with 5 resilient polishing platens.	each
9812.2	FIBERTEC Polisher (220-240V version) Includes advanced programmable fiber connector polishing system with 5 resilient polishing platens.	each



System has a handy station for resting connector holder during film changes



Cat No.	Description	Qty
Connector Holders		
9804.1	ST Holder (12 positions)	each
9805.1	SC Holder (12 positions)	each
9805.16	SC Holder (16 positions)	each
9805.8	SC APC Holder (12 positions)	each
9814.1	FC Holder (12 positions)	each
9814.8	FC APC Holder (10 positions)	each
9815.1	LC Holder (16 positions)	each
9815.1L2	LC2 Holder (16 positions)	each
9813.1	MU Holder (18 positions)	each
9815.8	LC APC Holder (12 positions)	each

INSTRUMENTATION

► UT.Minipol.1 Polisher Single Position Fiber Polisher

Fiber polisher for small volume terminations

Product Highlights

- Retro-polishing - Bring already-installed connectors up to current industry requirements
- Wide range of holders
- Low Cost machinery solution



UT.MINIPOL.1 provides many of the features of larger polishing units in a small benchtop package—perfect for users with small production batches, or operating with a limited budget.

Versatility

All connector types may be prepared by the system, including SC, FC, ST, D4, SMA, bare fibers, PC, and Flat polishes are all accommodated by simple changes of the lap and/or the workholder.

Unique Features

A factory-set reciprocating arm movement rides the rotating lap producing high performance. This produces quality results at a low price.

Scope Of Use

UT.MINIPOL.1 allows for use as a retropolishing machine or as a quick factory-use system whether used singly, or in tandem with other units.

Accessories

The system can be powered by 110 or 220 VAC converter or by a standard 12V battery. A wide variety of Workholders are available for extending the use of the system at any time.

Tools And Consumables

ULTRA TEC stocks a wide range of Polishing Films, Papers, Pads and accessories for all polishing applications.

Specifications

Lap Diameter4inch (100mm)
 Weight:2.2kg (5 lbs.)
 Power Supply:12V Converter
 Timer:10-120 Seconds

Ordering Information

Cat No.	Description	Qty
8801.1	UT.Minipol.1 Polisher	each

Accessories

4026.1	220VAC Adapter	
6594.1	Hard Surface Disc	
6593.1	Resilient Surface Disc	
4030.1	Carrying Case	
4027.1	Battery and Charger	

► NANOpol Bare Fiber Beveling System

NANOpol offers the fiber optic communications industry the ability to produce accurate polished bevels on bare optical fibers.

Angular control is achieved with the advanced positioning features of the integral micropositioned polishing head.

Designed for the price-conscious university and research environments, NANOpol uses a 4 inch diameter polishing lap – a size specially chosen for improved flatness/run-out and low consumables costs.



Ordering Information

Cat No.	Description	Qty
8801.BF	NANOpol Fiber Polishing Machine	each

Includes: NANOPOL Base unit with 4" o.d lapping plate, Fiber Polishing Micropositioner Produces bevels and flat polishes. Power: 110 V / 60Hz and 220 to 240V, 50 Hz

Accessories

1851.01	Lensing Module Add-on BF Ball Tip	each
1851.07	Lensing Module Add-on BF Single Flat Tip	each
8010.01	4" Aluminum Carrier Plate	each
8010.02	4" Resilient Carrier Plate	each
8010.03	Weight Kit	each
1535.01	Quick-Release Mount	each
2358.01	Ferrule Forming Lap	each
8010.05	Ferrule Clearing Wire	each
4444.04	4" Bare-fiber Polishing Film Package	each

QR Holders

2703.1	SMA 905 ,One Position Connector Holder	each
2703.6	SMA 906,One Position Connector Holder	each
2707.XXX	Bare fiber holder, One Position - Specify O.D. of Stripped Fiber	each

► **ULTRAPOL Fiber Lensing Machine**

The world's first **dedicated** mechanical fiber lensing system

Product Highlights

- Unsurpassed concentricity – singlemode compatible
- Fiber lens shapes of many types and angles
- Advanced angle control ensures optimum success rate
- Uses 5 inch lapping film – low consumable costs

ULTRAPOL Sculpted end polisher offers the fiber optic communications industry the ability to produce accurate end profiles on bare optical fibers.

Improved design of fiber holding, and all processing characteristics, provide concentricity of a couple of microns. This means that accurate bisecting of a singlemode (9micron) fiber core can be achieved.

Full angular control is achieved with the advanced positioning features of the integral micropositioned polishing head. This makes possible the production of the fiber lens shapes shown below.

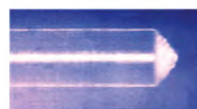
The system uses a 5 inch diameter polishing lap – a size specially chosen for improved flatness/run-out and lower consumables costs.



Sculpted End Examples



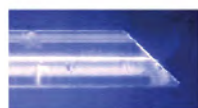
Large included-angle tapers



Small included-angle tapers



Chisel/screwdriver tips



Bevels



Flat Ends

Specifications

Produces sculpted ends on optical fibers – examples: cone tips, chisel/screwdriver tips, bevels
 Angular accuracy0.1 degrees
 Included angle range20 to 180 degrees
 Footprint22 inches (55 cm) wide
x 12 inches (30 cm) deep
x 19 Inches (48 cm) high
 Unit Weight27 kg (60 lbs)
 Voltage110 V / 60Hz and 220 to 240V, 50 Hz

Ordering Information

Cat No.	Description	Qty
6380.1	ULTRAPOL Fiber Lensing Machine Includes: ULTRAPOL Base unit with 5" o.d lapping plate, Fiber Lensing Micropositioner, with feed through spindle. Produces sculpted ends on optical fibers – examples: cone tips, chisel / screwdriver tips, bevels. Power: 110 V / 60Hz and 220 to 240V, 50 Hz	each
4026.1	5" (12.5 cm) spare polishing plate	each
1871.1	Set of 3, 125 micron replaceable ferrules	each
1325.1	Sapphire cleaving tool	each
1812.1	125 micron fiber spindle module	each
1814.1	140 micron fiber spindle module	each
1804.1	400 micron fiber spindle module	each
1860.1	600 micron fiber spindle module	each
M.5438.1	30 micron diamond, 5 inch, plain-backed film (15 pcs)	each
M.5436.1	15 micron diamond, 5 inch, plain-backed film (15 pcs)	each
M.5437.1	6 micron diamond, 5 inch, plain-backed film (15 pcs)	each
M.5433.1	3 micron diamond, 5 inch, plain-backed film (15 pcs)	each
M.5432.1	1 micron diamond, 5 inch, plain-backed film (15 pcs)	each
M.5450.1	ULTRAFILM B, 5 inch, plain-backed film (100 pcs)	each

INSTRUMENTATION

► Lapping and Polishing Fixtures

The Electron Microscopy Sciences Precision Lapping and Polishing Fixtures are designed to accurately produce polished parallel, tapered or critically oriented samples with minimal sub-surface damage. A series of specialized fixtures has been developed for lapping and polishing samples up to 6" in diameter, TEM samples and oriented crystals. In addition to size and shape, the fixtures differ in the type of thickness control techniques they employ. The Lapping and Polishing Fixtures are designed to be used either by hand or with a lapping machine (Model 920 above). Sample Mounting Fixtures are also designed to be used in conjunction with these fixtures to ensure that the sample is mounted parallel to the mounting block and that a thin, uniform layer of wax exists between the mounting block and the sample.

► Micrometer Controlled Fixtures

The micrometer method of thickness control employs a dial with 25 micron or finer graduations, that is adjusted relative to the outside support ring to set the amount of material to be removed. To set the dial, the sample is initially zeroed against the lapping plate and then the dial is adjusted to create a gap between the outside support ring and the center slide. This gap corresponds to the amount of material to be removed and gradually decreases, as the sample is lapped or polished, until the final thickness is reached. The load on the sample is varied by adding weights or finger pressure the top of the fixture. Due to the ease of adjustment a micrometer controlled fixture is generally used when desired sample thickness will vary from sample to sample.

FEATURES:

- Tungsten carbide base resists wear and maintains sample planarity.
- Wide base ensures stability thereby minimizing sample damage and edge rounding
- Wear ring is replaceable, on some fixtures, which extends the life of the fixture.
- Can be mounted in the Model 920 Lapping & Polishing Machine for semi-automatic processing
- Micrometer depth control allows precise control over sample thickness.
- Precisely crafted stainless steel construction ensures long life and high precision.

► Model 145 Lapping and Polishing Fixture

This model accommodates up to a ½" sample mount, which is held in place using a threaded draw rod and locating pin. This small, lightweight fixture is ideal for hand lapping or polishing of samples less than ½" in diameter. Comes with replaceable feet.

► Model 150 Lapping and Polishing Fixture

This model accommodates sample mounts up to 1" in diameter for both parallel and tapered samples. Angled blocks up to 45° are available and are simply mounted in place of standard parallel mounts when tapered sections are desired. The mounting blocks from this fixture are directly transferable from any cutting saw. The Model 150 is for general-purpose fixture and is capable of lapping and polishing multiple small or large samples up to 1" in diameter.

► Model 151 Counter-Balanced Lapping and Polishing Fixture

This model is identical to the model 150 except that the center slide is completely counter-balanced which enables the user to precisely vary the sample load. The model 151 is ideal when lapping or polishing very delicate materials, where only a minimal sample load can be tolerated.

► Model 155 Lapping and Polishing Fixture

This model works the same as the Model 150, but accommodates sample mounts up to 2" in diameter. A streamlined design reduces the overall fixture weight, which makes it ideal for lapping either by hand or on a lapping machine. This model also has replaceable tungsten carbide feet.



► Model 155DV Lapping and Polishing Fixture

This model is identical to the model 155 in all aspects, however, this model can be used to adapt an option of Vacuum (155V) or a Digital indicator (155D). The Model 155V has the ability to mount specimen up to 2" diameter using vacuum. The Model 155D has a digital indicator allowing 1micron resolution during the lapping and polishing process. You can purchase this model with both options (Model 155DV).

► Model 155L

The Model 155L (Previously Model 154) is ideal when lapping or polishing very delicate materials, where only a minimal sample load can be tolerated. The 155L uses counter-balance springs to reduce specimen load. The fixture is capable of lapping and polishing multiple small samples or larger samples up to 2" in diameter.

► Model 155E

Please see Model 147.

To order parts and accessories, see next page... >>>>>

➤ Lapping and Polishing Fixtures (continued)

➤ Standard Lapping Fixture Ordering

Cat. #	Model	Height	Base Dia.	Piston Weight	Thickness Control	Max. Sample Size		Sample Mounting	Special Features
						Dia.	Hgt		
50150-45	145	2.5"	1.5"	50g	Micrometer	0.5"	0.4"	Wax	
50150-50	150	4.5"	2.7"	300g	Micrometer	1.0"	0.5"	Wax	
50150-50L	150L	4.5"	2.7"	Zero	Micrometer	1.0"	0.5"	Wax	Low Force
50150-50MC	150MC	4.5"	2.7"	300g	Micrometer	1.0"	0.5"	Wax	
50150-55	155	5.5"	3.5"	350g	Micrometer	2.0"	0.32"	Wax	
50150-55D	155D	5.5"	3.5"	350g	Digital	2.0"	0.32"	Wax	
50150-55E	155E (153)	5.5"	3.5"	350g	Micrometer	2.0"	0.32"	Wax	Edge Polish
50150-55L	155L (154)	5.5"	3.5"	Zero	Micrometer	2.0"	0.32"	Wax	Low Forge
50150-55V	155V	6.75"	3.5"	350g	Micrometer	2.0"	0.32"	Vacuum	
50150-55DV	155DV	6.75"	3.5"	350g	Digital	2.0"	0.32"	Vacuum & Wax	
50150-55DL	155DL	5.5"	3.5"	Zero	Digital	2.0"	0.32"	Wax	Low Forge
50150-55LMD	155LMD	5.5"	3.5"	Zero	Micrometer	1.0"	0.50"	Magnetic & Wax	Low Forge
50150-47	147	5.5"	4"	355g	Micrometer	2.625"	0.40"	Wax	
50150-47D	147D	5.5"	4"	355g	Digital	2.625"	0.40"	Wax	
50150-47E	147E	5.5"	4"	355g	Micrometer	2.625"	0.40"	Wax	Edge Polish
50150-47V	147V	6.75"	4"	355g	Micrometer	2.625"	0.40"	Vacuum	
50150-47DV	147DV	6.75"	4"	355g	Digital	2.625"	0.40"	Vacuum & Wax	
50150-47ED	147ED	5.5"	4"	355g	Digital	2.625"	0.40"	Wax	Edge Polish

➤ Accessories and Spare Parts for Lapping and Polishing Fixtures

Cat. #	Fixture Model Used	Description	Pack
50151-00	155	Vacuum Mounting Kit for Vacuum Mounting Specimens, Kit includes: Vacuum Assembly #50151-01 & Draw Rod, Knob Assembly #50151-02	each
See Mounting Lock Series 50153 to order		Vacuum Mounting Block (1 required for #50151-00) NOTE: Vacuum Mounting Blocks are not included with #50151-00 and require a custom pattern specified by the customer	each
50151-05	155, 155D, 155V	Replace wear Ring, Stainless Steel with Tungsten Carbide Feet	each
50151-06	155D	Micrometer Dual Extension	each
50151-07	155D	Base Extension Adapter	each

➤ Angled Mounting Blocks for Lapping & Polishing Fixtures

All are 1" (25mm) Diameter Stainless Steel Mounting Blocks.

Cat. #	Fixture Model Used on	Angle	Pack
50153-01	150, 151, 155	0.25° Angle	each
50153-02	150, 151, 155	0.5° Angle	each
50153-03	150, 151, 155	1° Angle	each
50153-04	150, 151, 155	2° Angle	each
50153-05	150, 151, 155	3° Angle	each
50153-06	150, 151, 155	4° Angle	each
50153-07	150, 151, 155	5° Angle	each
50153-20	150, 151, 155	10° Angle	each
50153-21	150, 151, 155	20° Angle	each
50153-22	150, 151, 155	30° Angle	each
50153-23	150, 151, 155	45° Angle	each
50153-24	150, 151, 155	60° Angle	each
50153-25	150, 151, 155	Angle	each

➤ Weight for Use with Lapping and Polishing Fixtures

Cat.#	Description	Pack
50155-01	Cutting Weight, 7.5g	each
50155-02	Cutting Weight, 15g	each
50155-03	Cutting Weight, 20g	each
50155-04	Cutting Weight, 40g	each
50155-05	Cutting Weight, 100g	each
50155-06	Cutting Weight, 150g	each
50155-07	Cutting Weight, 200g	each
50155-08	Cutting Weight, 300g	each
50155-09	Cutting Weight, 400g	each
50155-10	Cutting Weight, 600g	each

➤ Vacuum Mounting Blocks - Vacuum Plates for use with #50151-00

Cat.#	Fixture Model	Description	Pack
50151-10	155D, 155V, 155DV	2.125" (54.0mm) Diameter Mounting Block, Blank for Vacuum Pattern*. Stainless Steel	each
50151-11	155D, 155V, 155DV	2.186" (55.5mm) Diameter Mounting Block, Blank for Vacuum Pattern*	each
50151-12	155D, 155V	2.125" (54.0mm) Diameter Mounting Block; 2" (50mm) Diameter Vacuum Pattern	each

* Blank Vacuum Plates can be machined into specific patterns depending upon customer requirements. An extra charge for this requirement is \$120.00 will be added to the Vacuum Plate cost.

➤ Vertical Mounting Blocks - Use for Edge Polishing

Cat.#	Fixture Model	Description	Pack
50154-01	155D	2" (50.0mm) Diameter Mounting Block, Vertically Mounted Samples; Star Pattern, 4-Position. Stainless Steel	each
50154-02	155D	2" (50.0mm) Diameter Mounting Block, Vertically Mounted Samples; Star Pattern, Reversible, 6-position (Max. 20mm Specimen Length), Stainless Steel	each
50154-03	155D	2" (50.0mm) Diameter Mounting Block, Vertically Mounted Samples; Star Pattern, Reversible, 6-position for 12mm Diameter Rod or 10mm Cube (Max. 20mm Specimen Length), Stainless Steel	each

➤ Flat Mounting Blocks (Stainless Steel) for Lapping & Polishing Fixtures

Cat. #	Fixture Model Used on	Description	Pack
50152-01	150, 151, 155	0.75" (19mm) Diameter	each
50152-02	150, 151, 155	1" (25mm) Diameter	each
50152-03	150, 151, 155	1 1/4" (31.75mm) Diameter	each
50152-04	155	1 1/2" (38mm) Diameter	each
50152-05	155	2" (50mm) Diameter	each

INSTRUMENTATION

► Sample Mounting Fixtures

The proper mounting of samples is a critical step in the lapping and polishing process. It is imperative that the sample is firmly mounted parallel to the sample mount surface to ensure accurate results. Typically, samples are mounted using a low melting point wax (such as EMS #50400-01, Crystal Bond 509...) Sample Mounting Fixtures are designed to both monitor the temperature of the wax and to provide a uniform mounting pressure.

Operation:

When using low melting point wax, the mounting block is first heated on a hot plate then a thin layer of wax is melted evenly on it. The sample is placed on the mounting block, an appropriate size pressure plate is placed on the sample and they are placed together on the base of the mounting fixture. A spring-loaded rod is then positioned in the center of an indent in the pressure plate while setting the pressure with the height adjustment of the arm. The whole assembly is then placed on a hot plate until the correct temperature is reached and maintained for a short while to ensure a uniform layer of wax cooling tray to facilitate the hardening of the wax.

► Model 110 Sample Mount

This model is designed to mount samples up to 2" in diameter and is supplied with 6 Pressure Plates ranging in size from 1/2" to 2" diameter. The unit is also supplied with a set of tongs to lift the fixture when hot. The model 110 is the most basic model and is ideal for routine sample mounting in laboratories.

► Model 125 Cooling Tray

This model is intended to be used with a Hot Plate (see page 1076, EMS Cat. #72350) and is designed to handle a sample mount, which can slide directly from the hot plate onto the cooling tray platform without being lifted. The Cooling Tray consists of a large anodized aluminum plate with cooling fins that are designed to facilitate the rapid and uniform cooling of the Sample Mounting Fixture.

► Sample Mounting Kit

To facilitate all of your work, we offer the Sample Mounting Kit, which includes the necessary equipment to establish a basic sample mounting for your lab. This kit includes:

- 1 each Model 110 Sample Mount
- 1 each Model 420 Hot/Stir Plate (EMS Cat. #72350)
- 1 each Model 125 Cooling Tray and 1 package of Mounting Wax (Crystal Bond 509, Cat #50400-05).

Cat.#	Description	Pack
50160-10	Model 110 Sample Mount	each
50160-25	Model 125 Cooling Tray	each
72350	Stirrer/Hot Plate	each
50400-05	Crystal Bond 509, 5 Sticks	each
50160-00	Sample Mounting Kit	each



► Chemical Polishing Fixture - Model 160

The polishing of semiconductor materials often requires the use of harsh chemicals such as bromine or hydrofluoric acid solutions that would corrode the stainless steel from which most of the EMS fixtures are constructed. A special fixture for satisfying this requirement has been developed.

The Model 160 is made of PTFE and is designed to hold crystal wafers up to 2 1/2" diameter while they are being polished with very corrosive chemicals. The sample is held in place by vacuum and the sample is polished by rubbing the exposed sample against a suitable polishing cloth soaked with the chemical solution. The Model 160 is ideal for damage free polishing of semiconductor materials with harsh chemicals and has been used extensively for polishing GaAs with bromine-methanol solutions.

**SPECIAL FEATURES:**

- PTFE construction provides suitable level of chemical resistance.
- Vacuum mounting method ensures simple and uniform sample mounting.
- Allows polishing of samples up to 2 1/2" diameter
- Suitable for bromine-methanol polishing of GaAs.

Cat. #	Description	Qty.
50164-60	Chemical Polishing Fixture - Model 160	each

► The Quick Jig

A Universal Mounting Fixture

The Universal Sample Mounting Fixture is a versatile spring-loaded fixture for securing samples with pressure during mounting using adhesives, waxes, and epoxies. The fixture can be used at room temperature or on a hot plate for heat curable epoxies or faster drying of conductive paint. A scale on the pressure rod allows the user to apply reproducible pressure, from very light to heavy. Two interchangeable trays accommodate six different sized disk sample mounts (1/2", 3/4", 1", 1-1/4", 1-1/2", and 2" diameters) and five angled SEM pin stubs (0°, 45°, 52°, 70°, and 90°). The angled SEM pin stubs are held with screws on the angled surface so that the sample lies horizontally and the pressure applied vertically normal to the sample's surface. The 70° angle is useful for pre-tilted EBSD sample holders and the 52° angle is useful for FIB holders. The PTFE tip contacting the sample is compliant and easily cleaned if any adhesive inadvertently comes in contact with it. The fixture adapts to a large range in sample height.

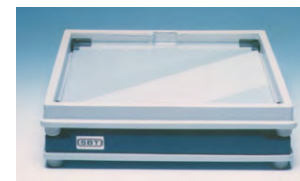


Cat. #	Description	Qty.
50160-05	Universal Mounting Jig	each

► Model 180 Stackable Lapping Trays Hand Lapping Tray

This model consists of a replaceable 12" square glass lapping plate mounted into a cast aluminum tray. The tray is designed to serve as a secure surface for the glass plate while polishing with abrasive slurries, abrasive paper or abrasive films. The area under the glass plate acts as a reservoir to contain the used slurry or fluids.

Cat.#	Description	Pack
50162-80	Model 180 Hand Lapping Tray	each
50162-85	Replacement Glass Bowl 12x12", 3/8" Thick	each



► Rail Polisher

FEATURES

- Low friction rails allow for a smooth glide of the fixture.
- Non-contact footing reduces abrasive film wear.
- Magnetic specimen mounts allow rapid and easy removal of specimens for viewing.
- Peek-thru aperture in the magnetic specimens mounts allow for transmitted light viewing.
- Variable loading is optional by adding weights or finger pressure to the top of the fixture.
- Micrometer depth control allows precise control over specimen thickness.
- Precisely crafted stainless steel construction ensures long life and high precision.

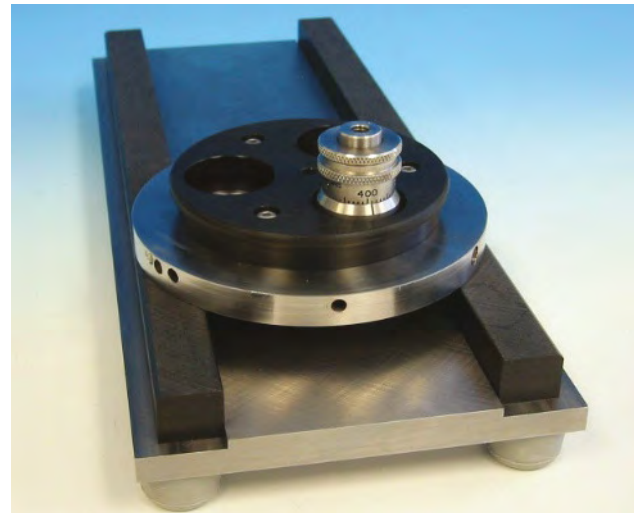
This newly introduced Lapping and Polishing Fixture, which is designed to accurately produce polished parallel, tapered or critically oriented samples with minimal sub-surface damage.

Derived from the Model 195 MultiLap™ Polishing Tool, the Rail Polisher version exhibits significant difference from the mode I195 MultiLap. The employment of the rail guide system allows for precision hand polishing of delicate specimens, which may be damaged on rotary polishing machines. Additionally, the rail guide system employs a non-contacting base, reducing wear on many types of abrasive films and media. The Rail polisher incorporates up to 3 separate pistons, which are used for holding the specimen during preparation and controlling the amount of material to be removed. Specimens up to 1" in diameter can be polished with controlled material removal for rapid viewing of the specimen in the light microscope. Also the magnetic mounts have a circular aperture, which provide means for viewing the specimen in transmitted light. Overall, the Rail Polisher is a versatile instrument for performing any controlled material removal process in the laboratory.



Micrometer Controlled Accuracy

The micrometer method of thickness control employs a dial with 10 μ m graduations that is adjusted relative to the outside support ring to set the amount of material to be removed. To set the dial, the sample is initially zeroed against the flat surface of the rail system and then the dial is adjusted to create a gap between the outside support ring and the



center slide. This gap corresponds to the amount of material to be removed and gradually decreases, as the sample is lapped or polished, until the final thickness is reached. Due to the ease of adjustment, a micrometer controlled fixture is generally used when desired sample thickness will vary from sample to sample.

Fixture Versatility:

EMS offers many different fixtures, which are suited for multiple applications. For example there are small fixtures such as the model 145 used in processing TEM and SEM specimens. Larger specimens such as wafers or optical devices can be processed using the model 150 or 155 lapping & polishing fixtures. Specific applications such as edge polishing can also be accommodated with special mounting blocks or special fixtures such as the models 147E or 155E. Additional options are available for most fixtures such as vacuum mounting and higher resolution thickness control by means of a digital indicator.

The Rail Polisher is available in either a one channel or a three channel model.

Sample Mounting Fixtures are available with One Piston, Two Pistons or Three Pistons.

Ordering

50010-11	Single Channel with 1 Piston Fixture	each
50010-12	Single Channel with 2 Pistons Fixture	each
50010-13	Single Channel with 3 Pistons Fixture	each
50010-31	Triple Channel with 1 Piston Fixture	each
50010-32	Triple Channel with 2 Pistons Fixture	each
50010-33	Triple Channel with 3 pistons Fixture	each

Abrasive and Cloth for use with Rail Polisher

50020-05	Al2O3 Rail Linear Abrasive Sheet, 0.05 μ m	25/pk
50020-1	Al2O3 Rail Linear Abrasive Sheet, 0.1 μ m	25/pk
50020-3	Al2O3 Rail Linear Abrasive Sheet, 0.3 μ m	25/pk
50020-10	Al2O3 Rail Linear Abrasive Sheet, 1.0 μ m	25/pk
50020-30	Al2O3 Rail Linear Abrasive Sheet, 3.0 μ m	25/pk
50020-50	Al2O3 Rail Linear Abrasive Sheet, 5.0 μ m	25/pk
50021-10	Rayon Fine Polishing Cloth Rail Linear	10/pk

Electron Microscopy Sciences offers a full range of equipment used in materials preparation for a variety of technological fields. Electron microscopy, metallography, wafer lapping and polishing, failure analysis, crystal orientation, plasma processing, MEMS and many other applications are facilitated by our equipment. Please contact us or see our comprehensive website, which includes our complete line.



► Twin Jet Electropolishing System Model MS-501B (METALTHIN Mk4)

The METALTHIN Twin-Jet Electropolisher was originally developed for producing high quality thin foils from radioactive materials. It is robust, compact, economical and easy to use.

The electrolyte tank, sample holder, thinning cell and tank base stand are machined from solid PVC to provide maximum resistance to corrosive electrolytes. The Cell parts are held together by stainless steel screws so that the Cell is easy to disassemble. The system incorporates the accumulated experience of many years of use in Universities, Industrial and Nuclear Research Centers and comprises a Thinning Cell and Control/Power Supply plus the optional Unipump and Dewar Flask.

New Features

Thinning current control: During the thinning process, small changes in electrical resistivity are caused by variations in the temperature of the electrolyte and by the thinning process itself. the CONTROL CURRENT facility automatically maintains the current that is initially set by the operator. This avoids the need to constantly monitor and adjust the setting.

The range of cell resistances to which automatic control of the thinning current can be applied are those that apply to the majority of electrolytes. If the conditions are outside the range of automatic control, the control current switch will flash to show that manual control is required.

- The external case has greatly increased strength and resistance to corrosive electrolytes.
- The electrical and instrumentation leads plug into the rear of the power supply to protect the connections from accidental contact with the electrolyte.
- The push switches are arranged in a single line on the front of the power supply.
- The push switches are fitted with flexible transparent covers to protect them from accidental contact with the electrolyte.
- The voltage and thinning current are displayed digitally.

For complete information of this unit, please visit our web site: www.emsdiasum.com

Ordering

55220-501B	Twin Jet Electropolisher – Model 501B	each
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Suggested Accessories

55222-32	UniPump Cryogenic Pump	each
55222-40	Dewar Flask Optional Accessories	each
55222-06	Graduated Grinding Jig	each
55230-08	UniDisc 3mm Disc Punch	each

► Unidisc MK2 – Model 508

The Unidisc is designed to produce 3mm diameter discs for electropolishing, and subsequent TEM examination, from sample strips.

Sample strips are fed into the side of the Unidisc. When the handle is pulled, the strip is trapped between two rigid metal die faces. The punch then pierces the tightly held sheet and ejects the disc into the collection tray. Deformation is confined to a much localized shear zone at the edges of the disc away from the central region which is later thinned using either the twin jet electropolisher or the single jet electropolisher. The punch and die are replaceable items made from hardened tool steel.

The standard model produces 3mm discs for TEM from sheet/foil samples with minimum distortion.

Optional models produce discs from 1mm to 6mm in diameter. Examples of the use of these includes the production of 1mm discs of highly radioactive materials which are pressed into holes punched in non-radioactive 3 mm discs and the composite disc thinned. This reduces the radiation dose to the personnel involved. The larger disc specimens are used in SEM.

Ordering information

- The standard Unidisc Mk2 is used for making 3mm disc from samples 0.004 to 0.006" (0.10 to 0.15mm) thick i.e. the optimum for electro polishing.
- If the thickness of the sample is outside the 0.004 to 0.006: range, the same punch is used but the die has to be changed because a different clearance between the punch and the die is required to make good flat discs without any flash around the edges.
- Discs can be made from materials up to and including 1mm thick stainless steel. To order non-standard 3mm die quote: **the source material and thickness.**
- Punch and die sets and/or individual punches and dies can be supplied to produce discs in the range of 1 to 6mm in diameter. To obtain advice on the feasibility of your project quote: **the diameter of the disc required, the thickness and type of the source material.**

55230-08	UniDisc Disc Punch Model MS508	each
55232-1	1mm Disc Die Set	each
55232-2	2mm Disc Die Set	each
55231-2P	Replacement Standard Punch (3mm)	each
55231-2D	Replacement Standard Die (3mm)	each



► Plasma Cleaner – Model PC2000

The PC2000 is designed to simultaneously clean TEM specimens and specimen stages, which minimizes, and in many cases, eliminates contamination of the specimen being analyzed. The specimen holder and specimen are subjected to reactive gas plasma prior to electron microscope analysis

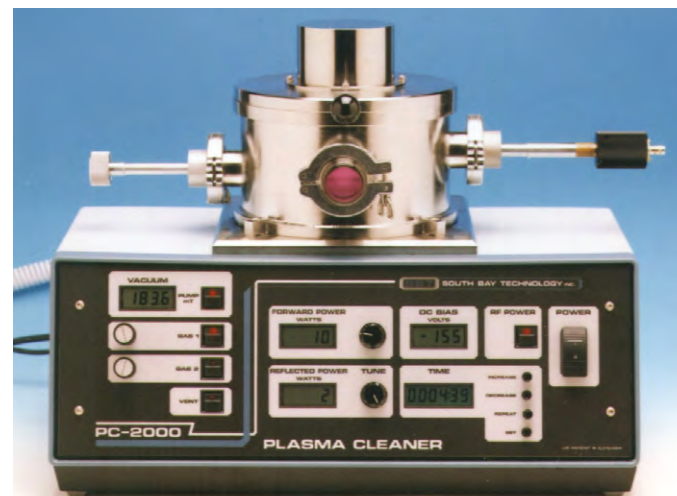
It has been well documented that low energy plasmas can be used to reactively etch or remove organic materials found on the surface of inorganic materials. This technology has been used by the industrial community to clean semiconductor wafers and optical materials for many years. A related technique is now being implemented in the field of electron microscopy, where specimens can become contaminated during the preparation process or from other sources. Current instruments use tightly focused, intense beams that create carbon deposits on the specimen surface due to organic contamination.

The specimen and the specimen stage are subjected to reactive gas plasma which efficiently removes a wide range of contaminants from critical surfaces. The procedure may be carried out prior to inserting the specimen and specimen stage into the EM by either mounting the specimen holder in the supplied port or by inserting the entire sample or sample assembly through the hinged upper port and into the 8" diameter x 4" high chamber. The system can be used with any side entry TEM holders, top entry TEM holders or with any sample that will fit inside the large, easily accessible chamber.

FEATURES

- Suitable for all side entry and top entry TEM holders. Large chamber also accommodates specimens up to 7" diameter and 3" high for cleaning tweezers, specimen mounts, etc.
- Digital LCD displays, indicate forward power in watts, reflected power, DC bias and vacuum level.
- Compatible with Argon, Oxygen, CF₄, and other gas mixtures.
- System comes standard with 3 ports which allow simultaneous cleaning of multiple holders or insertion of analytical tools into the plasma chamber.
- Power level can be optimized for each specimen type and gas species to maximize cleaning rate without risk of etching the specimen stage or the chamber.
- Viewport allows easy monitoring of the process.
- Safety interlocked controls simplify operation - ideal for multi-user environments.

For complete information on this model, see our interactive web site @www.emsdiasum.com



Ordering

55300 Plasma Cleaner- Model PC 2000 each

Spare Parts and Accessories for PC 2000

55300-1	Specimen Stage Adapter for JEOL side entry holders (for 100CX)	each
55300-2	Specimen Stage adapter for JEOL side entry holders (1210,1220,1230,2010,2010F, 3010, 3000F & 4010)	each
55300-3	Specimen Stage Adapter for Philips, side entry holder	each
55300-4	Specimen Stage Adapter for Zeiss, side entry holders	each
55300-5	Specimen Stage Adapter for Hitachi, side entry holders	each
55300-6	Specimen Stage Adapter for LEO, side entry holders	each
55300-7	Specimen Stage Adapter for Topcon, side entry holders	each
55300-8	Specimen Stage Adapter, Blank for customer applications	each
55300-20	Specimen Stage Adapter for Hitachi, top entry holders	each
55300-21	Specimen Stage Adapter for VG, top entry holders	each
55300-22	Specimen Stage Adapter for other top entry holders	each
55300-30	Vacuum Storage Container for JEOL, side entry holders (100X)	each
55300-31	Vacuum Storage Container for JEOL, side entry holders (1210, 1220, 1230, 2010, 2010F, 3010, 3000F, 40100)	each
55300-32	Vacuum Storage Container for Philips, side entry holders	each
55300-33	Vacuum Storage Container for Zeiss, side entry holders	each
55300-34	Vacuum Storage Container for Hitachi, side entry holders	each
55300-35	Vacuum Storage Container for LEO, side entry holders	each
55300-36	Vacuum Storage Container for Topcon, side entry holders	each
55300-40	Port Plug for JEOL Specimen Stage Adapter (100X)	each
55300-41	Port Plug for JEOL Specimen Stage Adapter (1210, 1220, 1230, 2010, 2010F, 3010, 3000F, 40100)	each
55300-42	Port Plug for Philips Specimen Stage Adapter	each
55300-43	Port Plug for Zeiss Specimen Stage Adapter	each
55300-44	Port Plug for Hitachi Specimen Stage Adapter	each
55300-45	Port Plug for LEO Specimen Stage Adapter	each
55300-46	Port Plug for Topcon Specimen Stage Adapter	each
55300-50	Chamber Gasket (2 required per unit), each	each
55300-51	Vacuum Pumping Station, 4 Station	each

INSTRUMENTATION



► Plasma Etcher – Model PE 2000

The PE 2000 RF Plasma Etcher is specifically designed for reactive gas plasma etching and surface treatments. The unit is capable of 150 watts RF forward power at 13.56 MHz and up to four gas processing. The system is ideal for R&D applications where single sample processing is needed and total control of each process parameter is necessary.

Processes such as photoresist strips, BPSG removal, oxide and nitride layer etch, surface treatment of plastics and plasma cleaning are typical applications. Samples up to 6" diameter as well as irregular shaped substrates can be accommodated in the 200mm diameter vacuum chamber. A fully manual control system coupled with digital readouts and integral matching network with switching type power generator offer a wide range of experimental etch parameters

FEATURES

- High etch rates at moderate power levels of 100 watts forward power - 200 Å/minute for oxide and 500Å/minute for nitride.
- Stainless steel gas system with three-position feed provides maximum etch uniformity and the best possible utilization of the reactive species. Includes a separate vent to atmosphere line.
- Gas lines, fittings and stage assembly are all stainless steel construction and designed for corrosive applications – A Fomblin charged corrosive series rotary vane pump is included.
- Safety interlocks prevent mis-operation thereby protecting the user and the system.
- Manual controls, with digital readouts, make it possible to process in a range of vacuum pressure levels using an unlimited combination of reactive species including oxygen, fluorine and chlorine
- System is supplied with two manual gas channels, but up to four mass flow channels can be added.

For complete information on this model, see our interactive web site @www.emsdiasum.com

Ordering

55310 Plasma Etcher- Model PE 2000 each

Spare Parts and Accessories for PE 2000

55312-03 Stainless Steel Chamber with Viewport each
55310-2 Chamber Gasket (2 required per unit) each



► Reactive Ion Etcher – Model RIE 2000

The RIE 2000 Reactive Ion Etcher is specifically designed for anisotropic etching of microelectronic devices. This R&D sized instrument is designed to simulate the operation of larger production instruments in process development and pilot production applications. The RIE 2000 is a turbo pumped system capable of reaching a base pressure of 10^{-6} torr. This low base pressure provides a clean etch environment and highly anisotropic etch without undercutting by eliminating residual species within the chamber prior to starting the etch process. Wafers up to 6" diameter as well as irregular shaped substrates can be accommodated in the 200mm diameter vacuum chamber. A fully manual control system coupled with digital readouts on the RIE 2000 offer a wide range of experimental etch parameters, and is not limited by routine, automated processing ranges.

FEATURES

- Manual controls make it possible to process in a wide range of vacuum pressure levels using an unlimited combination of reactive species.
- A stainless steel gas system with integral over the sample shower gas ring provides maximum etch uniformity and the best possible utilization of the reactive species.
- High etch rates at moderate power levels of 100 watts forward power can be achieved - greater than 200 Å/minute for oxide and 500Å/minute for nitride.
- System is supplied with two manual gas channels, but up to four mass flow channels can be added.
- Gas lines, fittings, and stage assembly are all stainless steel construction and designed for corrosive applications. Ceramic bearing turbo molecular pump and corrosive series rotary vane pump both are minimal maintenance, long life vacuum components.
- Safety interlocks prevent miss-operation thereby protecting the user and the system.

Ordering

55320 Reactive Ion Etcher- Model RIE 2000 each

Spare Parts and Accessories for RIE 2000

55320-01 Quartz Chamber, 8" OD x 5" High each
55320-02 RF Shield for Quartz Chamber each
55320-03 Stainless Steel Chamber with View-Port each
55320-04 Oil-Free Diaphragm Pump to Back Turbo Pump each
(in place of rotary vane pump)
55320-05 Mass Flow Controller, One Channel each
55320-06 Mass Flow Controller, Two Channel each
55320-07 Mass Flow Controller, Four Channel each
55320-08 Cold Cathode Gauge for accurate reading of base pressure (requires stainless steel chamber 55320-03) each

► Ion Beam Sputter Deposition and Etching System Model IBS/e

The Model IBS/e is a high vacuum thin film deposition system designed to precisely deposit sub-nanometer grain, conductive coatings onto specimens prior to examination in the electron microscope. Thin, conductive films are deposited onto specimens to prevent charging effects and to enhance contrast. Thin films are deposited using two ion beam sources directed at a target material, eliminating radiation or heating effects common with other coating techniques. Extremely thin, continuous metal or carbon films are deposited without risking damage to delicate features present on the specimen. Virtually any target material can be used for ion beam deposition with precise control over the deposition thickness. An optional third ion source allows specialized ion beam etching techniques to be employed. The ability to deposit amorphous, continuous films makes the IBS/e system ideal for high resolution electron microscopy techniques.

Applications

Specimens examined in high resolution electron microscopes utilizing field emission electron sources demand fine grain, ultra-thin conductive coatings for image capture and specimen analysis. Low voltage SEM specimens must frequently be coated with a conducting film to reduce charging and enhance contrast in images. Ultra-thin films on specimens for examination by both AFM and STM are sometimes needed to decrease surface resistivity, bind small particles to a substrate, and reduce distortion from tip/specimen interaction. All of these techniques require uniform thin films to be deposited on the specimens of interest without heat or radiation. Standard coating techniques such as DC diode, vacuum evaporation, and other thermally driven methods are incapable of handling these requirements. The IBS/e is capable of precisely depositing thin films without exposing specimens to damaging photon flux. Additional applications include producing SEM samples for "channeling contrast", Electron Back Scatter Diffraction (EBSD) Patterns, Orientation Imaging Microscope (OIM) and multilayer deposition for research and development applications. Reactive etching and deposition can be achieved by introducing reactive gas such as oxygen or nitrogen through an optional micro-mixing valve.

Ion Sources

The IBS/e ion sources are specifically designed for simple operation and fast servicing. Both sources are directed at a target material which is sputtered with ejection energies of < 40 eV onto the specimen. Operating at 10 kV, the ion sources produce a beam flux of 15mA/cm² to produce a uniform distribution over the entire specimen. Ion beam current is displayed digitally for quick evaluation of the operating conditions. The sources are easily dismantled through the vacuum chamber door. 24 hour factory Quick Exchange Service is available for the anode assemblies.

An etching ion source is optional for nano-matching samples prior to sputter deposition. Etching improves image contrast on highly polished cross section SEM samples and can expose interesting aspects of various types of biological samples.

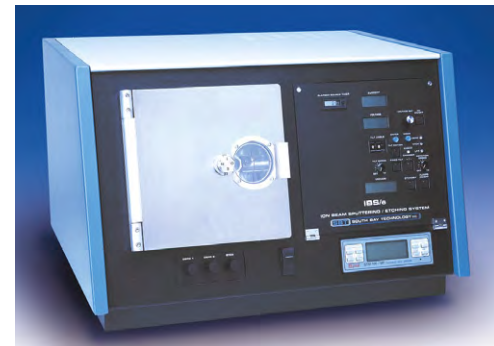
Specimen Stage Control

The Independent Rotate and Tilt Stage (IRT) drives specimens under the sputtered material with a wide range of parameters. Both the tilt and rotate axes are independently controlled to uniformly coat specimens. The IRT allows directional or rotary shadowing at fixed angles as well as variable speed controls for both tilt and rotation. The variable tilt angle rate improves uniformity by decreasing the tilt rate as the tilt angle increases. Specimens can be parked at 180° to shield them during target oxide removal.

The standard specimen stage can accommodate 2" wafers as well as SEM mounts and TEM specimens. Using the Large Area Stage (LAS) accommodates specimen wafers up to 4" diameter for ion beam sputter deposition.

High Vacuum System

The Model IBS/e creates a clean, hydrocarbon free, high vacuum automatically using a turbomolecular pump. Vacuum level is displayed digitally using a cold cathode high vacuum gauge. The system reaches a base pressure of 10⁻⁷ torr within minutes, allowing oxide-free metal films to be deposited with the need for liquid nitrogen trapping.



Film Thickness Monitor

Monitoring the film thickness precisely is done with a quartz crystal thickness monitor (QCTM). The QCTM will precisely monitor and repeatably terminate the sputtering process at preset film thickness or present time, whichever occurs first.

Targets

Four different target materials are selectable for deposition without breaking vacuum. Each target can be rotated into the sputter position simply by rotating a thumbwheel. The ability of the IBS/e to produce oxide free coatings without liquid nitrogen trapping allow refractory metals such as chromium, tungsten, and tantalum to be deposited without problems. For complete information of this product, please visit our web site @ www.emsdiasum.com

Specifications

Vacuum System

Roughing Pump:40 l/m N₂
 Turbo Pump:250 l/s/ N₂
 Base Pressure:10⁻⁷ torr
 Operating Pressure:x 10⁻⁵ torr (10 to 15 minutes)
 Vacuum Gauge:Cold cathode

Ion Sources

Beam Energy:2.5kV to 10 kV
 Beam Flux:15mA/cm²

IRT Stage

Tilt Range - Deposition Mode:0 to +/- 99°
 Tilt Range - Etch Mode:0 to +/- 99°
 Tilt Range - With Large Area Stage:0 to +/- 17 °
 Specimen Stage:2" Standard; 4" Optional
 Tilt Angle Rate:Variable
 Rotational Speed:0 to 40 RPM

Gas

Source Gas:Ar, 99.999% pure
 Pressure:2 sccm @ 5-7 PSI
 Vent Gas:N₂ @ 5 PSI

Power/Utilities

110 VAC / 15 A50/60 Hz
 220 VAC / 7.5 A50/60 Hz

See Ordering Information on the next page...

INSTRUMENTATION

► Ion Beam Sputter Deposition and Etching System Model IBS/e (continued)

Ordering

Please specify VOLTAGE option when ordering (120 or 240 VAC)

55330	Ion Beam Sputter Deposition and Etching System Model IBS/e	each
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Spare Parts and Accessories for IBS/e

55332-01	Etching Ion Source (mounted in IBS/e when purchased)	each
55332-02	Replacement Source Anode Assembly	each
55332-03	Large Area Stage, 4" (1000mm)	each
55332-Ar	Ar Regulator	each
55332-N2	N ₂ Regulator	each

Specimen Carriers

55332-10	Standard, 1.25" diameter platform carrier	each
55332-11	Standard, 2" diameter platform carrier	each
55332-12	¼" diameter pin, 1.25" diameter	each
55332-13	4 position, 10mm stub diameter, 1.25" diameter	each
55332-14	3 position, 12mm stub diameter, 1.25" diameter	each
55332-15	Stub for Hitachi FESEM Specimen Mount	each
55332-16	Flat Pinch Specimen Carrier, 1.25" diameter	each
55331-17	TEM 3mm Grid Specimen Carrier, 1.25" diameter	each

Targets

55332-30	Potassium Bromide Scintillator (for beam observation)	each
55332-31	¹⁹⁷ Gold, 0.008" foil	each
55332-32	Platinum, 0.020" foil, (1" x 0.0106)	each
55332-33	¹⁰⁶ Palladium, 0.020" foil	each
55332-34	¹⁹⁷ Gold/ ¹⁰⁶ Palladium, 0.020" foil	each
55332-35	Carbon, 0.125"	each
55332-36	Tantalum, 0.125"	each
55332-37	Tungsten, 0.125"	each
55332-38	Chromium, 0.125"	each
55332-39	Iridium, 0.020"	each
55332-40	¹⁰⁷ Silver, 0.020 foil	each
55332-41	Nickel, 0.125"	each

² Not recommended for high resolution imaging. All others suggested for magnification < 200kX

Retrofit Options

55332-50	Quartz Crystal Thickness Monitor	each
55332-51	SI O ₈ Ion Source (SI O ₈ Ion Source retrofits to a second sputtering or etching port. Needle Valve, connecting Ar tube and SHV high voltage cable included)	each
55332-52	SI O ₈ Ion Source Mating Flange	each
55332-53	E IRT Stage for IBS/e	each
55332-54	E IRT Stage Controller for IBS/e	each

Spare Parts

55330-01	SI O ₈ Source Spare Pack (6 sets). Includes: 6 qty. Front Cathodes / 6 qty. Rear Cathodes / 36 qty. Calibrated Ceramic Insulators	each
55330-02	Front Shield for SI O ₈ Ion Source	each
55330-03	Rear Shield for SI O ₈ Ion Source	each
55330-04	Anode for SI O ₈ Ion Source	each
55330-05	HV Conductor for SI O ₈ Ion Source	each
55330-06	Rear Cathode for SI O ₈ Ion Source	each
55330-07	Front Cathode for SI O ₈ Ion Source	each
55330-08	IBS Chamber /eIRT O-ring Set	each
55330-09	SI O ₈ Source Alignment Tool	each
55330-10	Calibrated Ceramic Insulator (6 qty.)	each
55330-11	RP Mist Eliminator Cartridge	each
55330-12	High Voltage Cable (for model IBS TM200)	each
55330-13	Target Blanks (Al)	each

► Model 250 - 2-Axis Goniometer

The Model 250 2-Axis Goniometer is used to hold crystals in the process of determining crystallographic orientation using either Laue back reflection or optical orientation techniques. A crystal can be rotated 360 degrees adjustment while held in the plane, which is adjustable $\pm 30^\circ$ with respect to the goniometer mounting surface. There is 0.2° vernier on the 360° adjustment, and 0.1° vernier on the $\pm 30^\circ$ adjustment.

The goniometer combines rugged stainless steel construction with ease and accuracy of adjustment. After orientation, the model 250 can be mounted on the following equipment for subsequent processing:

- Oriented Crystal Lapping Fixture
- Electrolytic Polishing Instrument
- Low Speed Diamond Wheel Saw
- Acid Saw
- Wire Saw

Dimensions:

Model 250: 2"W x 2"D x 1.5"H (50 x 50 x 37.5mm)

► Accessories

► Model 25002 - Track Mount

The Model 25002 Track Mount is designed to fit either 2.19" or 1.99" wide tracks. It has a horizontal adjustment perpendicular to the x-ray or optical beam and a fixed height of 3.625" from the track to the center of the mounted Model 250 Goniometer.

Dimensions: Model 25002: 2.75"W x 3"D x 4.5"H (70 x 76 x 14mm)

► Model 25005 - Track Mount

The Model 25005 Track Mount is identical to the Model 25002 except it has a fixed height of 34" from the track to the center of the mounted Model 250 Goniometer

Dimensions: Model 25005: 2.75"W x 3"D x 5"H (70 x 76 x 127mm)

► Model 66005 - 2-Axis Goniometer

The Model 66005 is a 2-axis goniometer used for orienting and cutting single crystals. It can be mounted on an x-ray track for orientation using the Model 66011 Track Mount and then transferred to the Model 660 for cutting. With the sample mounted to the goniometer, the vertical axis can be rotated 360° within 0.2° while the horizontal axis can be rotated $\pm 50^\circ$ from the 0.2° vernier on the arm.

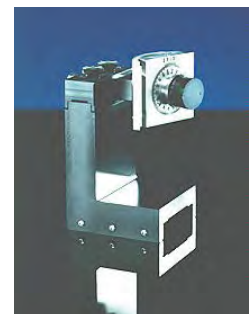
Dimensions: 2" (W) x 2" (D) x 2.5" (H)

► Model 66011 - Track Mount

The Model 66011 Track Mount is designed to mount the Model 66005 2-Axis Goniometer onto a 1.99" or 2.19" wide x-ray or optical track for crystal orientation.

Dimensions: 3.25"(W) x 3"(D) x 5"(H)

Model 66005 shown mounted on Model 66011 Track Mount



Model 250 mounted on model 25002



Model 66011 with Model 66005

► **Model 260 - 3-Axis Goniometer**

The Model 260 3-Axis Goniometer is constructed of hard-anodized aluminum and is used to hold crystals in the process of determining crystallographic orientation using either Laue back reflection or optical orientation techniques. (See EMS Model 210 Optical Orientation Instrument). The integral track mount is designed to fit a 2.19" wide or narrower x-ray or optical track. There is +/-25° of rotation in two of the axes and a full 360° of rotation in the other. The Model 260 is designed so that a 2" diameter crystal mounted on the goniometer with a 1/2" high mounting block is 3.625 inches above the track. The P/N 50176-61 riser can be used to raise the Model 260 by 1 inch when working with smaller crystals. The Model 260 can also be mounted on the following EMS equipment for subsequent processing:



■ **Model 850 Wire Saw**
 Dimensions: 3.5" W x 3.5" D x 3.25" H

► **Model 265 - 3-Axis Goniometer**

The Model 265 is a larger version of the Model 260 and is mounted on a 7" square flat base, which can be adapted for a wide range of applications. There is +/-25° of rotation in two of the axes and a full 360° of rotation in the other. The Model 265 is ideal for the orientation and cutting of large crystals and can easily be adapted to existing equipment.



Dimensions: 7" (W) x 7"(D) x 5"(H)

► **Model 170 - Multi-Axis Lapping Fixture**

The Model 170 was designed in collaboration with Lawrence Livermore National Laboratory and Max Planck Institute for the precision orientation and lapping or polishing of single crystals. This design is based on the work of Mader et al at MPI and is capable of applying a controlled force to delicate samples. The advantage of the Model 170 is that it can be mounted directly on an x-ray track for Laue back reflection. Precision of 0.1° in orientation can be obtained by double exposure with 180° rotation of the fixture in the optional x-ray track mount.



► **Model 25015 - Lapping and Polishing Fixture**

The Model 25015 is designed to complement the Model 250 2-Axis Goniometer and is used to lap or polish oriented crystals either by hand or on a rotating polishing wheel. The Model 250 Goniometer can be mounted on an x-ray track for orientation and then transferred directly into the Model 25015 for lapping or polishing. The Model 250 can also be transferred to an EMS saw prior to using the Model 25010. The Model 25015 utilizes a counterbalanced center slide to completely offset the weight of the center slide and the goniometer and is capable of lapping or polishing oriented crystals within 0.25°.



► **The Model 210 - Optical Orientation Instrument**

The Model 210 Optical Orientation Instrument is used to determine the orientation of a crystal or to align a crystal so that specifically oriented surfaces can be cut or polished. The Model 210 uses a laser beam that is reflected off a cleaved or preferentially etched crystal surface back onto a target that is perpendicular to the laser beam. Optical orientation is an orientation technique that can be used as an alternative to more hazardous and expensive x-ray techniques.



Ordering Crystal Orientation Equipment and Accessories

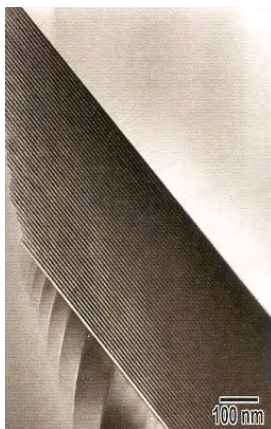
Description	Cat. #
Model 250 - 2-axis Goniometer (include mounting blocks and orientation software)	50176-50
Model 25002 - Track Mount (for 3.625" height)	50176-51
Model 25005 - Track Mount (for 4" height)	50176-52
Model 25015 - Lapping & Polishing fixtures (used to hold Model 250 for Polishing)	50176-53
Model 260 - 3-axis Goniometer	50176-60
1" Riser for Model 260	50176-61
Model 265 - 3-axis Goniometer	50176-65
Model 66005 - 2-axis Goniometer (used on Model 660)	50180-05
Model 66011 - Track Mount (for 3.625" to 4" height) used to hold the Model 66005	50180-11
Model 170 - Multi-axis Lapping Fixture (used to polish more than one sample)	50176-70
Model 17011 - Track Mount (for 3.625" height used on Model 170)	50176-71
Model 210 - Optical Orientation Instrument (includes laser w/o Goniometer or Track Mount)	50176-10
Spare Parts	
Set Screw A for Model 260	50177-10
Set Screw B for Model 260	50177-11
Set Screw C for Model 260	50177-12
Set Screw D for Model 260	50177-13
Brass Plug for Model 260	50177-20
Adapter to hold Model 260 onto Model 660 Saw	50177-25
Adapter to hold Model 250 onto Model 66007 (see Model 660 Saw)	50177-26
1" Stainless Steel Mounting Block (for use with Model 250, 66005)	50177-50
0.75" Stainless Steel Mounting Block (for use with Model 250, 66005)	50177-51
0.5" Stainless Steel Mounting Block (for use with Model 250, 66005)	50177-52
0.37" Stainless Steel Mounting Block (for use with Model 250, 66005)	50177-53



MicroCleave™ Kit - Model 520

The MicroCleave™ technique is a relatively simple and inexpensive method of producing superior cross sectional TEM specimens. For speed in preparation, it is unsurpassed.

One limitation of the technique is that it does require the substrate material to be cleaved or fractured. For this reason, it has been applied almost exclusively to semiconductor materials. Recently, the technique has been extended to other substrates, such as glass, silicon carbide, quartz, sapphire, and other hard materials. It is particularly well suited for rapidly examining coatings and thin films very soon after they are deposited.



An X-ray mirror consisting of 45 layers of alternating Mo/Amorphous Si (7.0 nm period) on Si substrate. Image courtesy of John McCaffrey – National Research Council of Canada



Multiple Quantum Well structure grown by MBE showing the thickness terraces possible with a MicroCleave™ sample. Courtesy of Scott Walk – Materials Directorate WPAFB. (Now with PPG Industries)

FEATURES:

- Relatively simple and inexpensive method for the preparation of TEM cross sections, where specific information is not required.
- Ideal when sample availability is limited as it requires very little starting material.
- While originally designed for semiconductors, the technique has been applied to glass, silicon carbide, quartz, sapphire, and other brittle materials.
- No ion milling is required. Therefore, no amorphization, no heating effects, no ion implantation, and no preferential sputtering.
- The MicroCleave™ sample is ideally suited for rapid crystallographic orientation and determination in the TEM
- The MicroCleave™ technique is fast and typically requires preparation times of less than 1 hour. This makes it particularly well suited for rapid examination of coatings and thin films shortly after deposition.

Ordering

50130-20	Model 520 MicroCleave™	Complete Kit
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Complete Kit includes:

Product #	Description	Qty
50130-50	Model 150MC Lapping Fixture	each
50130-51	#5201 Grid Bending Jig with Cover	each
50130-52	Engraved Mounting Block for 150MC	3/pk
50130-53	PTFE Block, 1x1x0.50"	5/pk
50130-54	Post-it Block	each
50130-55	Lantern Slide	each
50162-80	Model 180 Lapping Tray	each
50162-81	Angle Guide for Model 180	each
50130-56	Silicone Mat	each
70030	Coarse Scribe	each
62107-ST	Micro Scribe	15/pk
50130-59	Tab Grid (100/pk)	5/pk
71700	Lens-Tissue	each
50130-60	Transparent Ruler	5/pk
60968	Tri-pour Beaker with Lid, 50ml, 10/pk	each
50130-61	Petri Dish with Mounted Slide	each
50130-62	Petri Dish with lids	5/pk
71140	100-position Grid Storage Box	5/pk
50130-63	Silver Epoxy	each
66100-20	Red Sable Brush, Size 2/0	each
50130-64	Mixing Tray (Aluminum Dish), 10/pk	each
72350	Hot/Stirrer Plate	each
50160-25	Cooling Tray	each
72703-D	Tweezers #5, 45 Degree Bent	5/pk
50419-20	Quick Stick - Mounting Wax	each
50130-66	Lint-Free Cloth, size 4 x 4", 10/pk	each
50350-35	Diamond Lapping Film, 30 micron	each
50130-67	Squeegee	each

50130-21	Model 520-B - Basic MicroCleave™	Kit
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Basic Kit includes:

Product #	Description	Qty
50130-50	Lapping Fixture, Model 150MC	each
50130-51	#5201 Grid Bending Jig with Cover	each
50130-52	Engraved Mounting Block for 150MC	3/pk
50130-53	PTFE Block	5/pk
50130-54	Post-it Block	each
50162-80	Model 180 Lapping Tray	each
50130-61	Petri Dish with Mounted Slide	each
50162-81	Angle Guide for Model 180	each

References:

1. Ultramicroscopy, 38 (1991) 149, John P. McCaffrey.
2. TEM Samples of semiconductors Prepared by a Small-Angle Cleavage Technique, J.P. McCaffrey, Materials Research Society, Vol. 254 (1992).
3. Microscopy Research and Technique, 24 (1993) 180, j. p. McCaffrey.
4. A simplified Method for Modifying TEM Copper Grids for Use with Small Angle Cleavage Technique, Microscopy Today (96-4) (1996), Scott D. Walck.
5. The Small Angle Cleavage Technique: An Update, Scott D. Walck and John McCaffrey. Materials Research Society, Vol. 480 (1997).

SECTION 13

Silicon Wafer Cleaving Systems, Tools, & General Supplies

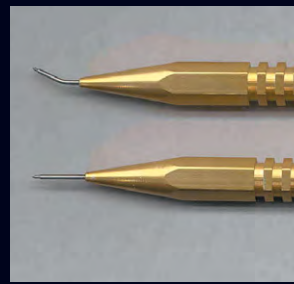
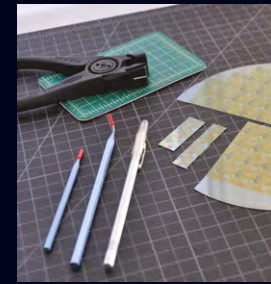
Cleaving System

Adhesives

Membrane and Gel Boxes

Hand-held Micro & Mini Tools

Wafer Tweezers



**Electron
Microscopy
Sciences**

Meet the LatticeAx™

the small, accurate, fast, low-cost cleaving solution, suitable for any lab.



► LatticeAx™ Cleaving System

Overview

The LatticeAx™ is a precision cleaver that fits in the palm of your hand. In an amazingly small footprint (4" cube, 100mm³), the patent-pending "Ax" and process are designed to assist the user to cleave site specific targets, as well as wafers, strips, or pieces to precisely sized samples with localized targets. One of the smallest, most efficient silicon wafer cleaving tools in the world, the LatticeAx™ is sure to revolutionize your workflow.

The LatticeAx™ features and process optimizes the very basic elements of the manual cleaving technique and overcomes manual cleaving disadvantages, such as lack of accuracy and repeatability. This machine-assisted hybrid cleaving tool bridges the gap between manual scribing and fully automated cleaving. It increases success rate by any user while keeping costs down. It takes little training and users will be "cleaving in minutes and experts in a day."

See how it works... Learn how to do it...

We've added video content to our website to help you get to know our latest products even better!

Stop by and see what it's all about.



Fast – 5 Minute Process

- Quick targeting with variable zoom
- Digitally displayed real-time imaging

10-µm Targeting Accuracy*

- Advanced vision package with 5-µm resolution*
- 1688 x 1248 UXGA CCD Camera and dedicated SW*

Robust – Simple Operation By Any User

- All components are integrated on a single platform
- All movements controlled via X,Y stage, Rotation table and microscope coarse and fine focus*

* specific to the new LatticeAx™ 300

Versatile – wide range of sample size, substrate type and top layers

- Si-GaAs-Sapphire
- Cu
- Resist
- Polyimide
- Passivation
- Films

Applications

- Site specific cross-section for SEM analysis
- Target localization prior to FIB or broad ion beam
- Downsize samples for SEM with height restriction
- Cleaving to create uniform samples for other analysis tools with non-wafer scale stages
- Vertical, mirror image cleaving for photonics analysis

Setup Requirements

- Flat, stable surface to support the LatticeAx™ at least 18" x 24" or 41cm x 61cm surface space
- Power for the vacuum pump (110V or 220V depending on local requirements)
- Computer running Windows 7 or XP with mouse, keyboard, monitor, video cable to the monitor

Options

- The Wafer Cleaving Station
- Wafer Cleaving Kit
- Marker-Scriber Kit
- Lattice Scriber
- CleanBreak Pliers

LatticeAx™ 110

Every user can cleave samples with wide variation of size, thickness and materials at high quality within 2 minutes.

By using the Patent Pending LatticeAx™ base platform, every user can cleave samples with wide variation in size, thickness and materials at high quality within 2 minutes. It uses precision knobs to produce fine, reproducible surface indentation followed by slow, controlled cleaving. The indenter is controlled by a stage with 5-µm steps. Combine this tool with your own optical microscope to improve cleaving accuracy.



The standard configuration includes 1 each:

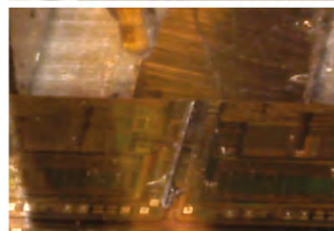
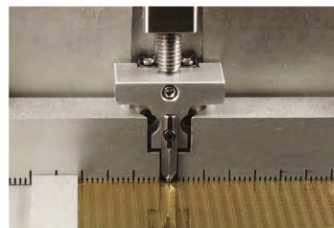
- LatticeAx™ 110 precision wafer cleaving tool
- LA Diamond Indenter – used for indenting the sample surface, pre-installed on the LatticeAx™
- V-115A or V-220A Vacuum pump (115V) or (220V) for securing wafer sample during indentation (hose included)
- LatticeAx™ transport case
- Manual and installation instructions

The Process

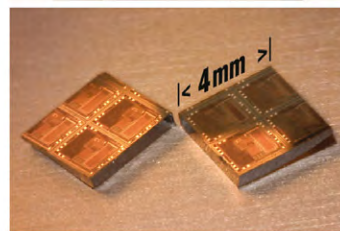
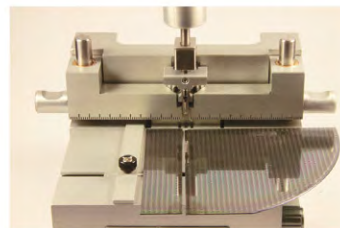
Using the LatticeAx™, wafer cleaving is accomplished in three basic steps that compliment existing skill sets used in wafer analysis. It's simple. Just SET... INDENT... CLEAVE... RESULT



Select target under high magnification (up to 80x) and use micrometer to position the indenter tip.



A precision control knob coupled with a sharp indenter tip results in fine indentation at the edge of the sample.



Cleaving position consists of a set cleaving pin and a cleaving bar used to apply uniform pressure to achieve a controlled cleave.



Cleave is always clean and precise.

LatticeAx™ 220

The LatticeAx™ 220 is the most popular cleaving tool delivering 20-µm cleaving accuracy.

The LatticeAx™ 220 combines the patent pending LatticeAx™ base with a digital microscope and real-time image acquisition and display software (SW) to achieve a cleaving accuracy of 20-µm and high quality cross-section surface in <5 minutes by any user. The LatticeAx™ 220 accepts samples with a wide range size, thickness and material.

The standard configuration includes 1 each:

- LatticeAx™ 110 precision cleaving tool
- LA Diamond Indenter – used for indenting the sample surface, pre-installed on the LatticeAx™
- USB digital microscope including:
 - Magnification adjustable, 10-90x
 - Interface USB 2.0
 - Software with measurement and calibration features (Windows XP, Windows 7 required)
- A robust stand:
 - 13" x 17" heavy duty work surface
 - Industrial vertical and horizontal poles and boom for mounting and operating the USB Digital Microscope

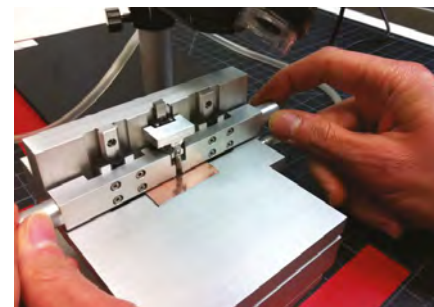
- V-115A or V-220A Vacuum pump (115V) or (220V) for securing wafer sample during indentation (hose included)
- LatticeAx™ transport case
- Manual and installation instructions

Computer and display not included



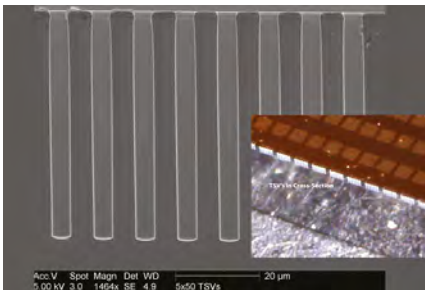
Specifications

<50 micron accuracy at 40x camera magnification
25 microns achievable at 90x camera magnification





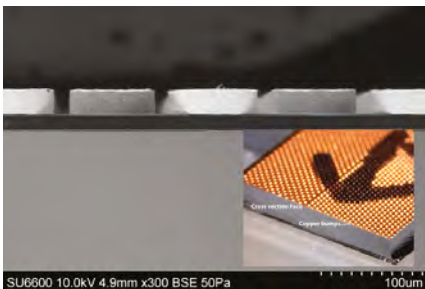
Results



Site-Specific Cleaving of Etched TSVs

Cross section of SEMATECH 5x50 micron TSVs.

A single tool (LatticeAx) process was used to simply cleave through the etched vias and the image in the SEM without any other preparation.



Cleaving Accurately Flip Chip Copper Bumps

A multi-tool process was used to prepare cross sections of copper bumps. The LatticeAx was used to cleave close to a specific row of copper bumps for quick, final broad argon ion beam milling.

► LatticeAx™ Cleaving System (continued)

LatticeAx™ 300

LatticeAx™ 300 is Electron Microscopy Sciences' highest performance cleaving solution. It integrates vision package with 5- μ m optical resolution and precise control of all axes for accurate positioning.

LatticeAx™ 300 delivers a cleaving accuracy of 10- μ m in <5 min. The patent pending LatticeAx™ base is integrated with a complete vision package that includes a monocular microscope with 5- μ m optical resolution, color CCD camera and real-time image acquisition and display SW, as well as, X-Y-R stage and industrial stand and poles. This dedicated cleaving workstation is used to survey, align, indent, cleave, and inspect any sample by any user.

Features

The LatticeAx™ 300, a fully integrated cleaving solution. Using precision knobs and following a set of instructions, it allows every user to create fine, reproducible surface indentation followed by slow, controlled sample cleaving of a wide variety of semiconductor materials.

The LatticeAx™ 300 system consists of:

- A vision package, a monocular microscope, color CCD camera with image display software, coarse focusing mount, fine focus, and fiber optic ring lighting. The result, 5- μ m optical imaging resolution and variable zoom digitally displayed in real-time.
- A robust setup integrated into a single platform to support the vision package: 13" x 17" heavy duty work surface, industrial pole and boom, X-Y-R sample positioning stage.

This solution offers a dedicated station to survey that any user can use to align, indent, cleave, and inspect samples with cleaving accuracy of 10 micron and throughput of <5 minutes/cross-section.

LatticeAx™ 300 Process

SET

- X-Y-R sample positioning stage to support sample positioning
- Complete high accuracy vision system with SW to survey and select the AOI
- Integrated micrometer with 5- μ m steps enables the user to accurately move and position the LatticeAx™ indenter tip over the selected target or cleaving line

INDENT

- The LatticeAx™ diamond indenter indentation: L: 1mm (from leading edge), W: 10- μ m, D: several microns (user adjustable)
- A control knob allows the user to move the indenter in Z and control the depth of the indentation based on the sample type
- Indentation step occurs under high magnification

CLEAVE

- Cleaving step taken place under high magnification
- 3-point cleaving process – 2 teeth coming from the top (on the cleaving bar) and one tip under the sample
- Back wall line indicates the indentation positioning such that the force will be equal on both sides
- Constant force cleaving bar creates uniform force. Slow cleave is an option.
- The cleaving bar can be moved in Z by holding on the bar or using a control knob

Specifications

Cleaving accuracy: +/-10- μ m from selected target

Cleaving accuracy is based on the indentation accuracy relative to the target (cleaving line). The LatticeAx™ integrates all the tools to allow the user to control the indentation location based on a viewed target.

Cleaving cycle time: 5 minutes

Actual indentation and cleaving steps take <1 minute. The remaining time is predicted for sample survey, target identification and line drawings as needed. This time can fluctuate based on user familiarity with the target and the target type, size and location.

Sample size

Minimum Sample size:
Use the Ax for the full set-indent-cleave – minimum sample size 9mm width
For <9mm, use the Ax to survey the target and create the fine indentation, while cleaving manually off the LatticeAx™
Maximum sample size: ½ of 12" wafer
Larger samples can be attempted but more complicated to handle
Thickness of sample: 'out of the package' die to a fully processed sample (not including package material)

Vision system

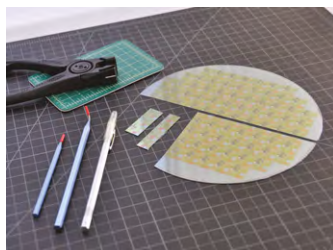
Monocular spec
Prime lens: 6.5X Zoom
Adaptor: 1.0x
Working Distance (mm): 92
System mag
Low mag: 0.70
High mag: 4.50
N.A. Objective
Low mag: 0.023
High mag: 0.071
Resolve limit (UM)
Low mag: 14.50
High mag: 4.70

Matching Pixel Size (microns)
Low mag: 5.08
High mag: 10.55
Depth of Field
Low mag: 0.95
High mag: 0.10
Color CCD Camera Spec
Color USB 2.0 ultra-small
CCD camera, 1/1.8",
UXGA, 1620x1236, 15
FPS, 28X28X42 mm

Accessories

Wafer Cleaving Kit

The complete tool set to get from wafer to cleanly cleaved pieces. This is a critical step to getting the best cross-sections. The kit includes wafer mat, scribes for marking and scribing, pliers for cleaving, rulers and instructions.



Includes:

- Diamond Scriber** - Pen style, optimal for top down scribe
- Diamond Scriber** - Straight tip, optimal for top down precise marking and/or scribing
- Diamond Scriber** - 30-degree tip, optimal for top down precise marking and/or scribing
- CleanBreak Pliers** - 6" wafer cleaving pliers. Simple and clean way to cleave (post scribe) wafers to strips and smaller pieces. 3/4" jaw, opening.
- Large Cutting Mat** - Wafer cutting mat, self healing, double-sided, green and black, 18" x 24"
- Small Ruler Mat** - Self healing, small wafer piece ruler mat, double-sided, green and black, 3 1/2" x 5 1/2"

Note: Always remember to use safety glasses when cleaving the wafer.

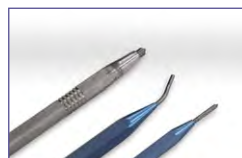
LatticeAx™ Diamond Indenter

Custom diamond indenter for the LatticeAx. The LatticeAx indenter is easily replaced by the user and comes with screws, allen wrench and installation instructions. Polished end for improved positioning.



Marker-Scriber Kit

Diamond scribes for marking fine marks and scribing the wafer surface. These diamond scribes also serve as replacements for those purchased in the starter kit. Three diamond scribes are included:



- Pen-style diamond scriber
- Fine scriber for precise marking and/or scribing
- Fine scriber with 30-degree tip for precise marking and/or scribing

Lattice Scriber

This is the best scriber you'll ever find for scribing semiconductor wafers. This custom scriber has an eight point truncated diamond tip that can be used for both toe and heel scribing held by robust 4" long pin vise handle.



CleanBreak Pliers

CleanBreak 6" wafer cleaving pliers. Simple and clean way to cleave (post scribe) wafers and wafer strips and smaller pieces. 3/4" jaw, opening. Comes with one set of replaceable jaws to maintain the best cleaving performance.



The Wafer Cleaving Station

The Wafer Cleaving Station includes a large cleaving mat, scribes for marking and scribing, pliers for cleaving, and rulers, everything in the Wafer Cleaving Kit. In addition, the Lattice Scriber, customized with an 8 point diamond tip that scribes well at any angle and an extra set of CleanBreak pliers is included with spare set of jaws so that a clean cleave is always possible. This package includes:



- Wafer Cleaving Kit
- Lattice Scriber: Ultimate scriber for semiconductor samples
- CleanBreak Pliers: Wafer-cleaving pliers

LatticeAx™ Options Package

Two spare custom diamond knives for the LatticeAx. The LatticeAx knife is replaced by the user and comes with allen wrenches and installation instructions. This package includes:



LatticeAx Diamond Indenter: Two spare diamond knives

Wafer Cleaving Kit The complete tool set to get from wafer to cleanly cleaved pieces. This is a critical step to getting the best crosssections. The kit includes wafer mat, scribes for marking and scribing, pliers for cleaving, rulers and instructions.



Diamond Scriber - Pen style, optimal for top down scribe

Diamond Scriber - Straight tip, optimal for top down precise marking and/or scribing

Diamond Scriber - 30 degree tip, optimal for top down precise marking and/or scribing

L-Square - 24"x 8.5", phenolic, non-warping, ruler acts as guide for macro cleaving up to 300mm wafers without damaging the top surface of the cleaving station

CleanBreak Pliers - 6" wafer-cleaving pliers. Simple and clean way to cleave (post scribe) wafers to strips and smaller pieces. 3/4" jaw

Large Cutting Mat - Wafer-cutting mat, self healing, double sided, green and black, 18 x 24"

Small Ruler Mat - Self healing, Small wafer piece ruler mat, double sided, green and black, 3.5 x 5.5"

Ordering Information

Cat No.	Description	Qty.
7640	LatticeAx™ 110 Cleaving System	each
7641	LatticeAx™ 220 Cleaving System	each
7650	LatticeAx™ 300 (115V) Cleaving System	each
7651	LatticeAx™ 300 (220V) Cleaving System	each
7642	Wafer Cleaving Kit	each
7643	Diamond Indenter	each
7644	Marker-Scriber Kit	each
7645	Lattice Scriber	each
7646	CleanBreak Pliers	each
7648	Wafer Cleaving Station	each
7649	LatticeAx™ Options Package	each

► General Supplies for Cleaving

► Brush; Red Sable

Extremely soft and pliable. Perfect for the manipulation of pre-viously fixed, dehy-drated specimens into embedding capsules or molds.



66100-00	Brush, Red Sable, Size #0	each
66100-01	Brush, Red Sable, Size #1	each

► EMS Tweezers Style 122



Fine, bent, serrated tips. Length: 6" (150mm)

78357-122	EMS 122	each
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► Dumont Diamond Tweezers

Dumont Stainless Steel tweezers coated with an extremely fine diamond dust on the inside tips. They are essential in applications where a tight grip is necessary. They are also available with an improved locking system. They are 5½" (150mm) long. They may not be suitable for use with EM grids.



► Fine Points Diamond Tweezers

78100	Tip measures 0.25 x 0.25mm	each
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► Medium Points:

78106	Tip measures 0.50 x 0.50 mm	each
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► Dust-Off Plus Model (DPSA)

Contains: Formula S (Difluoroethane) - 100% safe for the ozone. It comes with a patented 360° Vector Valve.

The multi-directional valve is used for easy blasting in hard to reach areas.

The valve can be removed from the can anytime without any loss of gas.

Its new concentrated formula will give you 57% more blasts per ounce, 17% more blasts per can.

The kit consists of a 8 oz. can and a Vector Valve nozzle. Refill is 8 oz can, 12 cans/case.



70840	Dust-Off DPSA Kit	each
70834	Vector Valve Nozzle Only	each
70843	Dust-Off Plus Refill, DPSR	each
70844	Dust-Off Plus Refill, DPSR	12/cs



71915 - PenVac with Deluxe Storage Case



71914 - Complete Pen-Vac System

► Pen Vac™

Pen-Vac™ is a new improved way to handle small, flat surface objects. Besides the electronics assembly industry, Pen-Vac is ideal for EM work as well. It can be used to handle grids, pick up stubs, align membranes, work with glass slides, cover slips and much more. Holds up to one minute.

- Lifts up to 50 grams.
- Totally self-contained vacuum.
- Light-weight, less than 1 ounce.
- Fits in your pocket like a pen.
- Brushed aluminum body.
- Optional storage compartment for vacuum tips and cups.
- No power supply needed.
- Available in various sizes.
- Interchangeable vacuum probes.

Pen-Vac™ comes with:

- A variety of Vacuum Probes, complete with a vacuum cup attached and it is available with plastic or aluminum hubs. Straight and angled to suit your applications. The stainless steel needle portion of the probes are one-half inch long.
- Vacuum Cups come in a wide range of materials. We offer the Static Dissipative and the Conductive Cups that provide ESD protection for electrostatic discharge of sensitive components. Cups comes in three sizes: ⅛" (3.17mm); ¼" (6.35mm); and ⅜" (9.52mm).

Set consists of:

One Pen with 6 Probes and Cups. (6 Probes: 3 angled, ⅛", ¼", ⅜" and 3 straight ⅛", ¼", ⅜")

71914	Complete Pen-Vac System	set
71915	Same as 71914 with Deluxe Case	set

Probes and Cups:

71916	⅛" Straight and Bent, Small	2/pk
71917	¼" Straight and Bent, Medium	2/pk
71918	⅜" Straight and Bent, Large	2/pk

► Mini-Cleaner Vacuum System

A powerful, lightweight, and compact cleaning system. Instead of blowing dust around with a freon duster, this high performance vacuum collects dust efficiently and removes it from delicate areas. The mini-cleaner comes with a crevice tool, 2 dusting brushes and 2 filters, weighs 8 oz. and provides 115 volts of cleaning power.



71910	Vacuum Kit	each
71912	Additional Filters	5/pk

➤ Adhesives and Mountants for Cleaving

➤ Crystalbond™/Wafer-Mount™

A temporary adhesive. These wash away adhesives are used as a temporary bond for holding delicate crystals, metallurgical specimens, glass components, and ceramic substrates for dicing, slicing, drilling and polishing. These materials adhere readily to metals, glass, ceramic and then can be washed after machining away using various solvents.

APPLICATIONS:

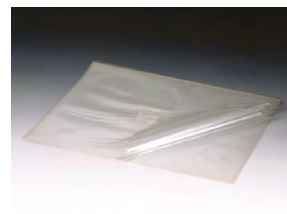
- Machining or slicing single crystal metal specimens.
- Grinding and polishing sapphire, ceramic, optical garnets, ferrites, and LCD glass.
- Dicing and slicing germanium and silicon wafers in semiconductor production.
- Holding beam leads in IC devices for pull-off tests.
- Dicing and slicing alumina and beryllia substrates for IC and microelectronic production.
- Dicing subminiature chip capacitors and microwave IC substrates.



Crystalbond 590

555

509



Wafer-Mount™ 559



562

➤ **Crystalbond™ 509:** offers excellent adhesion to metals, glass, and ceramic. This material is the best for precise high purity work since it leaves no residue after dissolving and does not clog the diamond wheel as compared to conventional waxes. Each stick weighs about 90 grams.

50400-01	Crystalbond 509, Clear Stick	each
50400-05	Crystalbond 509 Clear Stick	5/pk
50400-50	Crystalbond 509 Amber Stick	each
50400-S1	Crystal Bond 509 Stripper	1 qt
50400-S2	Crystal Bond 509 Stripper	1 gal

➤ **Crystalbond™ 555:** the same as 509 but used in applications where it is desirable to have a temporary bond which is water soluble. Each stick weighs about 90 grams.

50401-01	Crystalbond 555	each
50401-10	Crystalbond 555	10/pk

➤ **Crystalbond™ 590:** the same as 509 but offers maximum adhesion to subminiature parts. Each stick weighs about 225 grams.

50402-01	Crystalbond 590	each
50402-02	Crystalbond 590	2/pk
50402-S	Stripper	100 g

➤ **Wafer-Mount™ 559:** is available in sheet form 10"x10" (254x254mm). To use, remove the paper backing exposing the adhesive layer. The substrate is positioned on the film and pressed down firmly so that it adheres to the plastic film. No heating is required. The wafer mounted on the plastic film can then be held down using a vacuum manifold or mechanical means for dicing or scribing. After dicing or scribing, the parts can be separated from the wafer-mount 559 film by washing in acetone or MEK. Ideal for holding down silicon wafers, alumina, or glass substrates for scribing.

50403-02	Wafer-Mount 559	2/pk
50403-10	Wafer-Mount 559	10/pk

➤ **Wafer-Mount™ 562:** a dry temporary adhesive film, 0.003" thick, which can be easily cut to size with either a razor or scissor. This mount permits pre-placement of the adhesive film exactly where the user wants it. It melts at 195-210°F. After application it can be dissolved rapidly in trichloroethylene or toluene. This material is particularly useful in applications where a pre-formed adhesive film is needed to assure uniform bonding and flatness or in bonding stacks of substrates such as LCD glass slides for slicing. Sheet size 8"x10".

50404-10	Wafer-Mount 562	10/pk
50404-20	Wafer-Mount 562	20/pk

Crystalbond™ & Wafer-Mount™ Properties:

Type	509	555	590	559	562
Description	Thermo polymer*	Thermo polymer	Thermo polymer*	Plastic	—
Form	5/8" Dia. x 7" stick	1/2" x 1" x 7" stick	5/8" x 1 1/4" x 7 1/2" stick	.005"x10"x10" Sheet	.003"x8"x10" Sheet
Softening	160°F (71°C)	125°F (52°C)	257°F (125°C)	N/A	N/A
Flow Point	250°F (121°C)	130°F (54°C)	302°F (150°C)	N/A	200°F (93°C)
Viscosity at Flow Point	6,000 cps	500 cps	9,000 cps	N/A	N/A
Color	Clear/Amber	White	Brown	Clear	White
Solvent	Acetone or 509-S Stripper	Water	Methanol or 590-S Stripper	Acetone or MEK	Trichloroethylene or Toluene

*Thermoplastic polymer

► Microtools

► High Precision Diamond Scribing Tools



A newly designed diamond scribing tool set containing eight precision natural diamond scribes in various sizes and configurations. This set is perfect for precision work in microscopy.

The set consists of eight diamond tips, 3 mm in diameter and are mounted in interchangeable tool cones and an MT-1 tool handle. The tool and handle are all

housed in a hardwood instrument case. Individual scribes can be purchased separately.



Cat. #	Description	Pack
62105-S1	Straight tip, .02" (.50mm) dia. by .06" (1.5mm) tip length	each
62105-B1	Bent tip, .02" (.50mm) dia. by .06" (1.5mm) tip length	each
62105-S2	Straight tip, .01" (.25mm) dia. by .06" (1.5mm) tip length	each
62105-B2	Bent tip, .01" (.25mm) dia. by .06" (1.5mm) tip length	each
62105-SE	Straight extended tip, .02" (.5mm) dia. by .2" (5.0mm) tip length. Good for tight areas.	each
62105-BE	Bent extended tip, .02" (.5mm) dia. by .2" (5.0mm) tip length. Good for hard to reach areas.	each
62105-HS	Straight, heavy duty tip, .03" (.8mm) dia. by .12" (3.1mm) tip length	each
62105-HC	Bent, heavy duty tip, .03" (.8mm) dia. by .12" (3.1mm) tip length	each
62090-00	MT-1 Tool Handle, 4.75" (112mm) long, gold anodized	each
62105-00	High Precision Diamond Scribing Tools, complete set	each

► High Precision Fine Diamond Scriber

This diamond scriber is the ultimate scribing instrument offering the most precision for the most delicate applications. It is available in straight or bent configurations.

APPLICATIONS INCLUDE:

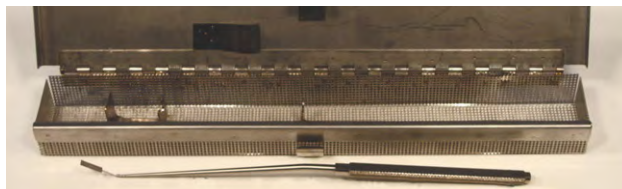
- Fine scribing under the microscope - for silicon wafers and glass coverslips
- Precision scribing and repairing - for thin film circuits and microcircuits, etc.

These diamond mountings are 0.8mm diameter with a reduced shank size of 0.5mm or 0.25mm diameter, which holds the diamond stylus. The natural diamond has a 60° included angle and a 0.12mm tip radius. The integrated 6.35mm anodized hexagonal (non-rolling) aluminum handle has a positive finger grip in the form of grooves for easy control and non-slippage. Each diamond scriber is packaged in a protective plastic tube.



Cat. #	Configuration and Shank Size
62107-ST	Straight Mounting, 0.5mm diameter
62107-BT	Bent Mounting, 0.5mm diameter
62108-ST	Straight Mounting, 0.25mm diameter
62108-BT	Bent Mounting, 0.25mm diameter

► Micro Ruler – Extended Reach

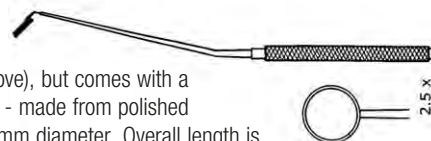


- Precision etched, non-glare ruler made from surgical stainless steel, only 3 mm wide. The ruler is calibrated in 0.1 mm graduations, 10 mm total range.
- Stainless steel handle 230 mm long. Balanced and angled for the ultimate in flexibility able to reach into areas which are impossible for other measuring devices.
- Available with or without a stainless steel autoclave case. Total weight of the ruler is 26 g.
- Applications include microscopy, chemistry and anywhere precise measurement in clean and very confined areas are of critical importance.

Cat. #	Description	Pack
62136-ER	Ext. Reach Micro Ruler only	each
62136-ERC	Ext. Reach Micro Ruler w/ Case	each

► Micro Mirror – Extended Reach

It is of similar construction with the Micro-Ruler (above), but comes with a 2.5x magnify Mirror - made from polished stainless steel, 4.8 mm diameter. Overall length is 230mm. Autoclavable Case is available as an option.



Cat #	Description	Pack
62136-M	Extended Reach Mirror	each
62136-MC	Extended Mirror With Case	each

► Hardened Steel Deburring Tool Set



Made from hardened steel, this tool has three razor sharp cutting edges ranging from a very sharp point to one that is approximately 10mm in length. These nickel plated triangular tools are mounted in red and black plastic handles. Tool length is 30mm by 2.1mm across (1.2"x.08"). The overall length of the tool is 154mm (5.7"). 2 tools/set.

62161-SD	Hardened Steel Deburring Tool Set	set
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► Sapphire Burnishing/Deburring Tool



This tool will out-perform any stone for the fine burnishing of soft or hard materials such as; miniature pivots, shafts, and pins that are made from hard steel, carbide and even ceramic.

This precisely ground sapphire blade is 1.5mm x 2.3mm, 14mm long (0.06 x 0.09 x .56"). It is permanently mounted in a hexagonal gold anodized aluminum handle. Total length is 120mm (4.75").

62160-00	Sapphire Burnishing/Deburring Tool	each
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► Omni Grids

► Copper Lift-Out Grids

Custom copper lift-out grids specifically designed for in-situ lift-out. These grids include multiple indexed mounting locations with both vertical bars and "V" shaped attachment surfaces. 3mm diameter.



75964-01 Copper Lift-Out Grids 100/vial

► Molybdenum Lift-Out Grids

Custom molybdenum lift-out grids specifically designed for in-situ lift-out. These grids include multiple indexed mounting locations with both vertical bars and "V" shaped attachment surfaces. 3mm diameter.



75964-02 Molybdenum Lift-Out Grids 25/vial

► Beryllium Haft-Ring Grids

Custom beryllium haft ring grids. 3mm diameter.



75964-03 Beryllium Haft Ring Grids 10/pk

► Copper 5-Post Lift-Out Grids

Custom copper 5-post lift-out grids specially designed for in-situ lift-out. These grids include multiple indexed mounting locations, all with vertical bars attachment surfaces. Now with lower profile sides for easier access to outermost posts. 3mm diameter.



75964-04 Copper 5-Post Lift-Out Grids 100/vial

► Copper 4-Post Lift-Out Grids

Custom copper 4-post lift-out grids specially designed for in-situ lift-out. These grids include multiple indexed mounting locations, two with vertical bars attachment surfaces and two with "V" shaped alignment surfaces. Sides have lower profile for easier access to outermost posts. 3mm diameter.



75964-05 Copper 4-Post Lift-Out Grids 100/vial

► Molybdenum 4-Post Lift-Out Grids

Custom Molybdenum 4-post lift-out grids specially designed for in-situ lift-out. These grids include multiple indexed mounting locations, two with vertical bars attachment surfaces and two with "V" shaped alignment surfaces. Sides have lower profile for easier access to outermost posts. 3mm diameter.



75964-06 Mo 4-Post Lift-Out Grids 25/vial

► Copper 3-Post Lift-Out Grids, Side Access

3 post copper lift-out grids, similar to 75964-01, in design but 35 micron thick with 1 edge lower for easy access. Packaged in glass vials



75964-07 Copper 3-Post Lift-Out Grids, Side Access 100/vial

► Copper 3-Post Lift-Out Grids, Shallow Downset

3 post copper lift-out grids specifically designed for in-situ lift-out. These grids include multiple indexed mounting locations with both vertical bar and "V" shaped attachment surfaces. These grids have a shallower downset and slightly wider center post than 75964-01. Packaged in glass vials.



75964-08 Copper 3-Post Lift-Out Grids, Shallow Downset 100/box

► Copper 5-Post Lift-Out Grids

5 post copper lift-out grids specifically designed for in-situ lift-out. These grids include multiple indexed mounting locations, all with vertical bar attachment surfaces. Now with lower profile sides for easier access to outermost posts. 3mm dia. Packaged in glass vials.



75964-09 Copper 5-Post Lift-Out Grids 100/box

► Copper 4-Post Lift-Out Grids

4 post copper lift-out grids specifically designed for in-situ lift-out. These grids include multiple indexed mounting locations, two with vertical bar attachment surfaces and two with "V" shaped alignment surfaces. Sides have lower profile for easier access to outermost posts. 3mm dia. Packaged in plastic vials.



75964-10 Copper 4-Post Lift-Out Grids 100/box

► Omni Grid Storage Box

Storage box for 100 standard or haft grids—3 mm diameter – TEM grids. Box comes complete with base, lid and clips.



75965-01 Grid Storage Box each

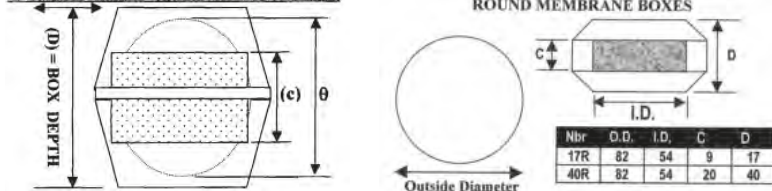
Omniprobe TEM Grid Comparison Chart

Part Number	Number of Posts	Material	Thickness (Nominal) Microns	Nominal Post Downset Microns	Unique Feature
75964-01	3	Copper	30	10	—
75964-02	3	Molybdenum	30	10 Top Downset only	—
75964-03	0	Beryllium	25	N/A	Half Ring
75964-04	5	Copper	40	10	5th Post is E
75964-05	4	Copper	30	10	—
75964-06	4	Molybdenum	30	10 Top DS Only	—
75964-07	3	Copper	30	5	Side Access
75964-08	3	Copper	30	5	—
75964-09	5	Copper	35	5	5th Post is "E"
75964-10	4	Copper	30	5	—

► Membrane Boxes

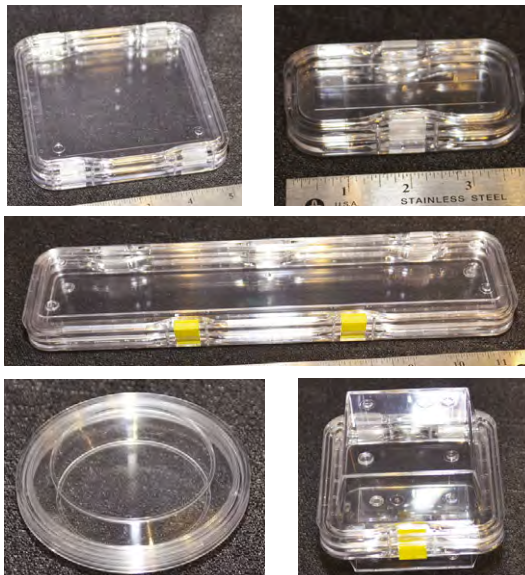
Our unique membrane storage boxes for the transfer, storage and shipping of many delicate items. Available in 5 different shapes and sizes these plastic containers, with a double elastic membrane on the top and bottom, offer security for all of your sensitive items. Once your item is placed in the box the elastic membrane conforms around the enclosed object and protects it from any movement.

ALL MEASUREMENTS ARE IN MILLIMETERS (mm)



Round Membrane Boxes

Cat. #	O.D, mm	I.D, mm	C	D	Qty
64304-20	82	54	20	40	each
64304-30	82	54	9	17	each



Cat. #	Overall Dimensions			Maximum Useful Area Dimensions			Capacity Weight	Qty	
	L, mm	W, mm	D, mm	L, mm	W, mm	D, mm			
Rectangular Boxes									
64304-27	250	200	212	162	18	—	—	each	
64304-28	250	200	204	154	40	—	—	each	
64304-29	100	50	67	20	20	—	—	each	
64304-36	100	50	16	67	17	9	8g	each	
64304-38	100	75	16	67	42	9	19g	each	
64304-39	100	75	25	62	37	18	31g	each	
64304-40	125	75	25	87	37	18	44gg	each	
64304-41	150	75	25	112	37	18	56g	each	
64304-42	150	125	25	112	87	18	132g	each	
64304-43	150	125	50	112	79	20	246g	each	
64304-44	250	200	100	188	138	60	1557g	each	
64304-45	250	200	200	157	—	—	3371g	each	
64304-46	300	150	16	267	117	9	211g	each	
64304-51	100	50	50	54	17	12	—	each	
<i>This box has no stackable feet.</i>									
64304-52	150	100	25	92	92	9	—	each	
64304-53	300	75	25	262	37	18	—	each	
64304-54	150	100	75	104	54	59	—	each	
64304-55	300	150	25	267	117	19	—	each	
64304-56	300	150	75	246	96	60	—	each	
64304-57	175	100	25	137	62	18	—	each	
64304-58	175	100	50	129	54	40	—	each	
64304-59	200	150	50	154	104	40	—	each	
Square Boxes									
64304-10	38	38	18	31	31	9	10g	12/pk	
64304-11	100	100	16	67	67	9	30g	each	
64304-12	100	100	25	62	62	18	52g	each	
64304-13	100	100	50	54	54	40	88g	each	
64304-14	125	125	16	92	92	9	57g	each	
64304-15	125	125	25	87	87	18	102g	each	
64304-16	125	125	50	79	79	40	187g	each	
64304-17	150	150	100	88	88	80	465g	each	
64304-18	125	125	75	92	92	60	—	each	
64304-19	150	150	25	112	112	18	—	each	
64304-21	150	150	75	104	104	60	—	each	
64304-22	100	100	75	—	—	—	—	each	
64304-23	175	175	25	137	137	18	—	each	
64304-24	175	175	50	129	129	40	—	each	
64304-25	200	200	25	162	162	18	—	each	
64304-26	200	200	50	154	154	40	—	each	
64304-50	150	150	50	104	104	40	324g	each	

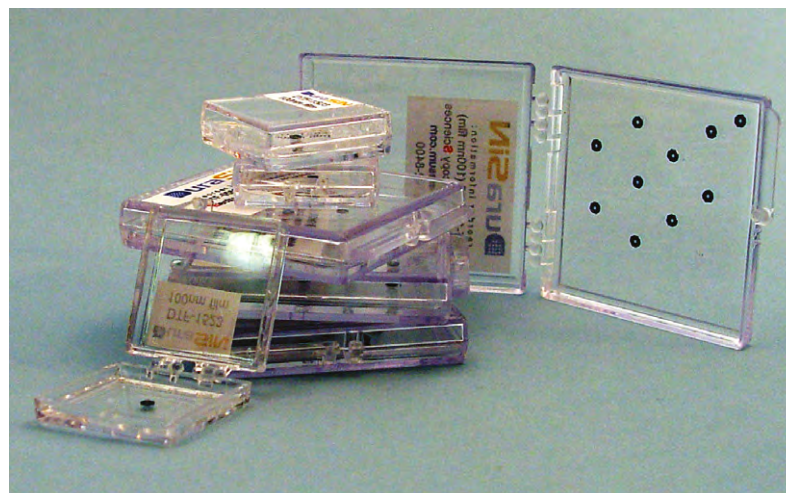
► Gel-Pak® Storage/Carrier Box

Patented gel technology – the innovative solutions for storage and carrying delicate materials

The traditional Gel-Box, Gel-Tray® and Gel-Slide Carriers are perfect for applications where devices are manually offloaded by tweezers or by hand.

- **Gel-Box (AD Series)** - Hinged plastic boxes coated with Gel in the bottom.
- **Gel-Tray® (BD Series)** - A removable 2" plastic tray coated with Gel and contained inside a hinged plastic box.
- **Gel-Slide (CD series)** - A removable 2" glass slide coated with Gel and contained inside a hinged plastic box.

(Gel-Pak® is A Division of Delphon Industries)



► GEL-BOX (AD Carrier Boxes)

Gel-Box AD Series Carriers owe their unique device-holding capabilities to a proprietary GEL coating applied directly to the bottom of a hinged box. Devices are held once contact is made with the GEL surface and will stay in place, even if the carrier is tilted or jarred. The carriers are designed for manual off-loading with tweezers or by hand. GEL-PAK AD series are ideal for handling devices where no direct contact with the top of the device is important.

The GEL-BOX Carriers may also be used for bare die handling, such as GaAs, PETs, laser diodes, and beam-lead devices where the die size is small (less than 1mm) and tweezers or other specialized techniques are used for off-handling.

FEATURES:

- No need for custom-molded containers for each device size.
- Ideal for handling subassemblies, hybrid models and packaged devices.
- Available in Transparent, Conductive and Anti-Static carriers in multiple sizes.
- Retention Level available: x0, x1, x2, x3, x4, x5, and x8 (the higher the number the more retention capability)

We offer standard retention level X4. Other retention levels are available with the order of 100 or more, and at least two weeks for delivery.

► GEL-TRAY® (BD Series) And GEL-SLIDE (CD Series)

Same as the Gel-Box, the Gel-Tray and Gel-Slide products are intended for manual applications in which the devices are loaded and unloaded using tweezers or by fingers. The Gel-Pak BD and CD series of pocketless trays are both configured as a 2" carrier stored in a protective plastic hinged box. The Gel coating is applied directly to the surface of the plastic tray (BD Series) or glass slide (CD Series).

These products offer the same functionality as the Gel-Box, however the plastic tray or glass slide can be easily removed from the box allowing for convenient handling when loading or unloading fixtures are being used.

The Gel-Slide (coated glass slides) is designed for higher temperature applications such as bonding and reflow where a plastic tray will not work. The CD slide has a temperature capability up to 220°C. The CD glass slides are also ideal for backside inspection due to their optical clarity.

Both the Gel-Tray and Gel-Slide products are available in the standard retention levels (X0, X4, X5, and X8) to accommodate variations in device size, weight, and surface roughness.

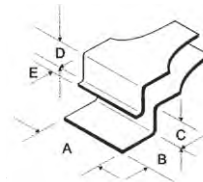
The protective 2" hinged boxes are available in transparent styrene (T), conductive black (C) and antistatic (AS) materials. The boxes, trays, and slides may be customized with a print pattern (grid) or company logo. Standard available Prints can be viewed at Gel-Tray/Gel-Slide Print options

Cat #	Description - Overall Box size	Qty
64900-x4	1"x1"x 1/4" Transparent Hinged Box	50/pk
64901-x3	2" x 2" x 0.25" Antistatic Gel-Box	50/pk
64901-x4	2"x2"x1/4" Conductive Hinged Box	50/pk
64902-x4	2"x2"x1/4" Anti-Static Top & Conductive Hinged Box	50/pk
64903-x4	2"x2"x1/4" Anti-Static Hinged Box	50/pk
64904-x4	2"x3"x3/8" Conductive Hinged Box	50/pk
64905-x4	2"x3"x3/8" Anti-Static & Conductive Hinged Box	50/pk
64906-x4	3.5"x4.5"x0.5" Conductive Hinged Box	50/pk
64908-X3	4.5" x 3.5" x 0.875" Conductive Base/Antistatic Lid Gel-Box	50/pk
64907-x4	3.5"x4.5"x7/8" Transparent Hinged Box	50/pk
64908-x4	3.5"x4.5"x7/8" Conductive Hinged Box	50/pk
64909-x4	2.5"x3.5"x0.5" Anti Static Top & Conductive Hinged Box	50/pk
64910-x3	6" x 4" x 0.5" Conductive Gel-Box	50/pk
64911-x3	6" x 4" x 0.5" Transparent Gel-Box	50/pk
64912-x3	7" x 5" x 1" Conductive Base/Antistatic Lid Gel-Box	50/pk
64913-x3	7" x 5" x 1" Conductive Gel-Box	50/pk
64914-x3	7.75" x 3.5" x 1" Conductive Gel-Box	50/pk
64915-x3	9.937" x 3.5" x 0.625" Transparent Gel-Box	50/pk

Cat #	Description	Qty
64900-10	2" x 2" Conductive BD Tray in Antistatic Hinged Box	50/pk
64900-11	2" x 2" Conductive BD Tray in Conductive Base/Antistatic Lid Hinged Box	50/pk
64900-12	2" x 2" Conductive BD Tray in Conductive Base/Transparent Lid Hinged Box	50/pk
64900-13	2" x 2" Conductive BD Tray in Conductive Hinged Box	50/pk
64900-14	2" x 2" Conductive BD Tray in Transparent Hinged Box	50/pk
64900-15	2" x 2" Conductive BD Tray in "High Clearance" Antistatic Hinged Box	50/pk
64900-16	2" x 2" Transparent BD Tray in Antistatic Hinged Box	50/pk
64900-17	2" x 2" Transparent BD Tray in Conductive Base/Antistatic Lid Hinged Box	50/pk
64900-18	2" x 2" Transparent BD Tray in Conductive Hinged Box	50/pk
64900-19	2" x 2" Transparent BD Tray in Transparent Hinged Box	50/pk
64900-20	2" x 2" Glass Slide in Transparent Hinged Box	50/pk
64900-21	2" x 2" Glass Slide in Conductive Hinged Box	50/pk
64900-22	2" x 2" Glass Slide in Antistatic Hinged Box	50/pk
64900-23	2" x 2" Glass Slide in MAG-40 Cassette	50/pk

► EMS Wafer Tweezers

These tweezers are especially designed for the handling of delicate and fragile silicon wafers, scintillation discs, glass slides, coverslips etc. Made from antimagnetic/anti acid steel with a very smooth surface and a non-glare finish.



► Style 2W

A: 6.5mm (0.25"); B: 5.0mm (0.20"); C: 2.5mm (0.10"); D: 4.0mm (0.15")

78410-2W EMS 2W each



► Style 2WFCPR

Tips are made of PEEK/CF30. These tips offer gently holding wafers. Replacement tips are available. A: 0.25" (6.6mm); B: 0.41" (2.0mm); C: 0.08" (2.0mm); D: 0.14" (3.5mm); E: 0.18" (4.5mm)

78410-2WFC EMS 2WFCPR each

78410-2WFR Replacement tips set



► Style 35B

A: 12.0mm (0.47"); B: 13.0mm (0.51"); D: 2.5mm (0.10")

78411-35B EMS 35B each



► Style 35S

A: 29.0mm (1.14"); B: 5.5mm (0.20"); D: 3.0mm (0.12")

78411-35S EMS 35S each



► Style 37S

A: 7.8mm (0.3"); B: 6.0mm (0.24"); E: 6.0mm (0.24")

78411-37S EMS 37S each



► Style 38FG

A: 9.5mm (0.37"); B: 11.0mm (0.34"); D: 4.0mm (0.15"); E: 2.5mm (0.10")

78411-38FG EMS 38FG each



► Style 3 WF

A: 9.5mm (0.37"); B: 10.0mm (0.39"); C: 2.5mm (0.10"); D: 4.0mm (0.15"); E: 2.5mm (0.10")

78411-3WF EMS 3WF each



► Style 39S2

A: 6.5mm (0.25"); B: 8.5mm (0.33"); D: 5.5mm (0.20"); E: 2.4mm (0.09")

78412-39S2 EMS 39S2 each



► Style 39S3

A: 9.5mm (0.37"); B: 8.5mm (0.23"); D: 5.5mm (0.20"); E: 2.4mm (0.09")

78412-39S3 EMS 39S3 each



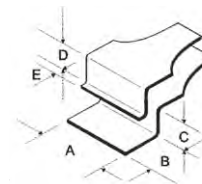
► Style 41W

A: 28.0mm (1.1"); B: 12.0mm (0.47"); D: 5.0mm (0.20"); E: 5.0mm (0.2")

78414-41W EMS 41W each



► EMS Wafer Tweezers (continued)



► Style 43 WFG

A: 9.5mm (0.37"); B: 8.5mm (0.33"); D: 3.5mm (0.14"); E: 2.5mm (0.10")

78414-43WFG EMS 43WFG each



► Style 44 WF

A: 12.0mm (0.47"); B: 8.5mm (0.33"); D: 3.5mm (0.14"); E: 2.5mm (0.10")

78414-44WF EMS 44WF each



► Style 4 WF

A: 12.0mm (0.47"); B: 9.0mm (0.33"); D: 4.0mm (0.15"); E: 2.5mm (0.10")

78414-4WF EMS 4WF each



► Style 4WFCPR

Tips are made of PEEK/CF30 - These tips offer gently holding wafers. Replacement tips are available. A: 0.46" (12mm); B: 0.41" (2.0mm); C: 0.08" (2.0mm); D: 0.14" (3.5mm); E: 0.18" (4.5mm)

78414-4WFC EMS 4WFCPR each

78414-4WFR Replacement Tips set set



► Style 48 WF

A: 28.0mm (1.1"); B: 9.0mm (0.35"); D: 4.0m (0.15"); E: 2.5mm (0.10")

78414-48WF EMS 48WF each



► Style 8WF

A: 28.5mm (1.12"); B: 12.0mm (0.47"); C: 2.2mm (0.08"); D: 3.5mm (0.14"); E: 2.5mm (0.10")

78420-8WF EMS 8WF each



► Style 8WNY

A: 65.0mm (2.55"); B: 19.0mm (0.75"); C: 1.3mm (0.05"); D: 2.0mm (0.08")

78422-8WNY EMS 8WNY each



► Style 600M - Bent

A: 20.0mm (0.79"); B: 11.0mm (0.43"); E: 2.3mm (0.09")

78425-600M EMS 600M each



► Style 96 - Self-Closing

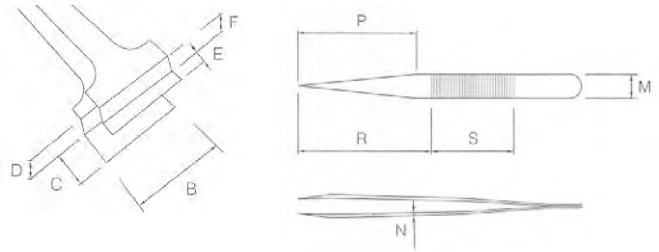
A: 14.5mm (0.57"); B: 10.5mm (0.41"); C: 9.0mm (0.35")

78426-96 EMS 96 each



► Rubis Wafer Tweezers

Made from SA steel with serrated handles. These tweezers are specially designed to handle different fragile and delicate materials of gallium or silicon wafers. They have a smooth polished non-glare surface with a satin finish. The tweezers have stopping pins turned up on lateral edges and graduated lower paddles prevent the wafer from slipping. The tweezers are also available in Peek material. Peek: An ESD Safe, $10^9\Omega \times \text{cm}$. Soft, conductive fiber, with heat resistance up to 250°C (short exposure 300°C). (Not compatible with nitric and sulfuric acids.)



► Style 2LB/4

No teeth. Length: 128mm (5"). B = 12.5mm ($\frac{1}{2}$ "), C = 8mm ($\frac{1}{8}$ "), D = 3mm ($\frac{1}{8}$ "), E = 2mm ($\frac{1}{2}$ "), F = 4mm ($\frac{1}{8}$ "), M = 9mm ($\frac{1}{8}$ "), N = 2mm ($\frac{1}{2}$ "), R = 48mm ($1\frac{3}{4}$ "), S = 42mm ($1\frac{3}{8}$ ")

78220-01 Wafer Tweezers, Style 2LB/4 each



► Style 39S-4

4 teeth, lower part perforated. Length: 128mm (5"). B = 12.5mm ($\frac{1}{2}$ "), C = 10mm ($\frac{1}{8}$ "), E = 2mm ($\frac{1}{2}$ "), F = 6mm ($\frac{1}{4}$ "), M = 9mm ($\frac{1}{8}$ "), N = 1.5mm ($\frac{1}{16}$ "), R = 48mm ($1\frac{3}{4}$ "), S = 4mm ($1\frac{1}{2}$ ")

78225-01 Wafer Tweezers, Style 39s each



► Style 41LB-2

2 teeth. Flat lower paddle. Length: 128mm (5"). B = 6mm ($\frac{1}{4}$ "), C = 7.0mm ($\frac{1}{4}$ "), E = 2mm ($\frac{1}{2}$ "), F = 3mm ($\frac{1}{8}$ "), M = 9mm ($\frac{1}{8}$ "), N = 1.5mm ($\frac{1}{16}$ "), R = 52mm (2"), S = 42mm ($1\frac{3}{8}$ ")

78226-01 Wafer Tweezers, Style 4 each



► Style 41LB-5

5 teeth. Flat lower paddle. Length: 132mm ($5\frac{1}{4}$ "), B = 16mm ($\frac{5}{8}$ "), C = 9mm ($\frac{1}{8}$ "), E = 2mm ($\frac{1}{2}$ "), F = 3mm ($\frac{1}{8}$ "), M = 11mm ($\frac{1}{2}$ "), N = 2mm ($\frac{1}{2}$ "), R = 52mm (2"), S = 42mm ($1\frac{3}{8}$ ")

78229-01 Wafer Tweezers, Style 41LB-5 each



► Style 42LB6

6 teeth. Step up lower paddle. Length: 130mm ($5\frac{1}{8}$ "), B = 19.5mm ($\frac{3}{4}$ "), C = 8mm ($\frac{1}{2}$ "), D = 3mm ($\frac{1}{8}$ "), E = 3mm ($\frac{1}{8}$ "), F = 4mm ($\frac{1}{8}$ "), M = 11mm ($\frac{1}{2}$ "), N = 2mm ($\frac{1}{2}$ "), R = 52mm (2"), S = 42mm ($1\frac{3}{8}$ ")

78237-01 Wafer Tweezers, Style 42LB 6 each



► Style 43LB-8-Peek

Clean-room compatible. Length: 138mm ($5\frac{1}{2}$ "). B = 27mm ($1\frac{1}{16}$ "), C = 21mm ($\frac{3}{4}$ "), D = 4mm ($\frac{1}{8}$ "), E = 6mm ($\frac{1}{4}$ "), F = 5mm ($\frac{1}{8}$ "), M = 11mm ($\frac{1}{2}$ "), N = 1.5mm ($\frac{1}{16}$ "), R = 61mm ($2\frac{1}{8}$ "), S = 35mm ($1\frac{1}{8}$ ")

78239-01 Wafer Tweezers, Style 43LB-8 Peek each



► Style 43LB-4-Peek

Clean-room compatible. Length: 138mm ($5\frac{1}{2}$ "). B = 13mm ($1\frac{1}{16}$ "), C = 21mm ($\frac{3}{4}$ "), D = 4mm ($\frac{1}{8}$ "), E = 6mm ($\frac{1}{4}$ "), F = 5mm ($\frac{1}{8}$ "), M = 11mm ($\frac{1}{2}$ "), N = 1.5mm ($\frac{1}{16}$ "), R = 61mm ($2\frac{1}{8}$ "), S = 35mm ($1\frac{1}{8}$ ")

78240-01 Wafer Tweezers, Style 43LB-4 Peek each



► Style 43LB-10

10 teeth. Flat lower paddle with opening controller. Length: 190mm ($7\frac{1}{2}$ "). B = 33.5mm (2"), C = 20mm ($\frac{1}{4}$ "), D = 7mm ($\frac{1}{4}$ "), E = 2mm ($\frac{1}{2}$ "), F = 3mm ($\frac{1}{8}$ "), M = 13mm ($\frac{1}{2}$ "), N = 2mm ($\frac{1}{2}$ "), R = 77mm (3"), S = 42mm ($1\frac{3}{8}$ ")

78241-01 Wafer Tweezers, Style 43LB-10 each



SECTION 14

Histology and Light Microscopy

Reagents for Fixing, Dehydrating, Clearing and Staining

Embedding Media

Aldehyde Control Systems

Tools and Gadgets for Histology Preparation

Adhesives and Mounting Media

Staining Apparatus

General Supplies

Brushes, Boards, Trays, Gloves, Markers, and Containers

Tissue Embedding and Processing Cassettes

Cryo-Embedding

Cytology Funnel Sample Chambers

Embedding Supplies, Capsules, Molds, and Markers

Microscope Slides, Cover Glasses, and Coverslips, Accessories

Microscope Slide Storage Boxes, Trays, Holders, and Mailers

Microtome Blades, Holders and Supplies

Tissue-Tek® Tissue Processor and Embedding System

Microtome and Microtome/Cryostat

Cytocentrifuge

Tissue Stainer and Embedding Center

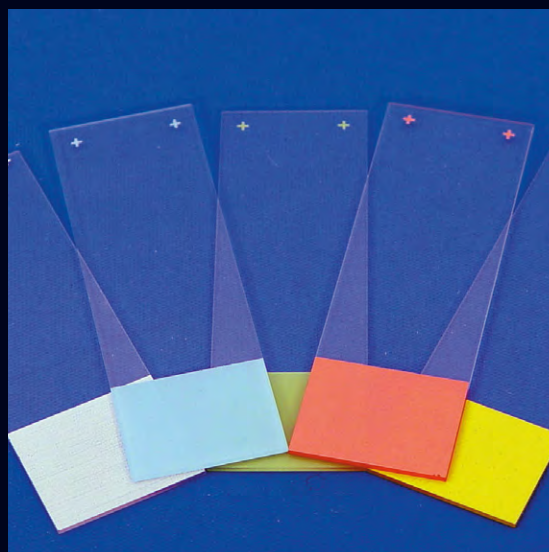
Cryostat Section Preparation Aids

Paraffin Embedding and Section Mounting

Slide Warmers and Ovens / Incubators

Pathscan IV Digital Histology Slide Scanner

Slide, Cassette, and Tissue Block Storage



**Electron
Microscopy
Sciences**



FIXING, CLEARING, AND DEHYDRATING CHEMICALS

➤ Acetate Buffer

RT	11482-42	Acetate Buffer, 0.2M, pH 4.2	500 ml
RT	11482-50	Acetate Buffer, 0.2M, pH 5.0	500 ml
RT	11482-56	Acetate Buffer, 0.2M, pH 5.6	500 ml

➤ Acetic Acid, Glacial, Reagent A.C.S

$C_2H_4O_2$ F.W. 60.05 CAS 64-19-7

Assay min 99.7%

RT	10040	Acetic Acid, Glacial	500 ml
RT	10041	Acetic Acid, Glacial	2.5 L

➤ Acetic Acid, Aqueous Solution

Prepared from acetic acid glacial with de-ionized water

RT	10042-02	Acetic Acid, 0.2% (v/v) Solution	500 ml
RT	10042-05	Acetic Acid, 0.5% (v/v) Solution	500 ml
RT	10042-10	Acetic Acid, 1.0% (v/v) Solution	500 ml
RT	10042-50	Acetic Acid, 5.0% (v/v) Solution	500 ml

➤ Acetone, Reagent, A.C.S.

CH_3COCH_3 F.W. 58.08 CAS #67-64-1

A.C.S. Specifications:

AssayMin. 99.5%
 Aldehyde (as HCHO)0.002%
 Density (G/ml) at 25°CMax. 0.7857
 Titratable Acid0.0003 meq/g.
 Titratable Base0.0006 meq/g.
 Isopropyl Alcohol0.05%
 Methanol (CH_3OH)0.05%
 Residue after Evaporation0.001%
 Solubility in waterTo Pass test
 Substances Reducing PermanganateTo Pass Test
 Water0.5%

RT	10000		1 qt. (946 ml)
RT	10010		4 x 1 qt.
RT	10012		250 ml
RT	10014		4 x 250 ml

➤ Acetone: Alcohol, 1:1 & Buffered Acetone

RT	10017	Acetone: Alcohol, 1:1	500 ml
RT	10018	Buffered Acetone Fixative	500 ml

➤ Acid Alcohols

An acidified alcohol solution for the differentiation of regressive stains.

RT	26071-01	Acid Alcohol, 0.5% HCl in 70% Alcohol	1 L
RT	26071-04	Acid Alcohol, 0.5% HCl in 70% Alcohol	4 x 1 L
RT	26072-01	Acid Alcohol, 1% HCl in 70% Alcohol	1 L
RT	26072-04	Acid Alcohol, 1% HCl in 70% Alcohol	4 x 1 L
RT	26073-01	Acid Alcohol, 1% HCl in 95% Alcohol	1 L
RT	26073-04	Acid Alcohol, 1% HCl in 95% Alcohol	4 x 1 L

➤ Alcohol

➤ Ethyl Alcohol, Specially Denatured

C_2H_5OH F.W. 46.07 CAS #64-17-5

Blended 95% Ethanol and 5% Methanol
 Suitable for all routine histology/cytology preparations.

Specifications:

Evaporation Residue5ppm max.
 Water0.1%
 Filtered SDA-3A.95%

RT	15050		1 qt (946 ml)
RT	15051		4 x 1 qt

➤ Ethyl Alcohol, Anhydrous*

(Ethanol) - 200 Proof

CH_3CH_2OH F.W. 46.07 CAS # 64-17-5

Specifications:

Specific Gravity<0.7942
 Purity>99.9%
 Acidity<0.002%
 Water (Karl Fisher)<0.1%
 Non-Volatile Matter<0.0025%

RT	15055		450 ml
RT	15056		4 x 450 ml
RT	15058		1 liter

*Tax has already been paid.

➤ Alkaline Alcohol

RT	10380	10% NH_4OH in 85.5% Alcohol	500 ml
RT	10381	1.6% NaCl in 80% Alcohol	500 ml
RT	10382	0.2% KOH in 80% Alcohol	500 ml

➤ Ammonium Hydroxide, 28% Reagent, A.C.S.

NH_4OH FW. 35.05 CAS #1336-21-6 Specific Gravity: 0.91

Assay28-30%

Specifications:

Residue After Ignition0.002%
 Carbon Dioxide0.002%
 Chloride0.5 ppm
 Phosphate2 ppm
 Sulfate2 ppm
 Heavy Metals0.5 ppm
 Iron0.2 ppm

RT	10600		450 ml
RT	10601		4 x 450 ml

➤ Amphibian Ringer Solution

Ingredients: NaCl; KCl; $CaCl_2 \cdot 6H_2O$ and Distilled water.

RT	11762-05	Amphibian Ringer Solution	500ml
RT	11762-10	Amphibian Ringer Solution	1 L

➤ B-5 Fixative

For lymph nodes.

RT	64122-05	B-5 Fixative	500 ml
RT	64122-06	B-5 Fixative	1 lt
RT	64122-10	B-5 Fixative	4 lt

➤ Borate Buffer *see Buffers on next page.*

➤ Bouin's Solution

Bouin's solution can be used as a fixation and a staining fluid. Bouin's fixative is excellent for use on biopsy specimens of the gastrointestinal tract. Tissue from the endocrine system are well fixed and many antibodies react well with tissue fixed in Bouin's. Bouin's solution may be used as a routine fixative or a staining solution, but should not be used as a preservative for tissue. Tissue cannot be held in Bouin's solution for extended periods. The maximum fixation time in this solution should be less than 48 hours and should be transferred to alcohol. Packaged in leak-proof histo-containers, pre-filled and ready-to-use.

Formulated with Picric Acid saturated aqueous solution 75%, Formalin (40% aqueous formaldehyde) 25% and Glacial Acetic acid 5% in de-ionized water

RT	15990-01	Bouin's Fluid	1 L
RT	15990-04	Bouin's Fluid	4 L

Bouin's Fluid in Pre-filled cups:

RT	15990-10	Bouin's Fluid	50 x 10 ml/cs
RT	15990-20	Bouin's Fluid	50 x 20 ml/cs
RT	15990-30	Bouin's Fluid	20 x 30 ml/cs

FIXING, CLEARING, AND DEHYDRATING CHEMICALS

All of our ready-to-use buffers are...

...Conveniently packaged.

...Prepared fresh for each order.

...Economical and time-saving.

The buffer is a vehicle for the fixative and requires certain properties:

a.) To maintain constant pH during the time of the fixation. The pH of the fixative in EM is adjusted using the buffer system chosen; e.g. range 6.5-8.0.

b.) The ionic constitution to prevent the extraction of cellular components, or the deposition of precipitates of fixative chemicals.

Desired pH should be specified when ordering.

➤ Acetate Buffer

RT	11482-42	Acetate Buffer, 0.2M, pH 4.2	500 ml
RT	11482-50	Acetate Buffer, 0.2M, pH 5.0	500 ml
RT	11482-56	Acetate Buffer, 0.2M, pH 5.6	500 ml

➤ Antibody Diluent

Buffer for diluting your primary and secondary antibodies, especially if they were stored for a while, even at -20 in glycerol, or in refrigerator.

4-8°C	62713	Antibody Diluent	50 ml
4-8°C	62714	Antibody Diluent	125 ml
4-8°C	62715	Antibody Diluent	500 ml
4-8°C	62713-01	Antibody Diluent for Frozen Sections	50 ml
4-8°C	62714-01	Antibody Diluent for Frozen Sections	125 ml
4-8°C	62715-01	Antibody Diluent for Frozen Sections	500 ml

See more information, see page 615 >>>>

➤ Antibody Dilution Buffer with Immunoglobulin- Free BSA

This ready-to-use Antibody Dilution Buffer is designed for the dilution of antibodies in all immunoassays, including immunofluorescence, IHC, ELISA, WB. This buffer contains immunoglobulin free BSA and does not contain phosphate, sodium azide, or mercury preservatives. It can be used for the dilution of all antibodies, including peroxidase, and antibodies to phosphoproteins. However, it is not suitable for dilution of antibodies to S100 proteins. This buffer contains green food color.

- Reagent Supplied: Ready to use buffer
- Application: Dilute antibodies, primary or secondary as recommended in the protocol by the manufacturer of these products.
- Storage: 2 – 8°C. Diluted antibodies can be stored at 2 – 8°C for several weeks, depending upon the stability of antibodies.

2-8°C	25886-01	Antibody Dilution Buffer, free BSA	100 ml
2-8°C	25886-05	Antibody Dilution Buffer, free BSA	500 ml

➤ Borate Buffer

RT	11455-78	Borate Buffer, pH 7.8	500 ml
RT	11455-82	Borate Buffer, pH 8.2	500 ml
RT	11455-90	Borate Buffer, pH 9.0	500 ml

➤ Citrate Buffer 0.2M

Buffer of Citric Acid and Sodium Citrate

0-5°C	11492-04	Citrate Buffer 0.2M, pH 4.0	1 L
0-5°C	11492-06	Citrate Buffer 0.2M, pH 6.0	1 L

➤ Citrate Buffer pH 6.0 (10x)

This buffer is intended for heat-induced antigen retriever on formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies.

	Cat. #	Description	Qty.
2-8°C	64142-07	Citrate Buffer pH 6.0	100 ml
2-8°C	62142-08	Citrate Buffer pH 6.0	1000 ml

See more information, see page 618 >>>>

➤ EDTA Buffer pH 8.5 (10x)

This buffer is intended for heat-induced antigen retriever on formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies.

	Cat. #	Description	Qty.
2-8°C	64142-09	EDTA Buffer pH 8.5	100 ml
2-8°C	62142-10	EDTA Buffer pH 8.50	1000 ml

See more information, see page 616 >>>>

➤ HRP-Conjugate Diluent

Specifically designed for preparing solution of your HRP-conjugate used as the detection reagent. It is the Antibody-diluent buffer with additional component for stabilizing your HRP-conjugate. Allows you to further standardize the assay preparing ready-to-use conjugate solutions in advance and store them in refrigerator without loss of activity.

	Cat. #	Description	Qty.
4-8°C	62716	HRP Conjugate Diluent	50 ml
4-8°C	62717	HRP Conjugate Diluent	125ml
4-8°C	62718	HRP Conjugate Diluent	500 ml

➤ ImmunoHistoZyme™, Ready-to-Use

ImmunoHistoZyme is used for proteolytic digestion of formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies.

	Cat. #	Description	Qty.
2-8°C	64142-13	ImmunoHistoZyme	15 ml
2-8°C	62142-14	ImmunoHistoZyme	100 ml

See more information, see page 616 >>>>

➤ Michel's Buffer

RT	18041-05	Michel's Buffer	500 ml
RT	18041-10	Michel's Buffer	1 L

➤ Millonig's Phosphate Buffer

Millonig (1964); Karlsson and Schultz (1965)

Ingredients: Sodium Phosphate, monobasic (NaH₂PO₄•xH₂O); Sodium Phosphate, dibasic (Na₂HPO₄•xH₂O); 0.5% Sodium Chloride (NaCl)
Shipping Conditions: Ambient Temperature
Maximum shelf life after receipt: 1 month

The pH of this buffer is 7.4 (0.1M); the osmolarity is 440 mosmols, so this buffer is hypertonic to most body fluids. Millonig recommended to use this buffer for the fixation of very hydrated tissues with osmium tetroxide. For marine organisms, a higher concentration of sodium chloride (3%) is recommended. We supply it in a double strength (0.2M), pH 7.4. Dilution is needed before use.

0-5°C	11582-05	Millonig's Phosphate Buffer 0.2M	500ml
0-5°C	11582-10	Millonig's Phosphate Buffer 0.2M	1 L

FIXING, CLEARING, AND DEHYDRATING CHEMICALS

► Pepsin Reagent, Ready To Use

Description: Pepsin is used for proteolytic digestion of formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. In IHC most commonly used fixative like formalin mask tissue antigens (cellular, membrane and nuclear) by cross-linking process, this results in poor or no staining in IHC. Pepsin digestion of FFPE tissue section improves accessibility of antibodies to tissue antigens.

Storage: 2–8°C. **DO NOT FREEZE**

Intended Use: Use as antigen retriever for some antibodies in IHC. Please refer to primary antibody protocol for IHC.

Reagent: Ready-to-use Pepsin reagent available in 2 sizes: 15 and 100 ml

Cat. #	Description	Qty.
2-8°C 64142-05	Pepsin Reagent	15 ml
2-8°C 62142-06	Pepsin Reagent	100 ml

► Phosphate Buffer, 0.1M

Prepared from Sodium Phosphate Monobasic Hydrate and Sodium Phosphate Dibasic Heptahydrate Non-Sterile. Meant for research purposes only.

0-5°C 19340-60	Phosphate Buffer, pH 6.0	1 L
0-5°C 19340-65	Phosphate Buffer, pH 6.5	1 L
0-5°C 19340-70	Phosphate Buffer, pH 7.0	1 L
0-5°C 19340-72	Phosphate Buffer, pH 7.2	1 L

► Phosphate Buffer Saline (PBS)

PBS is commonly used in biochemistry. It is a salty solution containing calcium chloride, sodium phosphate and potassium phosphate. PBS is isotonic and non-toxic to cells. 1X PBS final concentration is 0.137M NaCl, 0.01M Na₂HPO₄, 0.0027M KCl and pH 7.4.

0-5°C 19342-10	Phosphate Buffered Saline, 10X	1L
0-5°C 19242-40	Phosphate Buffered Saline, 10X	1 gal
0-5°C 19343-10	Phosphate Buffered Saline, 2X	1L
0-5°C 19343-40	Phosphate Buffered Saline, 2X	1 gal
0-5°C 19344-10	Phosphate Buffered Saline, 1X	1L
0-5°C 19344-20	Phosphate Buffered Saline, 1X	1 gal

► Pronase Reagent, Ready To Use

Description: Pronase is used for proteolytic digestion of formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. In IHC most commonly used fixative like formalin mask tissue antigens (cellular, membrane and nuclear) by cross-linking process, this results in poor or no staining in IHC. Pronase digestion of FFPE tissue section improves accessibility of antibodies to tissue antigens.

Storage: 2–8°C. **DO NOT FREEZE**

Intended Use: Use as antigen retriever for some antibodies in IHC. Please refer to primary antibody protocol for IHC.

Reagent: Ready-to-use Pronase reagent available in 2 sizes: 15 and 100 ml.

2-8°C 64142-03	Pronase Reagent	15 ml
2-8°C 62142-04	Pronase Reagent	100 ml

► R-UNIVERSAL Epitope Recovery Buffer (10x stock)

Properties: Clear, non-toxic solution.

Presentation: R-Universal Buffer is supplied as 10x concentrate. For epitope recovery dilute 1 part of stock with 9 parts of deionized water.

Application: For epitope recovery dilute 1 part of stock with 9 parts of deionized water.

Stability and Storage: The preparation is stable for 1 year when stored unopened at +4°C. Every lot is issued with a certificate indicating the expiry date. After opening, store at +4°C in the refrigerator and use within 6 months.

Certification: Each lot is certified for compliance to specifications. The product is produced under DIN EN ISO 9001: 2008 Quality Management system for the products in Immunoassay Development and Measurement, Products for Bioanalytics and Immunoassays.

Cat. #	Description	Qty.
0-4°C 62719-10	R-UNIVERSAL Epitope Recovery Buffer (10x stock)	125 ml
0-4°C 62719-20	R-UNIVERSAL Epitope Recovery Buffer (10x stock)	500 ml

See more information, see page 614 >>>>

► Section Block

A new class of blocking solutions based on chemically modified and fragmented ultra-pure casein. Effectively reduces unwanted binding of primary antibody and conjugates you use to charged surface of the slide and tissue section. Greatly reduces non-specific binding while preserving the specific reaction, by saturating potential non-specific protein-protein interactions. Moreover, in contrast to BSA-based, IgGm casein or serum-based blocking solutions there is no interaction of specific antibody and blocking protein itself. or oth ls not comparable to other commercially available or home-made blocking solutions. Recommended for research and diagnostic pathology, especially for retrieved sections and polyclonal antibodies..

Cat. #	Description	Qty.
62710	Section Block	50 ml
62711	Section Block	125 ml
62712	Section Block	500 ml

► Sodium Cacodylate Buffer

Prepared from Sodium Cacodylate Trihydrate (F.W. 214.02).

0-5°C 11650	Sodium Cacodylate Buffer, 0.2M, pH 7.4	225 ml
0-5°C 11652	Sodium Cacodylate Buffer, 0.2M, pH 7.4	500 ml
0-5°C 11653	Sodium Cacodylate Buffer, 0.2M, pH 7.4	1 L
0-5°C 11654	Sodium Cacodylate Buffer, 0.4M, pH 7.2	500 ml
0-5°C 11655	Sodium Cacodylate Buffer, 0.4M, pH 7.2	1 L

► Sorensen's Phosphate Buffer

A phosphate buffered mixed salts, prepared from sodium phosphate monobasic and sodium phosphate dibasic.

0-5°C 11600-10	Sorensen's Phosphate Buffer, 0.2M, pH 7.2	1 L
0-5°C 11600-40	Sorensen's Phosphate Buffer, 0.2M, pH 7.2	4 L
0-5°C 11601-10	Sorensen's Phosphate Buffer, 0.2M, pH 7.4	1 L
0-5°C 11601-40	Sorensen's Phosphate Buffer, 0.2M, pH 7.4	4 L

FIXING, CLEARING, AND DEHYDRATING CHEMICALS

► Sym-Collidine Buffer Kit

2,4,6-Trimethylpyridine
 $N:C(CH_3)CH:C(CH_3)CH:CCH_3$
 CAS #108-75-8 F.W. 121.18
 Bennett & Luft., Biophys & Biochem. Cytol., 6,113 (1959).
 A very stable buffer, used with Osmium tetroxide; provides excellent fixation, better stability and buffering capacity. The pH can be adjusted by varying the amount of hydrochloric acid in the final volume of 200ml.
 Preparation Instructions: Pour 9ml of 2N HCl; add 5.34ml of Sym-Collidine, mix well and add distilled water up to 200ml for a pH 7.4 solution.

Set consists of:

- 1 amp 5.34ml Sym Collidine
- 1 amp 9.0ml of 2N HCl

RT	11500	Sym-Collidine Buffer Kit	One set
RT	11510	Sym-Collidine Buffer Kit	Box/5 sets

► Tris (Hydroxymethyl) Aminomethane

Maleate Buffer

RT	11730		250 ml
RT	11740		500 ml

► Tris Buffer, 0.2M pH 8.0

0-5°C	11730-05	Tris Buffer	250ml
0-5°C	11730-06	Tris Buffer	500ml

► Tris Buffered Saline pH 7.4

0-5°C	11730-08	Tris Buffered Saline	250ml
0-5°C	11730-09	Tris Buffered Saline	500ml

► Tris-HCL 1M Buffer pH 6-8

0-5°C	11730-12	Tris-HCL Buffer	1M 250ml
0-5°C	11730-15	Tris-HCL Buffer	1M 500ml

► Tris HCL Buffer pH 7.2-9.0

0-5°C	11730-20	Tris-HCL Buffer	250ml
0-5°C	11730-25	Tris-HCL Buffer	500ml

► Tris Buffer pH 10.0 (10x)

Description: This buffer is intended for heat-induced antigen retriever on formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. In IHC most commonly used fixative like formalin mask tissue antigens (cellular, membrane and nuclear) by cross-linking process, this results in poor or no staining in IHC. The use of this buffer on FFPE tissue section improves accessibility of antibodies to tissue antigens.

Storage: 2–8°C. **DO NOT FREEZE**

Intended Use: 1X buffer solution is intended for heat-induced antigen retriever in IHC. Please refer to primary antibody protocol.

Reagent: 10 X, pH 10 antigen retriever solution.

Preparation of Working Solution: Dilute this 10X buffer as needed (e.g. 90 ml of deionized or distilled water + 10 ml of this buffer), mix well, 1X buffer can be stored at 2-8°C

	Cat. #	Description	Qty.
2-8°C	64142-11	Tris Buffer pH 10.0	100 ml
2-8°C	62142-12	Tris Buffer pH 10.0	1000 ml

► Trypsin Reagent

Description: Trypsin is used for proteolytic digestion of formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. In IHC most commonly used fixative like formalin; mask tissue antigens (cellular, membrane and nuclear) by cross-linking process, this results in poor or no staining in IHC. Trypsin digestion improves immunoreactivity of some antigens in FFPE tissue sections. For cytokeratin clone AE3 and AE1/AE3, this enzyme works much better than boiling the tissue with citrate buffer.

Storage: 2–8°C. **DO NOT FREEZE**

Intended Use: Use as antigen retriever for some antibodies in IHC. Please refer to primary antibody protocol for IHC.

Reagent: This enzyme is supplied as concentrated form along with buffer. The kit comes in 2 sizes. Small: Reagent B (Buffer) is 15 ml and the Reagent E (Enzyme) is 2 ml

Large: Reagent B (Buffer) is 100 ml and the Reagent E (Enzyme) is 10 ml

	Cat. #	Description	Qty.
2-8°C	64142-01	Trypsin Kit Small	Kit
2-8°C	62142-02	Trypsin Kit Large	Kit

► Universal Immunoassay Buffer™, 10X

Immunoassay buffer is used as a 1X in all immunoassays (immunofluorescence, IHC, ELISA, WB etc.) as a washing buffer and it can be used as a dilution buffer for antibodies; however it does not contain any carrier proteins. This buffer also does not contain any phosphate, sodium azide or mercury as preservatives and can be used for dilution of all antibodies, including peroxidase, antibodies to phosphoproteins. It is not suitable for dilution of antibodies to S100 proteins.

■ **Reagent Supplied:** 10X Buffer

■ **Application:** Dilute this 10X buffer 10 times with DI water. (90 ml water + 10 ml this buffer – mixed well). Wash 3-5 times with this buffer in between the steps of your immunoassay protocol.

RT	25880-01	Universal Immunoassay Buffer, 10X	100 ml
RT	25880-10	Universal Immunoassay Buffer, 10X	1 L

► Universal Antibody Dilution Buffer™

This ready-to-use Universal Antibody Dilution Buffer is designed for dilution of antibodies in all immunoassays, including immunofluorescence, IHC, ELISA, WB. This buffer does not contain any mammalian proteins, phosphate, sodium azide, or mercury preservatives and can be used for dilution of all antibodies, including peroxidase, and antibodies to phosphoproteins. However, it is not suitable for dilution of antibodies to S100 proteins,

■ **Application:** Dilute antibodies, primary or secondary as recommended in the protocol by the manufacturer of these products.

■ **Storage:** 2 – 8°C. Diluted antibodies can be stored at 2 – 8°C for several weeks, depending upon the stability of antibodies.

2-8°C	25885-01	Universal Antibody Dilution Buffer	100 ml
2-8°C	25885-05	Universal Antibody Dilution Buffer	500 ml

FIXING, CLEARING, AND DEHYDRATING CHEMICALS

► **n-Butyl Alcohol, Reagent, A.C.S.**

(Butanol)
 $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ F.W. 74.12 CAS # 71-36-3
 Specific Gravity: 0.81

Assay	99.4%
Residue after evaporation	0.005%
Titrate acid	0.0008meq/g
Butyl Ether	0.2%
Water	0.1%

RT 11920	450 ml
RT 11921	4 x 450 ml

► **Carnoy's Fixatives**

Stock solution

RT 64130-05	Carnoy's Fluid	500 ml
RT 64130-50	Carnoy's Fluid Without Chloroform	500 ml

► **Cedar Wood Oil**

CAS #8000-27-9 Refractive Index @ 20°C 1.504+/-0.002
 For clearing.

RT 12420	100 ml
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► **Chloroform, Reagent, A.C.S.**

CHCl_3 FW 119.38 CAS #67-66-3

A.C.S. Specifications:

Color (APHA)	10
Density @ 25°C.....	1.471-1.476
Residue after Evaporation	0.001%
Acetone & Aldehyde (about 0.00%).	To Pass Test
Acid & Chloride	To Pass Test
Free Chlorine (Cl)	To Pass Test
Lead (Pb)	0.05ppm
Subs. darkened by H_2SO_4	To Pass Test
Suitability for Dithizone Test.....	To Pass Test

RT 12540	450 ml
RT 12541	4 x 450 ml

► **Chromic Acid, Reagent, Crystals, A.C.S.**

CrO_3 FW 99.99 CAS #1333-82-0

A.C.S. Specifications:

Chloride (Cl).....	0.005%	Iron, Aluminum, Barium. .	0.03%
Insoluble Matter	0.01%	Sulfate (SO_4)	0.05%
Nitrate (NO_3)	0.05%	Assay	98%
Sodium (Na)	0.2%		

RT 12555	100g
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► **Chromic Acid 4% Aqueous Solution**

RT 12557	Chromic Acid 4% Aqueous Solution	500 ml
RT 12558	Chromic Acid 5% Aqueous Solution	500 ml

► **Clearing Solvent Xylene Substitutes**

This clearing solvent offers Histology and Cytology laboratories a safer alternative to xylene.

- Contains no xylene or toluene.
- For use in manual and automated systems.
- No citrus odor.

RT 64129-10	Clearing Solvent	1 gal
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Conjugates, Light Microscopy, see pages 72-90 >>>>

► **RDO Rapid Decalcifier**

RDO and RDO Gold were developed with the basic premise of making your work routine quicker and easier without sacrificing the quality and integrity of your samples.

RDO and RDO Gold are remarkably effective multipurpose decalcifiers that can be tailored to suit your specific lab routine.

**Both RDO and RDO Gold:**

- Offer crisp nuclear staining and definition
- Give distinguishable chromatin
- Show great surface decalcification
- Safe enough to be disposed down to lab sink to drain

How is RDO Gold different from the original RDO

- RDO Gold is designated for those biopsies which contain minimal amounts of calcium
- No filtration is required with RDO Gold
- RDO Gold gives stellar morphological representation of bone biopsies
- There is no folding of tissues with RDO Gold
- RDO Gold is clear and non-precipitate

Both RDO and RDO Gold are:

- Far superior to other decalcifiers
- Great cellular differentiation
- Safe – non-toxic – non-corrosive
- Dilutable
- Microwavable
- Superb staining quality
- Biodegradable
- Translucent
- Available in wide mouth liter bottle

References:

- 1/ Gayle Callis et al. "Decalcification of Bone: Literature Review and Practical Study of Various Decalcifying Agents, Methods, and Their Effects on Bone Histology". The J. of Histology, Vol. 21, No. 1, March 1998.
- 2/ Sherley A. Powell, HT (ASCP) HTL. "Method to Facilitate Sectioning Incompletely Decalcified Bone". Mercer University, School of Medicine. Microtime Georgia, State Newsletter.
- 3/ Becky Scholes, HTL, MT (ASCP). Bone Marrow Biopsies". H.I.S.T.O. Iowa State Newsletter.

Cat.#	Description	Qty.
RT 64143-01	RDO Decalcifier	1 L
RT 64143-06	RDO Decalcifier	6 x 1 L/cs
RT 64143-40	RDO Decalcifier	1 gal
RT 64143-44	RDO Decalcifier	4 x 1 gal/cs
RT 64144-01	RDO - Gold Decalcifier	1 L
RT 64144-06	RDO - Gold Decalcifier	6 x 1 L/cs
RT 64144-40	RDO - Gold Decalcifier	1 gal
RT 64144-44	RDO - Gold Decalcifier	4 x 1 gal/cs

► **Decalcifier**

- Ready-to-use.
- For hard specimens.
- Minimal interference with subsequent staining.
- Protects cellular structure.
- For use with human and animal calcified tissue, bone, cartilage and other hard specimens.

RT 64147-01	Decalcifier	1 L
RT 64147-06	Decalcifier	6 x 1 L
RT 64147-10	Decalcifier	10 L

FIXING, CLEARING, AND DEHYDRATING CHEMICALS

Techniques for RDO Rapid Decalcifier

Animal Tissue Techniques

*Fourth edition
Gretchen L. Humason
Decalcification*

Calcium deposits may be so heavily concentrated in the tissue that they may interfere with sectioning and result in torn sections and nicks on the knife edge. If deposits are sparse, overnight soakings of blocked tissue in water will soften the deposits sufficiently for sectioning. Heavy deposits may be removed by any of several methods, but do not leave tissue in any fluid longer than necessary.

If any doubt arises about the completion of decalcification, check for calcium by the following method:

To 5ml of the solution containing the tissue add 1ml of 5% sodium or ammonium oxalate. Allow to stand for 5 minutes. If precipitate forms, decalcification is not complete. A clear solution indicates it is complete. Sticking needles in the tissue to check hardness is a sloppy technique that can damage cells.

An excellent decalcifying fluid, RDO can be purchased by the gallon. After using RDO for several years, I recommend it as superior to other solutions. Its rapidity of action is remarkable and the quality of staining and histological detail following its use is excellent. Old bones cut down to one centimeter in thickness, if possible, require a six hour treatment: small and young pieces, only one to two hours. Teeth will require overnight and up to eighteen to twenty four hours. Do not over decalcify; this detracts from the staining quality. Decalcifying may be followed by a brief washing in water but this is not necessary. Fixation and decalcification may be combined in a mixture of one part undiluted formalin with nine parts RDO.

Manufacturers Note:

The combination of RDO and formalin is discourage, but should always be done under a fume hood to ensure the removal of potentially harmful vapors. Always follow the suggested directions for use.

► Deionized Water, Reagent Grade A.C.S.

H₂O F.W. 18.02 CAS #7732-18-5

EMS Reagent Grade Water is typically prepared at 18 megohm/cm specific resistance using a reverse osmosis, mixed deionization, activated filtration and final filtration at 0.2 microns.

Color (APHA)<+/-5
Bacteriological purity0 CFUs/L
Residue after evaporation10ppm
Coliformnegative

RT	22800-01	Deionized Water	1 gal
RT	22800-05	Deionized Water	5 gal

► Fast Frozen Fix

Prepared fixative – This is one step quick fix for frozen sectioned tissue. Fixes tissue to slide to allow for staining procedures. Apply to most tissue types.



RT	15280-01	Fast Frozen Fix™	100 ml
RT	15280-05	Fast Frozen Fix™	500 ml

► Fast Frozen Stain Kit

A rapid method to stain frozen tissue for permanent use. This kit includes a unique Fast Frozen Fix that is alcohol based, and will not interfere with immunohistochemical procedures and suitable for Laser Capture Microdissection (LCM). Kit consists of: 100 ml Fast Fix (15280-01), 100 ml Eosin Y 0,5% Solution (15285-02), 100 ml Gill Hematoxylin #3 (15285-03), 100 ml Scott's Bluing Solution (#15285-04) and one 100 ml CitraMount® Medium (#18005)

RT	15285-00	Fast Frozen Stain Kit	100 ml
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► Ferric Ammonium Sulfate

RT	15505-40	Ferric Ammonium Sulfate, 4% Aqueous	500 ml
RT	15505-50	Ferric Ammonium Sulfate, 5% Aqueous	500 ml

► Ferric Chloride, Hexahydrate, Reagent, A.C.S.

FeCl₃·6H₂O F.W. 270.30 CAS #13478-10-9

Assay	97.0-102%
Insoluble Matters	0.01%
Nitrate (about 0.001%)	To Pass Test
Phosphorous Compound	0.01%
Sulfate	0.01%
Arsenic	0.002%
Copper	0.003%
Zinc	0.003%

References for use:

Membrane stains

- Gasic, G., Berwick et al (1963). Hale stain for sialic acid containing mucins. J. Cell Biol., 19:223
- Gasic, G., Berwick, et al (1968). Positive and Negative colloidal iron as cell surface electron stains. Lab. Invest., 18:63
- Blanquet, P.R. and Loiez, A. (1974). Colloidal iron used at pHs lower than 1 as electron stain for surface proteins. J. Histochem. Cytochem., 22:368
- Matukafs, V.J., Panner et al (1967). Studies on ultrastructural identification and distribution of protein-polysaccharides in cartilage matrix. J. Cell Biol., 32:365
- Benedetti, E.L. and Emmelot, P. (1967). Studies on plasma membranes IV. The Ultrastructural localization and content of sialic acid in plasma membranes isolated from rat liver and hepatoma. J. Cell Sci., 2:499
- Rowley, J.R. (1971). Resolution of channels in the exine by translocation of colloidal iron. Pro. 29th Ann. EMSA Meet., p.352. Claitor's Pub. Division, Baton Rouge, LA
- Nicolson, G.L. (1973). Anionic sites of human erythrocyte membranes.I. Effects of trypsin, phospholipase C, and pH on the topography of bound positively charged colloidal particles. J. Cell Biol., 57:373
- Hendy, R. (1971). Electron microscopy of lipofucsin pigment stained by the Schmorl and Fontana technique. Histochemie, 26:311.

RT	15510		500 g
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► Ferric Chloride 10%, Aqueous Solution

RT	15512-02	Ferric Chloride 2% Aqueous	500 ml
RT	15512-10	Ferric Chloride 10% Aqueous	500 ml

FIXING, CLEARING, AND DEHYDRATING CHEMICALS

► Fixatives

► B-5 Fixative

For lymph nodes.

RT	64122-05	B-5 Fixative	500 ml
RT	64122-06	B-5 Fixative	1 lt
RT	64122-10	B-5 Fixative	4 lt

► Bouin's Solution

Bouin's solution can be used as a fixation and a staining fluid. Bouin's fixative is excellent for use on biopsy specimens of the gastrointestinal tract. Tissue from the endocrine system are well fixed and many antibodies react well with tissue fixed in Bouin's. Bouin's solution may be used as a routine fixative or a staining solution, but should not be used as a preservative for tissue. Tissue cannot be held in Bouin's solution for extended periods. The maximum fixation time in this solution should be less than 48 hours and should be transferred to alcohol. Packaged in leak-proof histo-containers, prefilled and ready-to-use.

Formulated with Picric Acid saturated aqueous solution 75%, Formalin (40% aqueous formaldehyde) 25% and Glacial Acetic acid 5% in de-ionized water

RT	15990-01	Bouin's Fluid	1 L
RT	15990-04	Bouin's Fluid	4 L

Bouin's Fluid in Pre-filled cups:

RT	15990-10	Bouin's Fluid	50 x 10 ml/cs
RT	15990-20	Bouin's Fluid	50 x 20 ml/cs
RT	15990-30	Bouin's Fluid	20 x 30 ml/cs

► Brasil Fixative

Ethanol, Picric Acid, Formalin, Acetic Acid, Glacial

This fixative is most popular when glycogen is the target. The solution is similar to Bouin's Solution (alcoholic) offering quick hardening and good staining with acid dyes.

RT	15995-10	Brasil Fixative	10x10ml
RT	15995-20	Brasil Fixative	100 ml

► Carnoy's Fixatives

Stock solution

RT	64130-05	Carnoy's Fluid	500 ml
RT	64130-50	Carnoy's Fluid Without Chloroform	500 ml

► Carson's Phosphate Buffered Formalin

Millonig's phosphate buffered formalin as modified by Carson, Martin and Lynn, by using 4% formalin in 0.1M sodium phosphate monobasic with sodium hydroxide to pH 7.2

RT	15732-05	Carson's Phosphate Buffered Formalin	500 ml
RT	15732-10	Carson's Phosphate Buffered Formalin	1 L

► Carson's Phosphate Buffered Paraformaldehyde

For some tissues, the use of formalin (contains 10 – 15% Methanol) is not suitable, we offer the alternative formaldehyde (prepared from paraformaldehyde – contains no methanol) for your convenience.

RT	15733-05	Carson's Phosphate Buffered Paraformaldehyde	500 ml
RT	15733-10	Carson's Phosphate Buffered Paraformaldehyde	1 L

► CytoPrep Fixative

CytoPrep Fixative forms a clear protective coating over specimens while fixing cells. It is ideal for cytological smears and it dries within 4 to 6 minutes. Good for safe storage and transportation of slides. It is water soluble and contains no chlorofluorocarbons. Comes in a 4 oz. spray can.

RT	64145-01	CytoPrep Fixative	4 oz.
RT	64145-12	CytoPrep Fixative	12 x 4 oz.

► Davidson's Fixative (Hartmann's/ Davidson's Fixative)

This is rapid fixative. Results with good nuclear detail and minimal formalin pigment. Hartmann's (Davidson's) Fixative is useful for preparing tumors, bone marrow, gynecologic specimen, fatty breast, medical biopsies. Fixation of small specimen is rapid. Exposure to the fixative should be limited to 24 hours (tissue may then be transferred to neutral buffered formalin or 70% alcohol for storage).

Based on the volume of 1125 ml solution, there is 2 part Formalin (35-39%), 3 part Ethanol, 1 part Glacial Acetic acid, and 3 part of tap water.

RT	64133-10	Hartmann's (Davidson's Fixative)	1 L
RT	64133-14	Hartmann's (Davidson's Fixative)	4 L

► Modified Davidson's Fixative

(14% Ethyl Alcohol, Denatured, 37.5% Formalin 37-39%, 6.25% Glacial Acetic Acid, and D.I. Water)

RT	64133-50	Modified Davidson's Fixative	1 L
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► Dietrich's Fixative

Ethanol, formalin, glacial acetic acid, distilled water

RT	15958-10	Dietrich's Fixative	10x10ml
RT	15958-20	Dietrich's Fixative	100 ml

► Fast Frozen Fix

Prepared fixative – This is one step quick fix for frozen sectioned tissue. Fixes tissue to slide to allow for staining procedures. Apply to most tissue types.

RT	15280-01	Fast Frozen Fix™	100 ml
RT	15280-05	Fast Frozen Fix™	500 ml

► Fixative/Decalcifier

- A solution that fixes and decalcifies in one step.
- Prevents loss of cellular structure.
- Enhances hematoxylin staining.

RT	64148-01	Fixative/Decalcifier	1 L
RT	64148-06	Fixative/Decalcifier	6 x 1 L

► Formalde-Fresh Low Odor Solution; Histology Grade

A specially formulated odor-mask which neutralizes the formalin odor without affecting subsequent tissue processing, handling, or staining. Low odor, ready-to-use 10% formalin solution. May be used as a fixative or preservative of specimens. Its shelf life is 24 months.

RT	15678-01	Formalde-Fresh	4 L
RT	15678-04	Formalde-Fresh	4 x 4 L

FIXING, CLEARING, AND DEHYDRATING CHEMICALS

► Fixatives (continued)

► Buffered Formalde-Fresh, Low-Odor 10% Formalin Solution

Low odor, prepared w/v, pH 6.9 to 7.1 at 25°C. 10% formalin in Phosphate buffer according to the A.F.I.P. Manual of Histology. This solution allows for long-term storage of tissue specimens.

RT	15741-01	Low-Odor Formalin 10% Buffered	4 L
RT	15741-04	Low-Odor Formalin 10% Buffered	4 x 4 L

► Formalin, Neutral, Buffered 10% w/v in Acetate Buffer

Buffered with Sodium Acetate in accordance with the A.F.I.P. Manual of Histology. pH 6.0 to pH 7.1 at 20°C. Filtered and ready-to-use.

RT	15738-01	Formalin 10% Buffered in Acetate	1 L
RT	15738-04	Formalin 10% Buffered in Acetate	4 L

► Formalin, Neutral, Buffered 10% w/v in Phosphate Buffer

Buffered with phosphate in accordance with the A.F.I.P. Manual of Histology. pH 6.9 to 7.1 at 25°C. Filtered and ready-to-use.

RT	15740	Formalin 10% Buffered in Phosphate	450 ml
RT	15740-01	Formalin 10% Buffered in Phosphate	1 L
RT	15740-04	Formalin 10% Buffered in Phosphate	4 L

► Formalin 1% Non Buffered

RT	15734-01	Formalin 1% Non-Buffered	1L
RT	15734-04	Formalin 1% Non-Buffered	4L

► Formalin 2%, Non-Buffered

RT	15735-01	Formalin 2% Non-Buffered	1L
RT	15735-04	Formalin 2% Non-Buffered	4L

► Formalin 3%, Non-Buffered

RT	15735-10	Formalin 3% Non-Buffered	1L
RT	15735-20	Formalin 3% Non-Buffered	4L

► Formalin 4%, Non-Buffered

RT	15735-30	Formalin 4% Non-Buffered	1L
RT	15735-40	Formalin 4% Non-Buffered	4L

► Formalin 5%, Non-Buffered

RT	15735-50	Formalin 5% Non-Buffered	1L
RT	15735-60	Formalin 5% Non-Buffered	4L

► TissuePrep Buffered 10% Formalin

Prefilled with 10% formalin Cat# 15740. Ready-to-use in pre-filled cups. Labeled in accordance to OSHA requirements, which gives you immediate information regarding handling and first aid procedures. Pre-measured in wide-mouth, leak-proof, opaque polypropylene containers which limits your exposure to formaldehyde and saves you time.

	Cat.#	Cup Size	Filled	Pack/cs
RT	15742-10	15 ml	10 ml	50/cs
RT	15742-20	30 ml	20 ml	50/cs
RT	15742-30	60 ml	30 ml	20/cs
RT	15742-60	120 ml	60 ml	20/cs

► Paraformaldehyde, Prepared Fixatives

In addition to our complete line of Formaldehyde solutions we have now added to the line.

Paraformaldehyde 0.5% in 0.1M phosphate buffer pH7.4

0-5C	15951-10	Paraformaldehyde, 0.5% each in 0.1M Phosphate Buffer	10x10ml
0-5C	15951-15	Paraformaldehyde, 0.5% each in 0.1M Phosphate Buffer	500 ml

Paraformaldehyde 1% Aqueous

RT	15953-10	Paraformaldehyde, 1% each Aqueous	10x10ml
RT	15953-15	Paraformaldehyde, 1% each Aqueous	500 ml

Paraformaldehyde 1% in 0.1M Phosphate Buffer pH, 7.4

0-5C	15952-10	Paraformaldehyde, 1.0% each in 0.1M Phosphate Buffer	10x10ml
0-5C	15952-15	Paraformaldehyde, 1.0% each in 0.1M Phosphate Buffer	500 ml

Paraformaldehyde 1% Glut 2% in 0.1M Phosphate buffer, pH 7.4

0-5C	15949-30	Paraformaldehyde 1 % Glutaraldehyde 2% in 0.1M Phosphate Buffer	10x10ml
0-5C	15949-35	Paraformaldehyde 1 % Glutaraldehyde 2% in 0.1M Phosphate Buffer	500 ml

Paraformaldehyde 3% Glutaraldehyde 0.35% in 0.1M Sodium Cacodylate, pH 7.4

0-5C	15949-50	Paraformaldehyde 3 % Glutaraldehyde 0.35% in 0.1M Sodium Cacodylate Buffer	10x10ml
0-5C	15949-60	Paraformaldehyde 3 % Glutaraldehyde 0.35% in 0.1M Sodium Cacodylate Buffer	500 ml

Paraformaldehyde 4% and Glutaraldehyde 1% in Phosphate Buffer, pH 7.0

0-5C	15949-70	Paraformaldehyde 4 % Glutaraldehyde 1% in 0.1M Phosphate Buffer	10x10ml
0-5C	15949-80	Paraformaldehyde 4 % Glutaraldehyde 1% in 0.1M Phosphate Buffer	500 ml

Paraformaldehyde 4% in 0.1M Sodium Cacodylate, pH7.4

0-5C	15952-10S	Paraformaldehyde 4 % in 0.1M Sodium Cacodylate Buffer	10x10ml
0-5C	15952-15S	Paraformaldehyde 4 % in 0.1M Sodium Cacodylate Buffer	500 ml

Paraformaldehyde 4% in 0.1M Phosphate Buffer, pH 7.4

0-5C	15735-10S	Paraformaldehyde 4% in 0.1M Phosphate Buffer	10x10ml
0-5C	15735-20S	Paraformaldehyde 4% in 0.1M Phosphate Buffer	500 ml

Paraformaldehyde 4% in 0.2M Phosphate Buffer, pH 7.4

0-5C	15735-30S	Paraformaldehyde 4% in 0.2M Phosphate Buffer	10x10ml
0-5C	15735-40S	Paraformaldehyde 4% in 0.2M Phosphate Buffer	500 ml

Paraformaldehyde 4% in 0.1M Phosphate Buffer, pH 7.2

0-5C	15735-50S	Paraformaldehyde 4% in 0.1M Phosphate Buffer	10x10ml
0-5C	15735-60S	Paraformaldehyde 4% in 0.1M Phosphate Buffer	500 ml

Paraformaldehyde 4% in 0.2M Phosphate Buffer, pH 7.2

0-5C	15735-70	Paraformaldehyde 4% in 0.2M Phosphate Buffer	10x10ml
0-5C	15735-80	Paraformaldehyde 4% in 0.2M Phosphate Buffer	500 ml

Paraformaldehyde 4% in 0.1M Phosphate BufferSaline, pH7.4

0-5C	15735-85	Paraformaldehyde 4% in 0.1M Phosphate Buffer Saline	10x10ml
0-5C	15735-90	Paraformaldehyde 4% in 0.1M Phosphate Buffer Saline	500 ml

Paraformaldehyde 4% in 0.2M Phosphate Buffer Saline, pH 7.4

0-5C	15735-95	Paraformaldehyde 4% in 0.2M Phosphate Buffer	10x10ml
0-5C	15735-100	Paraformaldehyde 4% in 0.2M Phosphate Buffer	500 ml

FIXING, CLEARING, AND DEHYDRATING CHEMICALS

► **Fixatives** (continued)► **Formaldehyde (Formalin)**► **Formaldehyde, Reagent, A.C.S.**

HCHO F.W. 30.03 CAS #50-00-0

Specific Gravity1.09

A.C.S. Specifications:

Assay35.5 to 38.0%

Residue after ignition0.005%

Color (A.P.H.A.)10

Sulfate (SO₄)0.002%

Heavy Metal (as Pb)5ppm

Titrate Acid0.006 meq/g

Chloride (Cl)5ppm

Iron (Fe)5ppm

RT **15680** 450 mlRT **15681** 4 x 450 mlRT **15682** 1 qt (946 ml)► **Formaldehyde, 37%, Microfiltered (Formalin Microfiltered)**

HCHO F.W. 30.03 CAS# 50-00-0

Microfiltered with a 0.45 micron membrane; suitable as an EM fixative when a methanol free solution is not necessary.

RT **15686** 10 x 10 ml► **Formaldehyde (Karnovsky's Fixatives)**RT **15720** kitRT **15730** box of 5 kits► **Formaldehyde/Zinc Fixative**

Prepared: Ready-to-use.

- Preserves fine nuclear details.
- Good for immunostaining.
- Contains no mercury.
- Can be used with automated tissue processors.
- Works well with standard and special stains because zinc is a stain enhancing mordant.

RT **15675-01** Formaldehyde/Zinc Fixative 1 LRT **15675-04** Formaldehyde/Zinc Fixative 4 L► **Ampule Breaker**► **Ampule Cracker**► **Breaksafe**

See page 214, 1104 >>>

► **Formaldehyde Aqueous Solution, 16% (Paraformaldehyde Aqueous Solution)**

EM Grade

Paraformaldehyde - methanol free solution. A more efficient and rapid penetrant fixative used in combination with Glutaraldehyde and Acrolein fixatives. Easy to break, prescored, 10ml ampoules sealed under inert gas, or 100ml bottles.

16% Aqueous SolutionRT **15700** 10 mlRT **15710** 10 x 10 mlRT **15710-S** 100 mlRT **15711** 10 box/lot**10% Aqueous Solution**RT **15712** 10 x 10 mlRT **15712-S** 100 ml**20% Aqueous Solution**RT **15713** 10 x 10 mlRT **15713-S** 100 ml**32% Aqueous Solution**RT **15714** 10 x 10 mlRT **15714-S** 100 ml

In addition to our complete line of Formaldehyde solutions shown above we have now added to the line.

METHANOL FREE

Since the DOT (Department of Transportation) has changed the definition of what a non dangerous solution of formaldehyde is to under 10%, we are now offering an 8% and a 4% solution. This will allow us to ship overnight as well as overseas without any hazardous charges saving our customers a good deal of money.

The quality of our 8% and 4% aqueous Paraformaldehyde solution is as good as all of the other concentrations that we offer.

4% Aqueous SolutionRT **157-4** 10 x 10 mlRT **157-4-100** 100 ml**8% Aqueous Solution**RT **157-8** 10 x 10 mlRT **157-8-100** 100 ml► **Perfusion Wash and Perfusion Fixative Ready to use**

For all of the best results we offer ready to use Perfusion washes and fixatives which are recommended by the NeuroScience Association. All of our solutions are ready made and are of the highest quality.

We have three groups of solutions commercially available.

Group I : Perfusion wash and Fixative Technical Grade. To be used for Standard stains:

Perfusion Wash (1220SK):
Phosphate Buffered Saline 0.1M
Phosphate Buffer pH 7.2-7.4

Perfusion Fixative (1221SK): 10%
Phosphate Buffered Formaldehyde

Group II: Perfusion wash and Fixative Reagent Grade. To be used for Standard and ImmunoHistochemistry Stains.

Perfusion Wash (1219SK):
Phosphate Buffered Saline 0.1M
Phosphate Buffer pH 7.2-7.4

Perfusion Fixative (1224SK):
Paraformaldehyde 4%/Sucrose 4%
in Phosphate Buffer 0.2M pH 7.2

Group III: Perfusion wash and Fixative Superior Reagent Grade. For the best results use this group. This is Sodium Cacodylate based for NSA'S Disintegrative Degeneration Stain

Perfusion Wash (1222SK): 0.8%
NaCl/0.4% Dextrose/0.8% Sucrose/
0.023% CaCl₂/Sodium Cacodylate
0.034%

Perfusion Fixative (1223SK): 4%
Paraformaldehyde/4% Sucrose/
1.4% Sodium Cacodylate

For a complete procedure and protocol for the use of these washes and fixatives please see the following site:
www.neuroscienceassociates.com/perf-solution1 or 2 or 3.htm

1220SK Perfusion Wash, Technical 1000 ml

1221SK Perfusion Fixative, Technical 1000 ml

1219SK Perfusion Wash, Reagent 1000 ml

1224SK Perfusion Fixative, Reagent 1000 ml

1222SK Perfusion Wash, Super Reagent 1000 ml

1223SK Perfusion Fixative, Super reagent 1000 ml

If you want a custom wash or fixative made, please just let us know and we will be happy to make you whatever you require.

TECHNICAL TIP

To fix cornea, one should use the following fixative: 2% Glutaraldehyde, 1% Paraformaldehyde (Formaldehyde) in a 0.1M Sodium Cacodylate buffer; pH 7.4 containing 0.02% Picric Acid. (Assouline, et al 1992)

FIXING, CLEARING, AND DEHYDRATING CHEMICALS

► Fixatives (continued)

► CoreDish™ Multiple Biopsy Containers Half Prefilled with 10% Formalin

Few recommendations concerning how the biopsies should be handled have been published. Performing a large number of biopsies means an increase in the number of containers handled and consequently a technical overload of the transmission network, which occurs without any financial counterpart. A new approach had to be developed in order to increase productivity.

We are proud to offer a multi-compartment container in the shape of a dish and half prefilled with 10% Neutral buffered Formalin, for holding and transporting biopsies. It is supplied with a leak-proof closure with O-ring ensuring total protection of contents. It conforms to OSHA directives. These CoreDish™ measure only 15mm H x 95 mm Diameter. Each compartment is clearly identified to allow proper placement and visualization of the biopsy being inserted. Thanks to CoreDish™ it is no more necessary to use a multiple of individual containers, thereby reducing cost and risks of confusion.

CoreDish™ available in many configurations to serve in different biopsy, such as prostate, upper GI tract and lower GI tract. A label allows recording the related information, patient ID, doctor, date and time.

► M970-D5B-2 CoreDish™ Breast Biopsy Container

Half Prefilled with 10% Formalin

This multi-compartment container (out of five compartments, four are labeled: LUQ, RUQ, LLQ, RLQ) in the shape of a dish and half prefilled with 10% Neutral Buffered Formalin, for holding and transporting biopsies. It is supplied with a leak-proof screw closure with O-ring ensuring total protection of contents. It conforms to OSHA directives. The dish measures only 15 x 95 mm in diameter. Each compartment is clearly identified to allow proper placement and visualization of the breast biopsy being inserted. A writing area for patient information is provided.



15736-10

Cat. #	For	Compartments	
RT 15736-10	Breast	5	10/pk

► M970-D8P CoreDish™ Prostate Biopsy Container

Half Prefilled with 10% Formalin

For prostate biopsies. Eight compartments. Leakproof seal with O-ring lid. An area for patient information is provided. Seven labeled compartments: Base, Lateral Base, Medium, Lateral Medium, Apex, Lateral Apex.



15736-20

Cat. #	For	Compartments	
RT 15736-20	Prostate	8	10/pk

► M970-D8UGI CoreDish™ Upper GI Biopsy Container

Half Prefilled with 10% Formalin

For upper GI track biopsies. Eight compartments. Leakproof seal with O-ring lid. An area for patient information is provided. Seven labeled compartments: Gastric Card, Gastric Body, GE Junction, Gastric ATR, Distal Esophage, Pylorus, Duodenum.



15736-30

Cat. #	For	Compartments	
RT 15736-30	Upper GI	8	10/pk

► M970-D12LGI CoreDish™ Lower Gi Biopsy Container

Half Prefilled with 10% Formalin

For lower GI track biopsies. Twelve compartments. Leakproof seal with O-ring lid. An area for patient information is provided. Ten labeled compartments: Proximal Flexure Colon, Hepatic Fleure Colon, Distal Transverse Colon, Ascending Colon, Splenic flexure Colon, Cecum, Descending Colon, Terminal Ileum, Rectum, Sigmoid Colon.



15736-40

Cat. #	For	Compartments	
RT 15736-40	Lower GI	12	10/pk

► M970-D12P CoreDish™ Prostate Biopsy Container

Half Prefilled with 10% Formalin

For prostate biopsies. Twelve compartments. Leakproof seal with O-ring lid. An area for patient information is provided. TWelve labeled compartments: L Base, R Base, L Lateral Base, R Lateral Base, L Medium, R Medium, L Lateral Medium, R Lateral Medium, L Lateral, L Apex, R Apex, R Lateral Apex.



15736-50

Cat. #	For	Compartments	
RT 15736-50	Prostate	12	10/pk

FIXING, CLEARING, AND DEHYDRATING CHEMICALS

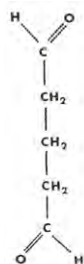
► Glutaraldehyde

OCH₂CH₂CH₂CHO F.W. 100.12
CAS #111-30-8

Specific Gravity @ 20/20°C: 1.131

**THE HIGHEST
PURITY!**

Glutaraldehyde



For any special concentration, or packaging requirements other than those already listed, please call us today. We will manufacture in accordance to your specifications.

► EM Grade Distillation Purified

- The Universal Fixative for Electron Microscopy.
- Purified to EM Grade from commercial grade by "all-glass vacuum-distillation."
- THE HIGHEST PURITY, free from polymers and other contaminants.
- Each lot is tested and assayed in our lab before we ship and guarantee its purity.
- Sealed under dry nitrogen.
- Refrigerated prior to shipment.

After glutaraldehyde has been purified to EM grade, it has a high risk of polymerizing if it is not handled properly. Electron Microscopy Sciences takes special precautions to assure a polymer-free, pure glutaraldehyde.

Every lot of our EM grade glutaraldehyde is assayed prior to shipping assuring you consistent purity and the highest possible quality. If stored properly, our Glutaraldehyde has a very long shelf life.

We package our glutaraldehyde in 10ml, single dose ampoules, sealed under dry nitrogen, and kept refrigerated until it is shipped. We offer our glutaraldehyde in a wide range of percentages to simplify mixing procedures and avoiding waste.

EM grade glutaraldehyde, stored in volumes greater than 100ml, with repeated defrosting and recapping, will polymerize in time, producing an absorption peak of 235nm rather than the 280nm of pure EM grade. The presence of polymerized glutaraldehyde greatly reduces its efficiency as a cross-linking agent, preventing proper fixation. For this reason, we provide 10ml ampoules and 100ml bottle quantities for larger applications.

8% Aqueous Solution

0-5°C	16000	10 ml ampoule	ea
0-5°C	16019	Box 10 x 2 ml	bx
0-5°C	16020	Box 10 x 10 ml ampoules	bx
0-5°C	16021	same as 16020 10 bxs +	bx
0-5°C	16022	same as 16020 20 bxs +	bx
0-5°C	16010	100 ml bottle	ea

10% Aqueous Solution

0-5°C	16100	10 ml ampoule	ea
0-5°C	16120	Box 10 x 10 ml ampoules	bx
0-5°C	16121	same as 16120 10 bxs +	bx
0-5°C	16122	same as 16120 20 bxs +	bx
0-5°C	16110	100 ml bottle	ea

25% Aqueous Solution

0-5°C	16200	10 ml ampoule	ea
0-5°C	16220	Box 10 x 10 ml ampoules	bx
0-5°C	16221	same as 16220 10 bxs +	bx
0-5°C	16222	same as 16220 20 bxs +	bx
0-5°C	16210	100 ml bottle	ea

50% Aqueous Solution

0-5°C	16300	10 ml ampoule	ea
0-5°C	16320	Box 10 x 10 ml ampoules	bx
0-5°C	16321	same as 16320 10 bxs +	bx
0-5°C	16322	same as 16320 20 bxs +	bx
0-5°C	16310	100 ml bottle	ea

70% Aqueous Solution

0-5°C	16350	10 ml ampoule	ea
0-5°C	16360	box 10 x 10 ml ampoules	bx
0-5°C	16365	box 10 x 2 ml ampoules	bx

► Biological Grade

0-5°C	16400	25% Solution	450 ml	ea
0-5°C	16401	25% Solution	4 x 450 ml	bx
0-5°C	16410	25% Solution	1 gal.	ea
0-5°C	16411	25% Solution	4 x 1 gal.	bx
0-5°C	16500	50% Solution	450 ml	ea
0-5°C	16501	50% Solution	4 x 450 ml	bx
0-5°C	16520	50% Solution	1 liter	ea
0-5°C	16521	50% Solution	4 x 1 liter	bx

► Serum Vial Glutaraldehyde

Over the years, many of our valued customers have requested purchasing our Glutaraldehyde in serum vials. This packaging allows the user to puncture the special non-reactive seal with a hypodermic syringe and draw out the exact quantity of Glutaraldehyde needed without opening the container. This packaging assures freshness and purity of the Glutaraldehyde at all times

0-5°C	16216	25% Aqueous EM Grade	10 x 10 ml
0-5°C	16214	Glutaraldehyde in serum Vial	100 ml
0-5°C	16316	50% Aqueous EM Grade	10 x 10 ml
0-5°C	16314	Glutaraldehyde in serum Vial	100 ml

* All other concentrations are available in serum vials upon request.

► Anhydrous EM Grade Glutaraldehyde:
Specially Prepared-10% Solution

Rapid-Freezing on a polished metal surface, at the temp. of liquid helium or liquid nitrogen, followed by freeze-substitution in osmium-acetone, has been shown to be a very useful technique for capturing rapid cellular events and for preserving cell ultrastructure.

- John M. Robinson and Morris J. Karnovsky, 1991. "Rapid-freezing Cytochemistry: Preservation of Tubular Lysosomes and Enzyme Activity". J. of Histochem., Cytochem. Vol. 39, No. 6, pp 787-792

Ordering Information: (please call for additional information)

0-5°C	16530	10% in Acetone	10 x 10 ml	bx
0-5°C	16531	10% in Ethanol	10 x 10 ml	bx
0-5°C	16532	10% in Methanol	10 x 10 ml	bx
0-5°C	16533	10% in Solvent of your choice	10 x 10 ml	bx

We would be pleased to fill your specific glutaraldehyde needs. Please call for prices on special concentrations or size requirements.

FIXING, CLEARING, AND DEHYDRATING CHEMICALS

► **Glutaraldehyde, Pre-Made, Ready-to-Use, in Buffer**

Glutaraldehyde 0.625% in 0.1M Phosphate Buffer, pH 7.4

0-5°C	16535-05	Glutaraldehyde 0.625% in Phosphate Buffer, pH 7.4	500 ml
0-5°C	16535-10	Glutaraldehyde 0.625% in Phosphate Buffer, pH 7.4	1 L

Glutaraldehyde 2% in 0.1M Phosphate Buffer, pH 7.4

0-5°C	16536-05	Glutaraldehyde 2% in Phosphate Buffer, pH 7.4	500 ml
0-5°C	16536-10	Glutaraldehyde 2% in Phosphate Buffer, pH 7.4	1 L

Glutaraldehyde 2% in 0.1M Sodium Cacodylate Buffer, pH 7.4

0-5°C	16536-15	Glutaraldehyde 2% in Sodium Cacodylate Buffer, pH 7.4	500 ml
0-5°C	16536-20	Glutaraldehyde 2% in Sodium Cacodylate Buffer, pH 7.4	1 L

Glutaraldehyde 2.5% in 0.1M Phosphate Buffer, pH 7.4

0-5°C	16537-05	Glutaraldehyde 2.5% in Phosphate Buffer, pH 7.4	500 ml
0-5°C	16537-10	Glutaraldehyde 2.5% in Phosphate Buffer, pH 7.4	1 L

Glutaraldehyde 2.5% in 0.1M Sodium Cacodylate Buffer, pH 7.4

0-5°C	16537-15	Glutaraldehyde 2.5% in Sodium Cacodylate Buffer, pH 7.4	500 ml
0-5°C	16537-20	Glutaraldehyde 2.5% in Sodium Cacodylate Buffer, pH 7.4	1 L

Glutaraldehyde 3% in 0.1M Phosphate Buffer, pH 7.4

0-5°C	16538-05	Glutaraldehyde 3% in Phosphate Buffer, pH 7.4	500 ml
0-5°C	16538-10	Glutaraldehyde 3% in Phosphate Buffer, pH 7.4	1 L

Glutaraldehyde 3% in 0.1M Sodium Cacodylate Buffer, pH 7.4

0-5°C	16538-15	Glutaraldehyde 3% in Sodium Cacodylate Buffer, pH 7.4	500 ml
0-5°C	16538-20	Glutaraldehyde 3% in Sodium Cacodylate Buffer, pH 7.4	1 L

Glutaraldehyde 3% Sodium Phosphate Buffer, pH 7.2

0-5°C	16539-45	Glutaraldehyde 3% in Sodium Phosphate Buffer, pH 7.2	10x10 ml
0-5°C	16539-50	Glutaraldehyde 3% in Sodium Phosphate Buffer, pH 7.2	500 ml
0-5°C	16539-55	Glutaraldehyde 3% in Sodium Phosphate Buffer, pH 7.2	1 L

Glutaraldehyde 4% in 0.1m Phosphate Buffer, pH 7.3

0-5°C	16539-60	Glutaraldehyde 4% in 0.1m Phosphate Buffer, pH 7.3	10x10 ml
0-5°C	16539-65	Glutaraldehyde 4% in 0.1m Phosphate Buffer, pH 7.3	500 ml
0-5°C	16539-70	Glutaraldehyde 4% in 0.1m Phosphate Buffer, pH 7.3	1 L

Glutaraldehyde 2% Paraformaldehyde 2% in Phosphate Buffer, pH 7.4

0-5°C	16536-06	Glutaraldehyde 2% Paraformaldehyde 2% in Phosphate Buffer, pH 7.4	100ml
0-5°C	16536-07	Glutaraldehyde 2% Paraformaldehyde 2% in Phosphate Buffer, pH 7.4	500ml
0-5°C	16536-08	Glutaraldehyde 2% Paraformaldehyde 2% in Phosphate Buffer, pH 7.4	1 Liter

Glutaraldehyde 2.5% Paraformaldehyde 1% in Phosphate Buffer, pH 7.4

0-5°C	16537-06	Glutaraldehyde 2.5% Paraformaldehyde 1% in Phosphate Buffer, pH 7.4	100ml
0-5°C	16537-07	Glutaraldehyde 2.5% Paraformaldehyde 1% in Phosphate Buffer, pH 7.4	500ml
0-5°C	16537-08	Glutaraldehyde 2.5% Paraformaldehyde 1% in Phosphate Buffer, pH 7.4	1 Liter

Glutaraldehyde 2.5% Aqueous

0-5°C	16537-16	Glutaraldehyde 2.5% , Aqueous	10x10ml
0-5°C	16537-17	Glutaraldehyde 2.5% Aqueous	500ml
0-5°C	16537-18	Glutaraldehyde 2.5% Aqueous	1 Liter

Glutaraldehyde 3.0% Aqueous

0-5°C	16537-19	Glutaraldehyde 3% Aqueous	100ml
0-5°C	16537-20S	Glutaraldehyde 3% Aqueous	500ml
0-5°C	16537-21	Glutaraldehyde 3% Aqueous	1 Liter

Glutaraldehyde 3.0% Paraformaldehyde 3% in 0.1M Phosphate Buffer, pH 7.4

0-5°C	16538-06	Glutaraldehyde 3% Paraformaldehyde 3% in Phosphate Buffer, pH 7.4	10x10ml
0-5°C	16538-07	Glutaraldehyde 3% Paraformaldehyde 3% in Phosphate Buffer, pH 7.4	500ml
0-5°C	16538-08	Glutaraldehyde 3% Paraformaldehyde 3% in Phosphate Buffer, pH 7.4	1 Liter

Glutaraldehyde 4% in 0.1M in Sodium Cacodylate Buffer, pH 7.4

0-5°C	16539-06	Glutaraldehyde 4% in 0.1M Sodium Cacodylate Buffer, pH 7.4	10x10ml
0-5°C	16539-07	Glutaraldehyde 4% in 0.1M Sodium Cacodylate Buffer, pH 7.4	500ml
0-5°C	16539-08	Glutaraldehyde 4% in 0.1M Sodium Cacodylate Buffer, pH 7.4	1 Liter

Glutaraldehyde 5.0% Aqueous

0-5°C	16539-15	Glutaraldehyde 5% Aqueous	10x10ml
0-5°C	16539-20	Glutaraldehyde 5% Aqueous	500ml
0-5°C	16539-25	Glutaraldehyde 5% Aqueous	1 Liter

Glutaraldehyde 5% in 0.1M Phosphate Buffer, pH 7.4

0-5°C	16539-30	Glutaraldehyde 5% in 0.1M Phosphate Buffer, pH 7.4	10x10ml
0-5°C	16539-35	Glutaraldehyde 5% in 0.1M Phosphate Buffer, pH 7.4	500ml
0-5°C	16539-40	Glutaraldehyde 5% in 0.1M Phosphate Buffer, pH 7.4	1 Liter

► **Glutaraldehyde/Formaldehyde Fixative (Karnovsky's)**

This fixative contains 3% glutaraldehyde and 2% formaldehyde in 0.1M phosphate buffer, pH 7.4

Karnovsky's with formalin 2% and Biological glutaraldehyde 3% in 0.1m Phosphate Buffer

0-5°C	15731-10	Karnovsky Fixative Reagent Grade	1 L
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Karnovsky's with paraformaldehyde solution and EM grade glutaraldehyde

0-5°C	15732-10	Karnovsky Fixative EM Grade	1 L
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Please Note: This kit can be formulated to fit your requirements. Please contact us.

► **Glutaraldehyde Spill Control; G-gard-ER**

Transforms glutaraldehyde to a nearly neutral solution and renders the solution acceptable for sewer disposal. Prepares glutaraldehyde for biodegradation. Reduces biocidal activity and odor. 65g G-gard pre-treats one gallon of 1% solution.

RT	24142-01	Glutaraldehyde Spill Control	64g
RT	24142-10	Glutaraldehyde Spill Control	10x64g

► **Ampule Breaker**

► **Ampule Cracker**

► **Breaksafe**

See page 214, 1104 >>>>

FIXING, CLEARING, AND DEHYDRATING CHEMICALS

► **Fixatives** (continued)► **HISTOCHOICE™ MB® ***
The Molecular Biology Fixative

- **SAFE** - Contains no Formaldehyde, Glutaraldehyde or Mercury
- **NON-TOXIC** – Is completely odorless and can be safely disposed of down the drain

HISTOCHOICE™ MB® Tissue Fixative is the first fixative designed for the molecular biologist. It is specialty formulated to preserve antigenic sites for antibody probes and nucleic acid sites for immunohistochemistry. HISTOCHOICE™ MB® replaces formaldehyde based, alcohol based, Zenkers, B-5, B-3, Bouin's and other fixatives with superior results. Tissue fixed in HISTOCHOICE™ MB® exhibit vibrant staining, better nuclear and cytoplasmic detail, and will retain a crisp appearance even after long-term fixation.

Because this formula is designed specially for molecular biology applications, HISTOCHOICE™ MB® fixed sections do not require pre-digestion or other recovery procedures to make important sites available. This means you spend less time preparing slides and more time doing research.

More than a fixative, HISTOCHOICE™ MB® is a preservative that leaves antigens and nucleic acids in their native state, allowing binding for specific probes. Primary antibodies can often be diluted several-fold due to the increased number of preserved antigenic sites, saving cost on every slide you process.

HISTOCHOICE™ MB® fixed tissue retains a much more natural look and feel than formalin fixed tissue. It is important to remember that these tissues are not fixed by formalin, but rather preserved by HISTOCHOICE™ MB®.

RT	64115-01	HISTOCHOICE™ MB® Fixative	1 L
RT	64115-04	HISTOCHOICE™ MB® Fixative	4 L
RT	64115-44	HISTOCHOICE™ MB® Fixative	4 x 4 L

* HISTOCHOICE™ is registered name of Amresco

► **Hollande's Fixative**

A modification of Bouin's solution. It is stable and will decalcify small bone specimens. Tissue that is fixed with Hollande's can be stained successfully with most stains, and the cupric acetate in the solution stabilizes red blood cell membranes and eosinophil and endocrine cell granules so that less lysis occurs than with Bouin's solution. Hollande's is widely used as a fixative for biopsy specimens of the gastrointestinal tract.

Thorough washing of the fixative prior to placing the specimen in a phosphate buffered formalin solution is necessary because the salts present in the solution will form an insoluble phosphate precipitate. Packaged in leak-proof histo-containers; prefilled ready-to-use.

	Cat.#	Cup Size	Filled	Pack/cs
RT	64120-10	15 ml	10 ml	50/cs
RT	64120-20	30 ml	20 ml	50/cs
RT	64120-30	60 ml	30 ml	20/cs
Bulk packaging is available:				
RT	64120-01	Hollande's Fixative		1 L
RT	64120-04	Hollande's Fixative		4 L

► **McDowell Trumps Fixative**

RT	18030-05	McDowell Trumps Fixative	500 ml
RT	18030-10	McDowell Trumps Fixative	1 L

► **Michel's Fixative, pH 7.0 – 7.4**

RT	18040-05	Michel's Fixative	500 ml
RT	18040-10	Michel's Fixative	1 L
RT	18040-20	Michel's Fixative Pre-filled	20 x 10 ml

TECHNICAL TIP**Tissue Biopsy in Michel's Fixative**

Place tissue biopsy in Michel's fixative for 24-48 hours and then wash the tissue with Michel's Buffer three changes a minimum of 10 minutes each change and freeze at -70°C.

► **Mirsky's Fixative™**

- **Saponin/Glyoxylate Fixative**
- **Preserves Immunohistological activity**
- **Contains no formaldehyde**
- **Fast-acting**



Mirsky's Fixative™ is a superior fixing agent for use in immunohistological and immunological protocols. Mirsky's contains no formaldehyde or glutaraldehyde. Therefore, it has considerably reduced toxicity and virtually no odor. Mirsky's Fixative is neutral, buffered, and isotonic (308 mOsmol). Additionally, Mirsky's Fixative does not contain toxic or hazardous buffers such as cacodylate or barbital. Hardening or shrinkage of tissue is considerably reduced.

Double reactive sites afford excellent cross-linking properties while maintaining sample enzyme activity. Samples processed in Mirsky's Fixative for light microscopy can subsequently be used in electron microscopy procedures. Special buffer systems may be used in place of the buffer provided.

Use as a replacement for formalin and/or glutaraldehyde fixatives in immunohistological and immunocytological staining protocols. Tissue size is unlimited, as long as the sample is no thicker than 0.5cm in at least one plane to assure uniformity of tissue penetration. The gross visual appearance will be different than in formaldehyde and tissue may seem "raw". This is due to double site binding of the fixative with a resultant reduction in tissue shrinkage. Microscopic examination of tissue morphology will be noticeably improved. This material is intended to maintain enzyme and antibody activity. For best results, tissue section of high digestive enzyme content should be thoroughly rinsed in saline solution before fixation (e.g. trypsin in intestinal samples). Once fixed, tissue may be retained in Mirsky's Fixative and ethanol indefinitely.

Mirsky's Fixative is normally distributed as a concentrated two bottle system, although high through-put laboratories often use the single bottle ready-to-use format. The two bottle system is comprised of Mirsky's Fixative 10X Concentrated and Mirsky's Fixative 10X Buffer. To reconstitute to working strength, add 1 part Mirsky's Fixative 10X Buffer to 8 parts distilled or deionized water, mix thoroughly, then add 1 part Mirsky's Fixative 10X Concentrate and mix again.

The two bottle system has a shelf life of 12 months while the ready-to-use format has a shelf life of 30 days.

0-5°C	15560	Mirsky's Fixative System	200 ml
0-5°C	15561-05	Mirsky's Fixative Ready-to-Use	500 ml
0-5°C	15561-10	Mirsky's Fixative Ready-to-Use	1L
0-5°C	15561-20	Mirsky's Fixative Ready-to-Use	2L

FIXING, CLEARING, AND DEHYDRATING CHEMICALS

► **Russell's Zenker Fixative (Russel's Modified Zenker)**

Due to the hazardous nature of mercury, Zenker's fluid is no longer available however in place of it we are offering Russell's Zenker Fixative, which contains Zinc Chloride, and the staining results produced by this fixative are comparable to those of Zenker's Stock solution. Russell's Modified Zenker's is used in the same manner as Zenker's stock solution.

RT	64123-05	Russell's Modified Zenker's Solution	500 ml
RT	64123-06	Russell's Modified Zenker's Solution	1 L

► **Formic Acid 96%, Reagent, A.C.S.**

HCOOH F.W. 46.03 CAS #64-18-6

Specific Gravity: 1.22

RT	15750	225 ml
RT	15760	1 liter

► **Formalin Prefilled HistoTainer™**

The HistoTainer™ (Empty Vials, see page 482) is half filled with 10% Neutral Buffered Formalin as a fixative. These ready-to-use prefilled containers are timer saving and make your work more efficient.

EMS #	Description	Vial Size	Prefilled	Qty
RT 15743-20	Formalin Prefilled HistoTainer	20 ml	10 ml	24
RT 15743-40	Formalin Prefilled HistoTainer	40 ml	20 ml	24
RT 15743-60	Formalin Prefilled HistoTainer	60 ml	30 ml	24
RT 15743-90	Formalin Prefilled HistoTainer	90 ml	45 ml	24
RT 15743-120	Formalin Prefilled HistoTainer	120 ml	60 ml	24

► **Gold Chloride, Hydrate**

(Chloroauric Acid; Hydrogen Tetrachloroaurate)

H(AuCl₄)₂.H₂O F.W. 357.79 CAS #16961-25-4

Assay99.9985%

Gold contents49%+

A highly purified gold compound for the preparation of Colloidal Gold sols. Prewighed to facilitate your work.

(Preparation instructions for Gold Sols included)

RT	16580	10 x 1/10 g	bx
RT	16582	10 x 1/2 g	bx
RT	16583	1 g	g
RT	16584	10 x 1 g	bx

► **Gold Chloride Aqueous Solutions**

RT	16586	Gold Chloride 0.1% Aqueous	500 ml
RT	16587	Gold Chloride 0.2% Aqueous	500 ml
RT	16588	Gold Chloride 0.5% Aqueous	500 ml
RT	16589	Gold Chloride 1.0% Aqueous	500 ml
RT	16590	Gold Chloride 10.0% Aqueous	500 ml

► **Gum Mastic**

0-4C	16590-01	Gum Mastic, 2.5% in Alcohol	500 ml
0-4C	16591	Gum Mastic, 5% in Alcohol	500 ml
0-4C	16592	Gum Mastic, 10% in Alcohol	500 ml
0-4C	16595	Gum Mastic, 10% in Isopropanol	500 ml

► **Hexamethylenetetramine, A.C.S. Reagent, Granular**

(Urotropine; Methenamine)

C₆H₁₂N₄ F.W. 140.19 CAS #100-97-0

Assay99.0-100.5%

Specifications:

Residue after Ignition0.1%

Chloride0.014%

SulfateTo Pass Test

Heavy Metals.0.001%

Used in silver stains.

Swift, J.A. (1968) Microsc. Soc. 88, 449.

RT	16710	50 g
RT	16710-25	25 g
RT	16712	Methenamine, 3% Aqueous 500 ml

► **Hexylene Glycol, Reagent, A.C.S.**

(2-Methyl-2,4-pentanediol)

(CH₃)₂C(OH)CH₂CH(OH)CH₃ F.W. 118.18 CAS #107-41-5

Specific Gravity @25°C-0.923

A.C.S. Specifications:

Assay.....99%

IR SpectrumTo Pass Test

Refractive Index @20°C0.921-0.923

Mixed with water in all proportions. Used as a dehydrating agent for fat tissues.

RT	16740	450 ml
RT	16750	4 x 450 ml

For ImmunoGold Reagents...

See Section 2, pages 72-90

Including not only the more commonly known reagents for EM and LM but, as well, a newly introduced line of products such as Silver Enhancement specifically for EM, Ultra-Small Fab fragments, Blocking Solutions, and even a line of donkey gold conjugates.



FIXING, CLEARING, AND DEHYDRATING CHEMICALS

► HISTOCHOICE® Clearing Agent

Histology grade – Non-flammable, replacement for Xylene for all tissue clearing needs.

64114-01	Histochoice Clearing Agent	4 L
64114-04	Histochoice Clearing Agent	4x4 L

► HISTOCHOICE™ MB® *
The Molecular Biology Fixative

■ **SAFE** - Contains no Formaldehyde, Glutaraldehyde or Mercury

■ **NON-TOXIC** – Is completely odorless and can be safely disposed of down the drain

HISTOCHOICE™ MB® Tissue Fixative is the first fixative designed for the molecular biologist. It is specially formulated to preserve antigenic sites for antibody probes and nucleic acid sites for immunohistochemistry. HISTOCHOICE™ MB® replaces formaldehyde based, alcohol based, Zenkers, B-5, B-3, Bouin's and other fixatives with superior results. Tissue fixed in HISTOCHOICE™ MB® exhibit vibrant staining, better nuclear and cytoplasmic detail, and will retain a crisp appearance even after long-term fixation.

Because this formula is designed specially for molecular biology applications, HISTOCHOICE™ MB® fixed sections do not require pre-digestion or other recovery procedures to make important sites available. This means you spend less time preparing slides and more time doing research.

More than a fixative, HISTOCHOICE™ MB® is a preservative that leaves antigens and nucleic acids in their native state, allowing binding for specific probes. Primary antibodies can often be diluted several-fold due to the increased number of preserved antigenic sites, saving cost on every slide you process.

HISTOCHOICE™ MB® fixed tissue retains a much more natural look and feel than formalin fixed tissue. It is important to remember that these tissues are not fixed by formalin, but rather preserved by HISTOCHOICE™ MB®.

RT	64115-01	HISTOCHOICE™ MB® Fixative	1 L
RT	64115-04	HISTOCHOICE™ MB® Fixative	4 L
RT	64115-44	HISTOCHOICE™ MB® Fixative	4 x 4 L

* HISTOCHOICE™ is registered name of Amresco

► Histo-Clear®/Histo-Clear II®

Histo-Clear (Distilled essential oils – food grade) and Histo-Clear II (A mixture of Aliphatic Hydrocarbon and Distilled essential oils – food grade, reduced citrus odor) are excellent non-toxic clearing agents replacing Xylene.



RT	64110-01	Histo-Clear	1 L	RT	64111-01	Histo-Clear II	1 L
RT	64110-04	Histo-Clear	1 gal	RT	64111-04	Histo-Clear II	1 gal
RT	64110-10	Histo-Clear	5 gal	RT	64111-10	Histo-Clear II	5 gal

Histo-Clear® is register name of National Diagnostics

► Histosol™ - Xylene Substitute

Histosol™ is the original high flash point (114°F TCC) histological clearing agent. It is intended to be used as a replacement for xylene where the hazards associated with aromatic hydrocarbon vapors are to be reduced. Museum-quality tissue slides can be prepared with Histosol without change in protocol or procedure. Histosol is manufactured from petrochemical products and is miscible in all proportions with ethanol, isopropanol, and t-butanol. It is also miscible with all paraffin-based tissue embedding media and all permanent mounting materials.

23405-01	Histosol – Xylene Substitute	1 gal
23405-04	Histosol – Xylene Substitute	4 x 1 gal

Histosol® is register name of National Diagnostics

► Hollande's Fixative

A modification of Bouin's solution. It is stable and will decalcify small bone specimens. Tissue that is fixed with Hollande's can be stained successfully with most stains, and the cupric acetate in the solution stabilizes red blood cell membranes and eosinophil and endocrine cell granules so that less lysis occurs than with Bouin's solution. Hollande's is widely used as a fixative for biopsy specimens of the gastrointestinal tract.

Thorough washing of the fixative prior to placing the specimen in a phosphate buffered formalin solution is necessary because the salts present in the solution will form an insoluble phosphate precipitate. Packaged in leak-proof histo-containers; prefilled ready-to-use.

	Cat.#	Cup Size	Filled	Pack/cs
RT	64120-10	15 ml	10 ml	50/cs
RT	64120-20	30 ml	20 ml	50/cs
RT	64120-30	60 ml	30 ml	20/cs
Bulk packaging is available:				
RT	64120-01	Hollande's Fixative		1 L
RT	64120-04	Hollande's Fixative		4 L

► Hydrochloric Acid, Diluted, (w/v)

HCl F.W. 36.46 CAS 7647-01-0

RT	16762	Hydrochloric Acid, 1% Aqueous	500 ml
RT	16763	Hydrochloric Acid, 2% Aqueous	500 ml
RT	16765	Hydrochloric Acid, 10% Aqueous	500 ml
RT	16766	Hydrochloric Acid, 20% Aqueous	500 ml

► Hydrogen Peroxide 30% Solution-Stabilized, Reagent, A.C.S.

H₂O₂ F.W. 34.01 CAS #7722-84-1

Assay	29-32%
Maximum of Impurities:	
Chloride(Cl)	0.0003%
Nitrate	0.0002%
Phosphate	0.0002%
Sulfate	0.0005%
Heavy Metal	0.0001%
Iron	0.00005%
Titrateable Acid	0.0006meq/g

RT	16790		100 ml
RT	16792		450 ml
0-4°C	16793	Hydrogen Peroxide, 3% Aqueous	500 ml

► Hydroquinone Aqueous Solution

0-4°C	16795-1	Hydroquinone, 1%	500 ml
0-4°C	16795-2	Hydroquinone, 2%	500 ml
0-4°C	16795-4	Hydroquinone, 4%	500 ml

► Isopropyl Alcohol, Reagent, A.C.S.

(2-Propanol) CH₃CH(OH)CH₃ F.W. 60.10 CAS #67-63-0

A.C.S. Specifications:

Color (APHA)	10
Density @ 25°C	0.781-0.783
Boiling Range (including 82.3°C)	1°C
Titrateable Acid or Base	0.0001 meq/g
Residue after Evaporation	0.001%
Solubility in water	To pass test
Water	0.2%

RT	16930		1 qt
RT	16931		4 x 1 qt

FIXING, CLEARING, AND DEHYDRATING CHEMICALS

► **McDowell Trumps Fixative**

RT	18030-05	McDowell Trumps Fixative	500 ml
RT	18030-10	McDowell Trumps Fixative	1 L

► **Methanol, Reagent, A.C.S.**

(Methyl Alcohol) CH₃OH F.W. 32.04 CAS #67-56-1

Assay99.8%
 Specific Gravity0.79

A.C.S. Specifications:
 Residue after Evaporation0.001%
 Boiling Range (Boiling point 64.6°C)2°C max
 Appearance.....Clear
 Color (A.P.H.A.)10 max
 Acetone & Aldehydes (0.001%)To pass test
 Titratable Acid.....0.0003 meq/g
 Titratable Base0.0002 meq/g
 Water0.2% max

RT	18510		1 qt
RT	18511		4 x 1 qt

► **Michel's Buffer**

RT	18041-05	Michel's Buffer	500 ml
RT	18041-10	Michel's Buffer	1 L

► **Michel's Fixative, pH 7.0 – 7.4**

RT	18040-05	Michel's Fixative	500 ml
RT	18040-10	Michel's Fixative	1 L
RT	18040-20	Michel's Fixative Pre-filled	20 x 10 ml

TECHNICAL TIP

Tissue Biopsy in Michel's Fixative

Place tissue biopsy in Michel's fixative for 24-48 hours and then wash the tissue with Michel's Buffer three changes a minimum of 10 minutes each change and freeze at -70°C.

► **Millonig's Phosphate Buffer**

Millonig (1964); Karlsson and Schultz (1965)

Ingredients: Sodium Phosphate, monobasic (NaH₂PO₄•xH₂O); Sodium Phosphate, dibasic (Na₂HPO₄•xH₂O); 0.5% Sodium Chloride (NaCl)

Shipping Conditions: Ambient Temperature
 Maximum shelf life after receipt: 1 month

The pH of this buffer is 7.4 (0.1M); the osmolarity is 440 mosmols, so this buffer is hypertonic to most body fluids. Millonig recommended to use this buffer for the fixation of very hydrated tissues with osmium tetroxide. For marine organisms, a higher concentration of sodium chloride (3%) is recommended. We supply it in a double strength (0.2M), pH 7.4. Dilution is needed before use.

0-5°C	11582-05	Millonig's Phosphate Buffer 0.2M	500ml
0-5°C	11582-10	Millonig's Phosphate Buffer 0.2M	1 L

► **Periodic Acid, Reagent**

H ₂ IO ₆	F.W. 227.96	CAS #10450-60-9
Assay		>99.0%
Heavy Metals		0.005%
Insoluble Matters		0.01%
Iron		0.003%
Other Halogen (Cl)		0.01%
Residue after Ignition		0.01%
Sulfate		0.01%

- Ainsworth, S.K. et al. (1972). Alkaline bismuth reagent for high resolution ultrastructural demonstration of periodic-reactive sites. *J. Histochem. Cytochem.*, 20:995.
- Mowry, R.W. (1958). Improved procedure for the staining of acid polysaccharides by Muller's colloidal (hydrrous) ferric oxide and its combination with the Feulgen and the periodic acid Schiff reaction. *Lab. Invest.*, 7:566
- Mowry, R.W. (1959). Effect of Periodic Acid used prior to Chromic Acid on the staining of Polysaccharides by Gomori's methenamine silver. *J. Histochem. Cytochem.*, 7:288
- Tsuchiya, A. and Ogawa, K. (1973). Ultracytochemistry of the Periodic Acid (PA) - Phosphotungstic Acid (PTA) reaction. *J. Electr. Microsc.*, 22:290
- Hanker, J.S. et al (1964). Osmiophilic reagents: new cytochemical principles for light and electron microscopy. *Science New York*, 146:1039
- Derenzini, M. et al (1986). An improved periodic acid-thiosemi-carbazide-osmium technique to reveal glycoconjugates at the molecular level in-situ. *J. Histochem. Cytochem.*, 34:1161

RT	19325		25 g
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► **Periodic Acid Aqueous Solutions**

19324-05	Periodic Acid 0.5% Aqueous	500 ml
19324-10	Periodic Acid 1% Aqueous	500 ml
19324-50	Periodic Acid 5% Aqueous	500 ml

► **Phosphate Buffer Saline (PBS)**

PBS is commonly used in biochemistry. It is a salty solution containing calcium chloride, sodium phosphate and potassium phosphate. PBS is isotonic and non-toxic to cells. 1X PBS final concentration is 0.137M NaCl, 0.01M Na₂HPO₄, 0.0027M KCl and pH 7.4.

0-5°C	19342-10	Phosphate Buffered Saline, 10X	1L
0-5°C	19242-40	Phosphate Buffered Saline, 10X	1 gal
0-5°C	19343-10	Phosphate Buffered Saline, 2X	1L
0-5°C	19343-40	Phosphate Buffered Saline, 2X	1 gal
0-5°C	19344-10	Phosphate Buffered Saline, 1X	1L
0-5°C	19344-20	Phosphate Buffered Saline, 1X	1 gal

► **Phosphate Buffer, 0.2M**

Prepared from Sodium Phosphate Monobasic Hydrate and Sodium Phosphate Dibasic Heptahydrate Non-Sterile. Meant for research purposes only.

0-5°C	19340-60	Phosphate Buffer, pH 6.0	1 L
0-5°C	19340-65	Phosphate Buffer, pH 6.5	1 L
0-5°C	19340-70	Phosphate Buffer, pH 7.0	1 L
0-5°C	19340-72	Phosphate Buffer, pH 7.2	1 L

For a complete line of all of our salt buffers see pages 26-29 >>>>

FIXING, CLEARING, AND DEHYDRATING CHEMICALS

► Phosphomolybdic Acid,

Crystal, Reagent, A.C.S.

(Dodeca-Molybdophosphoric Acid)

 $H_3PO_4 \cdot 12(MoO_3) \cdot 24H_2O$ F.W. 2257.6 CAS #51429-74-4

RT	19400	100 g
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► Phosphomolybdic Acid Aqueous Solutions

RT	19402-1	Phosphomolybdic Acid 1% Aqueous	500 ml
RT	19402-10	Phosphomolybdic Acid 10% Aqueous	500 ml

► Phosphotungstic Acid, Crystal, Reagent, Highest Purity

(Tungstophosphoric Acid)

 $H_3[P(W_3O_{10})_4] \cdot aq$ F.W. 2880.17+aq CAS #12501-23-4

Specifications:

Solubility	.....Practically clear, colorless solution
Ammonia (NH ₃)	.....0.004%
Chloride (Cl)	.....0.03%
Insoluble Matter	.....0.02%
Nitrate (NO ₃)	.....0.004%
Sulfate (SO ₄)	.....0.005%
Heavy Metals and Iron	.....No color formation on addition of.....Hydrogen Sulfide

Used as a Fixative: Issidorides, M.R., and Kasorchis, T. (1981). Dispersed and compact chromatin demonstrated with a new EM Method: phosphotungstic acid-hematoxylin block-staining. *Histochemistry* 73,21.

Used widely as a Negative Stain:

- As Spray method: Horne, R.W., and Pasquali-Ronchette, I. (1974). A negative staining-carbon film technique for studying viruses in the electron microscope.
- Preparation procedures for examining icosahedral and filamentous viruses. *J. Ultrastruct. Res.* 47, 361. Locke, M., and Kirhman, N. (1971).
- Hot Alcoholic phosphotungstic acid and uranyl acetate as routine stains for thick and thin sections. *J. Cell Biol.*, 50, 550., Farragiana, T., and Marinuzzi, V. (1979).
- Phosphotungstic acid staining of polysaccharides containing structures on epoxy embedded tissues. *J. Submicrosc. Cytol.* 11, 263. Bloom, E.E., And Aghajanian, G.K. (1968).
- Fine structural and cytochemical analysis of the staining of synaptic junctions with PTA. *J. Ultrastruct. Res.* 22, 261.

RT	19500	100g
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► Phosphotungstic Acid Aqueous Solutions

RT	19502-1	Phosphotungstic Acid, 1% Aqueous	500 ml
RT	19502-3	Phosphotungstic Acid, 3% Aqueous	500 ml
RT	19502-5	Phosphotungstic Acid, 5% Aqueous	500 ml

► Picric Acid, Reagent, Crystal, A.C.S.

(2,4,6-Trinitrophenol)

 $C_6H_2(NO_2)_3OH$ FW 229.11 CAS #88-89-1

A.C.S. Specifications:

Water	.....min 30%
Melting Point (dried)	.....121-123°C
Insoluble in Resinous Matter0.01%
Insoluble in benzene0.1%
Sulfate0.01%

RT	19550	100 g
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► Picric Acid Solutions

RT	19552	Picric Acid Saturated, Aqueous	500 ml
RT	19553	Picric Acid, 0.1% in Acetone	500 ml
RT	19554	Picric Acid, 4.67% in 95% Alcohol	500 ml

► Poly-L-Lysine Solutions

► A/ Poly-L-Lysine Hydrobromide, F.W. < 30,000 – 70,000 >

CAS #25988-63-0

A polycation, which binds to DNA, red cell membranes and any negatively, charged proteins. It is useful for promoting cell adhesion; for the preparation of polycationic beads, useful in immobilization techniques; immobilization of membranes; immobilization of plant protoplasts. In cell culture, immobilization by micro encapsulation with the alginate-poly-L-lysine microcapsule system. We offer a prepared 0.1% aqueous solution, micro-filtered, which is ideal for cell culture growth.

RT	19320-A	Poly-L-Lysine 0.1% Aqueous Solution	10 ml
RT	19321-A	Poly-L-Lysine 0.1% Aqueous Solution	100 ml

► B/ Poly-L-Lysine Hydrobromide, FW. < 70,000 – 150,000 >

CAS #25988-63-0

Poly-L-lysine with a molecular weight of >70,000. This solution is useful in promoting cell adhesion to solid substrates. Used for nuclear antigen-coated red cells in hymolytic plaque assay. We offer a prepared 0.1% aqueous solution which is micro-filtered and is used to increase tissue adhesion to the glass slide, which is needed for immunohistochemical and immunolabeling techniques, as well as lengthy staining procedures.

RT	19320-B	Poly-L-Lysine 0.1% Aqueous Solution	10 ml
RT	19321-B	Poly-L-Lysine 0.1% Aqueous Solution	100 ml

► Potassium Dichromate, Crystal, Reagent, A.C.S.

 $K_2Cr_2O_7$ F.W. 294.18 CAS #7778-50-9

A.C.S. Specifications:

Insoluble and NH ₄ OH ppt	.....0.005%
Chloride	.....0.001%
Sulfate	.....0.005%
Calcium	.....0.003%
Sodium0.02%
Loss on drying at 105°C0.05%

RT	20100	Potassium Dichromate	250 g
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► Potassium Dichromate, Aqueous Solutions

RT	20103-3	Potassium Dichromate, 3% Aqueous	500 ml
RT	20103-4	Potassium Dichromate, 5% Aqueous	500 ml

► Potassium Ferricyanide, Reagent, A.C.S.

 $K_3Fe(CN)_6$ F.W. 329.25 CAS #13746-66-2

A.C.S. Specifications:

Chloride	.....0.01%
Ferro Compounds (Fe(Cn)4)	.....0.05%
Insoluble Matters	.....0.005%
Sulfate	.....0.01%

RT	20150	Potassium Ferricyanide	100 g
RT	25102-20	Potassium Ferricyanide, 20% Aqueous	500 ml

FIXING, CLEARING, AND DEHYDRATING CHEMICALS

► Potassium Ferrocyanide Aqueous Solution

RT	25154-2	Potassium Ferrocyanide, 2% Aqueous	500 ml
RT	25154-5	Potassium Ferrocyanide, 5% Aqueous	500 ml
RT	25154-10	Potassium Ferrocyanide, 10% Aqueous	500 ml
RT	25154-20	Potassium Ferrocyanide, 20% Aqueous	500 ml

► Potassium Hydroxide, Pellets, Reagent, ACS.

KOH F.W. 56.11 CAS #1310-58-3
 Assay>85.0%
 Water contains:10-15%

RT	20155	Potassium Hydroxide	100 g
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► Potassium Hydroxide Aqueous Solutions

RT	20156-1	Potassium Hydroxide, 1% Aqueous	500 ml
RT	20156-2	Potassium Hydroxide, 4% Aqueous	500 ml
RT	20156-10	Potassium Hydroxide, 10% Aqueous	500 ml

► Potassium Iodide, Granular, Reagent, A.C.S.

KI F.W. 166.00 CAS #7681-11-0
 Refer to Bismuth Carbonate for references on use.

RT	20158	Potassium Iodide	50 g
RT	25109-3	Potassium Iodide, 3% Aqueous	500 ml

► Potassium Permanganate, Reagent, A.C.S.

KMnO₄ F.W. 158.03 CAS #7722-64-7
 A.C.S. Specifications:
 Chloride & Chlorate.....0.005%
 Nitrogen Compounds0.005%
 Sulfate0.02%
 Insoluble Matters0.2%

An EM fixative and a metal stain.
 J. Ultrastruct. Res., 21,424 (1968)

RT	20200	Potassium Permanganate	250 g
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► Potassium Permanganate, Aqueous Solutions

RT	20202	Potassium Permanganate 0.25% Aqueous	500 ml
RT	20203	Potassium Permanganate 0.3% Aqueous	500 ml
RT	20204	Potassium Permanganate 1% Aqueous	500 ml

► Propylene Glycol, Reagent, A.C.S.

(1,2-Propanediol)
 CH₃CHOHCH₂OH FW 76.10 CAS #57-55-6
 Specific Gravity (H₂O=1): 1.04
 Assay>99.5%
 Specifications:
 Residue after Ignition0.005%
 Chloride1ppm
 Water0.2%
 Titratable Acid0.0005meq/g

RT	20350	Propylene Glycol	450 ml
RT	20352	Propylene Glycol	4 x 450 ml

► Rosin Solution

RT	20550-05	Rosin Alcohol Stock Solution	500 ml
RT	20550-15	Rosin Alcohol Working Solution	500 ml

► Scott's Tap Water Substitute

Magnesium sulfate buffered with sodium bicarbonate. Ready-to-use.

RT	26070-06	Scott's Tap Water Substitute	1 L
RT	26070-07	Scott's Tap Water Substitute	4 L

► Schiff's Reagent

For use in the Periodic Acid Leucofuchsin (PAS) method as a general tissue stain.

0-5C	26052-05	Schiff's Reagent	500 ml
0-5C	26052-06	Schiff's Reagent	1L

► Silver Nitrate Aqueous Solutions

RT	21054-1	Silver Nitrate, 1%, Aqueous	500 ml
RT	21054-2	Silver Nitrate, 2%, Aqueous	500 ml
RT	21054-5	Silver Nitrate, 5%, Aqueous	500 ml
RT	21054-10	Silver Nitrate, 10%, Aqueous	500 ml
RT	21054-20	Silver Nitrate, 20%, Aqueous	500 ml

► Silver Nitrate, Reagent, A.C.S.

AgNO₃ F.W. 169.89 CAS #7761-88-8
 Assay99.9+%

A.C.S. Specifications:

Substances not precipitated by HCl.....max 0.010%
 Sulfatemax 0.0002%
 Coppermax 0.0002%
 Ironmax 0.0002%
 Leadmax 0.001%

References for Silver stain:

- Elektronemikroskopische Swift, J.A. (1968).** The electron histochemistry of cystine-containing proteins in thin transverse sections of human hair. J.R. Microsc. Soc. 88,449.
- Elektronemikroskopische Thiery, J.P. (1967).** Mise en evidence des Polysaccharides sur coupes fines en microscopie electronique. J. Microsc. (Paris) 6,987.
- Elektronemikroskopische Rambourg, A. (1967).** An improved silver methenamine technique for the detection of periodic acid-reactive complex carbohydrates with the electron microscope. J. Histochem. Cytochem. 15, 409.
- Elektronemikroskopische Hernandez et al., (1968).** Periodic acid-chromic acid-methenamine silver technique for glycoprotein detection in the electron microscope. J. Histochem. Cystochem. 16, 507.
- Elektronemikroskopische Ribí, W.A. (1976).** A golgi-electron microscope method for insect nervous tissue. Stain Technol. 51,13.
- Elektronemikroskopische Braak, H., and Braak, E. (1982).** A simple procedure for electron microscopy of Golgi-impregnated nerve cells. Neurosci. Lett. 32,1.

RT	21050		25 g
RT	21052		100 g

► Sodium Bicarbonate, Powder, Reagent, A.C.S.

NaHCO₃ F.W. 84.01 CAS #144-55-8
 Assay97.7-100.3%

Specifications:

Insoluble Matters0.015%
 Chloride0.003%
 Phosphate0.001%
 Sulfur Compounds0.003%
 Ammonium5ppm
 Iron0.001%
 Potassium.....0.05%

RT	21125		500 g
RT	21127	Sodium Bicarbonate, 5% Aqueous	500 ml

► Sodium Cacodylate Buffer

Prepared from Sodium Cacodylate Trihydrate (F.W. 214.02).

0-5C	11650	Sodium Cacodylate Buffer, 0.2M, pH 7.4	225 ml
0-5C	11652	Sodium Cacodylate Buffer, 0.2M, pH 7.4	500 ml
0-5C	11653	Sodium Cacodylate Buffer, 0.2M, pH 7.4	1 L
0-5C	11654	Sodium Cacodylate Buffer, 0.4M, pH 7.2	500 ml
0-5C	11655	Sodium Cacodylate Buffer, 0.4M, pH 7.2	1 L

FIXING, CLEARING, AND DEHYDRATING CHEMICALS

► Sodium Hydroxide, Solution

CAS #1310-73-2

Carbonate-free. This solution is prepared from ACS Reagent grade sodium hydroxide, and is standardized colorimetrically against potassium biphthalate primary reference material.

Normal Concentration 1.98-2.02

RT	21170	Sodium Hydroxide Solution 2N	225 ml
RT	21170-01	Sodium Hydroxide Solution 1N	225 ml

► Sodium Hydroxide Aqueous Solutions

RT	21172-1	Sodium Hydroxide, 1% Aqueous	500 ml
RT	21172-2	Sodium Hydroxide, 2.5% Aqueous	500 ml
RT	21172-3	Sodium Hydroxide, 3.1% Aqueous	500 ml
RT	21172-10	Sodium Hydroxide, 10% Aqueous	500 ml

► Sodium Bisulfite Solution

A 1% aqueous stock solution for fungal staining.

RT	26084-05	Sodium Bisulfite Solution	500 ml
RT	26084-06	Sodium Bisulfite Solution	1 L

► Sodium Meta-Bisulfate Aqueous Solution

RT	21175-1	Sodium Meta-Bisulfite, 1% Aqueous	500 ml
RT	21175-3	Sodium Meta-Bisulfite, 3% Aqueous	500 ml
RT	21175-5	Sodium Meta-Bisulfite, 5% Aqueous	500 ml

► Sodium Thiosulfate Aqueous Solution

RT	21360-1	Sodium Thiosulfate, 1% Aqueous	500 ml
RT	21360-2	Sodium Thiosulfate, 2% Aqueous	500 ml
RT	21360-10	Sodium Thiosulfate, 10% Aqueous	500 ml

► Sorensen's Phosphate Buffer

A phosphate buffered mixed salts, prepared from sodium phosphate monobasic and sodium phosphate dibasic.

0-5°C	11600-10	Sorensen's Phosphate Buffer, 0.2M, pH 7.2	1 L
0-5°C	11600-40	Sorensen's Phosphate Buffer, 0.2M, pH 7.2	4 L
0-5°C	11601-10	Sorensen's Phosphate Buffer, 0.2M, pH 7.4	1 L
0-5°C	11601-40	Sorensen's Phosphate Buffer, 0.2M, pH 7.4	4 L

► Sucrose, Reagent, A.C.S.

C₁₂H₂₂O₁₁ F.W. 342.20 CAS #57-50-1

Specifications:

Insoluble Matters	0.005%
Loss on Drying 105°C	0.03%
Residue after Ignition	0.01%
Titrateable acid	0.0008meq/g
Chloride	0.005%
Sulfate	0.005%
Heavy Metals	5ppm
Iron	5ppm
Invert Sugar	0.05%

RT	21600		500 g
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► Tannic Acid, Reagent, A.C.S.: EM Grade

C₇₆H₅₂O₄₆ F.W. 1701.28 CAS #1401-55-4

RT	21700		100 g
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► Tannic Acid Aqueous Solutions

21702-5	Tannic Acid, 5% Aqueous	500 ml
21702-10	Tannic Acid, 10% Aqueous	500 ml

► Tartrazine Solutions

RT	21740	Tartrazine, 1.5% in 1.5% Acetic Acid, Aqueous	500 ml
RT	21741	Tartrazine, 1.5% Aqueous	500 ml
RT	21742	Tartrazine, Saturated in Cellosolve	500 ml

► Thionin Solutions

RT	21910	Thionin, 0.5% in 20% Alcohol	500 ml
RT	21911	Thionin, 0.1% Aqueous	500 ml

► Tissue-Tek® VIP™ Fixative

Eliminate the need for routine warm water flushing with the Tissue-Tek® VIP™ Fixative. Using the unique Neutra-pHase™ technology, the Tissue-Tek® VIP™ Fixative produces no precipitates in the presence of alcohol, contrary to all other 10% neutral buffered formalin products. The Tissue-Tek® VIP™



Fixative will not promote formation of salts within the tissue processor lines which can cause costly damages to any brands of tissues processors unless regular maintenance is performed. Since the base ingredient is formalin, it is fully compatible and can replace 10% NBF without any adjustments to your procedures. The product is offered in three convenient package sizes: 1 gallon, 2.5 gallons and 5 gallons.

EMS#	Tissue-Tek	Description	Qty
62582-01	5990	Tissue-Tek™ VIP® Fixative	1 gal
62582-04	5990	Tissue-Tek™ VIP® Fixative	4 x 1 gal
62582-02	5989	Tissue-Tek™ VIP® Fixative	2.5 gal
62582-05	5991	Tissue-Tek™ VIP® Fixative	5 gal

► Toluene Reagent, A.C.S.

C₆H₅CH₃ FW 92.14 CAS #108-88-3Specific Gravity (H₂O=1): 0.866

b.p. 110-111°C

Assay99.9%

Specifications:

Color (A.P.H.A.)	10
Residue after evaporation	0.001%
Subs. darkened by H ₂ SO ₄	To pass test
Sulfur compound (as S)	0.003%
Water	0.03%

RT	22030		450 ml
RT	22032		4 x 450 ml

► Tris (Hydroxymethyl) Aminomethane, Free-base, Reagent Grade

White crystalline powder

C₄H₁₁NO₃ F.W. 121.14 CAS #77-86-1

A 40% (w/v) aqueous solution. It is clear and colorless.

Assay>99.9%

Water<0.2%

Heavy Metals2ppm

RT	11700		100 g
RT	11720		500 g

► Tris (Hydroxymethyl) Aminomethane

Maleate Buffer (pH 5.2-8.6)

RT	11730		250 ml
RT	11740		500 ml

FIXING, CLEARING, AND DEHYDRATING CHEMICALS

➤ **Water Deionized, Reagent Grade A.C.S.**

H₂O F.W. 18.02 CAS #7732-18-5

EMS Reagent Grade Water is typically prepared at 18 megohm/cm specific resistance using a reverse osmosis, mixed deionization, activated filtration and final filtration at 0.2 microns.

Color (APHA)<+/-5
 Bacteriological purity0 CFUs/L
 Residue after evaporation10ppm
 Coliformnegative

RT	22800-01	Deionized Water	1 gal
RT	22800-05	Deionized Water	5 gal

➤ **Xylenes, Reagent, A.C.S.**

(Xylol, Dimethylbenzene)

C₆H₄(CH₃)₂ FW 106.27 CAS #1330-20-7

Specific Gravity (H₂O=1): 0.865
 b.p. 136-140°C

This reagent is a mixture of isomers (ortho, meta, and para) and may contain Ethylbenzene

Specifications:

Color (A.P.H.A.)10
 Subs. darkened by H₂SO₄To pass test
 Sulfur Compounds (as S)0.003%
 Water0.05%
 Residue after evaporation0.002%

RT	23400		450 ml
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➤ **Xylene Substitute**

A xylene substitute for use in histology and cytology. It is safer and a more preferable alternative to xylene. It can be used as a solvent and clearing agent, as well as for dissolving paraffin waxes, glues and adhesives.

PROPERTIES:

- Minimal tissue shrinkage.
 - Dries faster with no residue.
 - Non-corrosive and far less toxic than xylene.
 - Soluble with alcohol, paraffin embedding media, and mounting media.
- It can be used in all procedures that require xylene. Biodegradable.

RT	23410-01	Xylene Substitute	1 gal
RT	23410-04	Xylene Substitute	4 x 1 gal

➤ **Histosol® - Xylene Substitute**

Histosol® is the original high flash point (114°F TCC) histological clearing agent. It is intended to be used as a replacement for xylene where the hazards associated with aromatic hydrocarbon vapors are to be reduced. Museum-quality tissue slides can be prepared with Histosol® without change in protocol or procedure. Histosol® is manufactured from petrochemical products and is miscible in all proportions with ethanol, isopropanol, and t-butanol. It is also miscible with all paraffin-based tissue embedding media and all permanent mounting materials.

RT	23405-01	Histosol® - Xylene Substitute	1 gal
RT	23405-04	Histosol® - Xylene Substitute	4 x 1 gal

Histol® is a registered name of National Diagnostics

➤ **Xylene: Peanut oil, 2:1**

RT	23402	Xylene:Peanut oil, 2:1	500 ml
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➤ **Xylene Substitute – Hemo-De® ***

An intensive study from 1992 throughout 2000 has shown that Hemo-De® (d-Limonene) a terpene-based chemical with a pleasant citrus fragrance, was able to replace many of the clinical laboratories toxic reagents, such as carbol-xylene, xylene, ethyl acetate and formalin.

In Parasitology – Hemo-De replaces ethyl acetate in the concentration procedure; Hemo-De replaces carbol-xylene, xylene and formalin in the trichrome procedure.

In Histology – Hemo-De replaces xylene in most all procedures. Hem-De is a superior solvent and Clearing agent that can be used in all tissue processing, deparaffinating and slide preparation.

Hemo-De Features:

- Soluble with alcohol and mounting media
- Biodegradable, non-corrosive, non-flammable (Combustible)
- Contains no benzene and no toluene
- Low toxicity levels
- Minimal tissue shrinkage
- Reasonably fast drying and leaves no residue

Hemo-De Application:

In Research and Medical – Hematology, Cytology, Pathology, Microbiology, Histology, Pathology, Hospital

In Mechanical Applications – Cleaning of machine parts, cleaning tools, engines etc.

In Electronic Applications – Circuits boards, electronic components, tools.

General Applications – Clean metal and glass surfaces. Dilute with water can be used to clean all plastic surfaces. Removal of adhesives, glues, tars...

Hem-De Information:

Chemical name:d-Limonene (Terpene Hydrocarbon, n.o.s.)
 Composition:d-Limonene, CAS [5989-27-5]
 98.0% Butylated Hydroxyanisole (BHA),
 CAS [25013-16-5] <0.024%

Flash Point (TCC):121°F (49.4°C)
 Boiling Point:349°F (176°C) @ 760mmHg
 Freezing Point:-74°C
 Shipping:Terpene Hydrocarbons, n.o.s. ID No. 04858003,
 Flammable Liquid, Group III

RT	23412-01	Xylene Substitute	1 gal
RT	23412-04	Xylene Substitute	4 x 1 gal
RT	23412-05	Xylene Substitute	5 gal

NOTE: Hemo-De® is a product of Scientific Solvents

➤ **Russell's Zenker Fixative (Russel's Modified Zenker)**

Due to the hazardous nature of mercury, Zenker's fluid is no longer available however in place of it we are offering Russell's Zenker Fixative, which contains Zinc Chloride, and the staining results produced by this fixative are comparable to those of Zenker's Stock solution. Russell's Modified Zenker's is used in the same manner as Zenker's stock solution.

RT	64123-05	Russell's Modified Zenker's Solution	500 ml
RT	64123-06	Russell's Modified Zenker's Solution	1 L

➤ **Zinc/Formalin - see Formaldehyde/Zinc #15675, page 454 >>>>**

STAINING CHEMICALS AND PREPARED SOLUTIONS

► Certified Dyes/Stains

Certified by the Biological Stain Commission

All Dyes/Stains are for research use only. Not meant for drug, food, or household use.

Cat.#	Storage	Dyes/Stain	C.N. #	Major uses	Size
10035	RT	Acid Fuchsin	DcR-8	Stain for connective tissue and erythrocytes; and proteinaceous material in liver. Cain's method for mitochondria.	25g
10050	RT	Acridine Orange		Pickett's fluorescence method for fungi fluorescent against a dark background. For differentiation of nucleic acids and cytology.	25g
10350	RT	Alcian Blue 8GX	AnAn-6	Acid mucopolysaccharides. Cell walls. Cartilage granules. As a carbohydrate & mucosubstance stain in different pH levels. Movat's method for connective tissue stain. Monroe/Frommer method for pituitary staining. AB/PAS/OG method for human adenohypophyseal cytology.	25g
10360	RT	Alizarin Red S	DcAr-5	Minute bone and fetal ossification in mammalian embryos. Used with toluidine blue for distinction of bone & cartilage in mammalian embryos.	25g
10840	RT	Aniline Blue	DcK-11	Used with bieberich scarlet for staining collagen, reticulum, muscle, plasma, and nuclei. All connective tissues. Used as a counterstain with red nuclear dye.	25g
10850	RT	Auramine O	DcAu-4	Staining paraffin sections of infected tissue. Acid-fast organisms exhibit fluorescence.	25g
11150	RT	Azocarmine G		Alpha, beta, and all D-cells of the islets of Langerhans and animals.	5g
11240	RT	Azur A		A nuclear stain. Cell granules McNeal method for leukocytes.	10g
11200	RT	Azur B		Distinction of cellular RNA & DNA in botanical tissue. Negri body stain. Malarial parasites.	10g
11210	RT	Azur II		Morphological details of marrow cells, nuclei, and bacteria.	10g
11260	RT	Basic Fuchsin (Rosaniline)	DcFb-26	Gram positive/negative bacteria. A pituitary stain.	25g
18100	RT	Basic Green 4 (Malachite Green)	DcMg-11	In microbiology, distinction of diphtheria and other bacteria. A vital stain for onion epidermis.	25g
11265	RT	Bieberich Scarlet (Ponceau BS)		Used with picric acid/aniline blue for staining collagen, reticulum, muscle, and plasma. Luna's method for erythrocytes & eosinophil granules. Guard's method for sex chromatin and nuclear chromatin.	25g
11310	RT	Bismarck Brown Y		PAP for staining smears. Nuclei & granules. Mucin & calciform cells of intestine, cartilage & embryo.	25g
11465	RT	Brilliant Cresyl Blue	DcV-5	Platelets & reticulum of immature red cells. Counterstained with Wright's stain.	10g
12410	RT	Carmine (Alum Lake)	DcCa-16	Glycogen stain. Elastic fibers in blood vessels, nuclei, & collagen.	10g
12780	RT	Cresyl Fast Violet, (Cresyl Violet Acetate)	DcW-5	Vogt's method for nerve cells. A neurological tissue stain. Nissl substance & PAS-positive material. Powers & Clark method for spinal cord and brain with formalin or Bouins fixed.	5g
12785	RT	Crystal Violet	DcC-38	Gram positive/Gram negative bacteria, and filaments. Holzer's method for glial fibers (nerve). Amyloid in pathological human tissue. Determining chromatin & nucleoli in plant tissue.	25g
14851	RT	Eosin Y	DcE-40	Maximow's method for morphological details of marrow cells; a constituent of Wright Stain for elastic fibers in blood; as a eosin-phloxine counterstain.	25g
15010	RT	Erythrosin B (Erythrosin extra bluish)	DcEr-5	Used with methylene blue as a plasma stain for nerve cells. Use crystal violet for plant tissue.	10g
15500	RT	Fast Green FCF	DcGf-12	Lillie modification of Masson's for cells, cytoplasm, muscle, and collagen; Guard method for sex chromatin.	5g
15670	0-5°C	Fluorescein Isothiocyanate		Culing's Method for fluorescent antibody staining for demonstration of specific antigens.	½g

STAINING CHEMICALS AND PREPARED SOLUTIONS

► Certified Dyes/Stains (continued)

15942	RT	Giemsa	(Dry Powder) DcGe-19	Thin film stain for differentiation of types of leucocytes; Rickettsiae, bacteria, & inclusion bodies. May-Grunwald/Giemsa for bone marrow stain. Pinkus' acid orcein-giemsa for connective tissue staining.	10g
15940	RT	Giemsa	(solution) DcGe-19	Same as above; Prepared ready-to-use.	100ml
16620	RT	Hematoxylin	DcH-48	Weigert's iron hematoxylin for nuclear stains. Gill's hematoxylin for nuclei & nuclear chromatin	10g
16910	RT	Indigo Carmine	DcI-7	A stain for Negri bodies; used with acid fuchsin. Used in picric acid in contrast to basic fuchsin. In plant cytology.	25g
17920	RT	Light Green SF, Yellowish	DcL-30	Grocott's method for fungi. Dahl's method as a bone and calcium stain. McManus' method for glycogen. Fraser-Lendrum method as a connective tissue stain.	10g
18700	RT	Methyl Green	DcG-10	Myeloperoxidase stain; Used with bismarck brown for mucin & calcifomrcells of intestine, cartilage of trachea, and embryonic tissue; Used with toluidine blue for differentiating between diphtheria & other bacteria.	25g
18600	RT	Methylene Blue	DcA-24	For use in acid-fast bacteria, acid-fast baccilli, and as a rickettsia stain. Cain's method for mitochondria. For staining Negri bodies in nerve cells.	25g
18850	RT	Methyl Violet 2B	DcMv-5	Highman's method for amyloid and nuclei staining. Used with crystal violet & bismarck brown Y for staining metachromatic granules of diphtheria organisms.	25g
19010	RT	Nigrosin, W.S.		For staining the central nervous system. For the negative staining of bacteria; used in place of India ink.	25g
19020	RT	Nile Blue A		A fat and lipid stain; differentiation of melamines and lipofuchsin. Staining for phospholipids.	10g
19056	RT	Oil Red O	DcRo-3	Used as a pigment stain.	10g
19060	RT	Orange II		Kalter's method used with fast green FCF, safranin O, and crystal violet for quadruple staining of tissues. Orange G substitution for better contrast.	25g
19070	RT	Orange G	DcO-13	For staining fibrin, keratin, collagen, and erythrocytes. Staining alpha, beta, and gamma cells. For staining nissl substances and PAS-positive material.	25g
19350	RT	Phloxine B	DcPh-6	For staining inclusion bodies and nuclei. Thomas's method for malarial parasites. For staining hemaglobin and hemosiderin. For staining keratin, prekeratin and mucin. A beta cell stain. Counterstain for hematoxylin.	25g
19560	RT	Pyronin Y	DcPy-2	Cudder's method combined Gram/Pappenheim stain for gonorrheal pus. Kurnick's method used with methyl green which stains liver cells. For staining protein in the diazosulfanilic acid technique; a substitute for azur A. Can be used for pyronin B.	5g
20800	RT	Safranin O	DcS-25	Prussian Blue method for hemosiderin. Weigert's iron hematoxylin with methachromic dyes which stain nuclei and granules. A alkaline phosphate stain. Flemming's method for staining chromatin and nuclear elements.	25g
21610	RT	Sudan Black B	DcZb-2	A stain for fat in animal tissue. A stain for chromosomes, golgi, and 25g leucocyte granules.	
22050	RT	Toluidine Blue O	DcU-10	Alizarin red/Toluidine blue for distinction between bone & cartilage and the degree of ossification in mammalian embryos. Johnson's method for methachromatic tissue. With cresyl violet for staining DNA & RNA. With thionin for malignant cells of biopsy specimens.	50g
22720	RT	Wright Stain	DcWr-38	For differentiation of blood corpuscles. Used with brilliant cresyl blue for staining platelets and reticulum of immature red cells. For staining blood and bone marrow films.	25g

For further description of the above stains/dyes or for more stains/dyes, see pages 468-471 alphabetically listed.

STAINING CHEMICALS AND PREPARED SOLUTIONS

► Certified Dyes/Stains (continued)

► Acid Fuchsin, Certified, C.N. #DcR-8

(Rubin S, Fuchsin S, Fuchsin Acid, Acid Magenta, Acid Violet 19)
 $C_{20}H_{17}N_3Na_2O_6S_3$ F.W. 585.54 CAS #3244-88-0
 Solubility: 0.053% Water; 1.21% Alcohol

RT **10035** 25 g

► Acridine Orange, Certified C.N. #46005

(Basic Orange 14)
 $C_{17}H_{19}N_3HCl \cdot ZnCl_2$ F.W. 369.94 CAS #10127-02-3
 Ultrastructural probes on DNA templates within human bone marrow and lymph node cells. Frenstar, J., Adv. Cell Mol. Biol., 3, 1(1974) Used to detect changes in DNA template activity within cells. Frenster, J. Cell Nucl., 1, 565 (1974) Fluorescent dye for cytochemistry. J. Histochem. Cytochem., 31, 737 (1983) J. Lab. Med., 15 (3),180, (1984)

RT **10050** 25g

► Alcian Blue 8GX, Certified, C.N. #AnAn-6

(Ingrain Blue I)
 $C_{56}H_{68}N_{16}S_4Cu$ F.W. 1298.88 CAS #12040-44-7
 Solubility: Water-soluble
 Dye Content: Approx. 50%
 Used as a fixative: 0.5-2% Alcian Blue in Glutaraldehyde fixative enhances the preservation and contrast of the cell coat and intercellular substances. Used as a stain: For staining cell surface materials and cartilage components.
 Schofield, et al., Histochem J. 7, 139,1975
 Used as a wetting agent: Sommer, J. R (1977). To cationize glass. J.Cell Bio. 75, 245a. Alcian Blue and Ruthenium Red were used to study cartilage ultrastructure. Thyberg, J., Lohmander, S., and Friberg, U., J. Ultrastruct. Res., 45, 407 (1973).

RT **10350** 25g

► Alizarin Red S, Certified, C.N. #DcAr-5

(Alizarin Carmine, Mordant Red 3)
 $C_{14}H_7O_7SNa \cdot H_2O$ F.W. 360.28 CAS #130-22-3
 Solubility: 7.69% Water; 0.1% Alcohol.
 Certified for Staining Bone. Stain for nervous tissue in small invertebrates, and for sections of nervous tissue. Lee, "The Microtometist's Vade-Mecum", 10th Ed., The Blakiston Co., Phila., 1937; Dawson, Stain Tech., 1, 123 (1926); Lundvall, Anat. Anz., 27, 521 (1905); 137. Used to differentiate bone from cartilage in mammalian embryos; used with Toluidine Blue. William, Stain Tech., 16, 23 (1941)

RT **10360** 25g

► Aniline Blue Disodium Salt, Water Soluble, Certified, CN. #DcK-11

$C_{32}H_{25}N_3O_9S_3Na_2$ F.W. 737.74 CAS #28631-66-5
 (Acid Blue 22; China Blue; Cotton Blue; Marine Blue V; Soluble Blue 3M, 2R; Water Blue)
 Solubility: 50% Water; 0.0% Alcohol; 4.5% Cellosolve; 7.8% Glycol; 0.0% Xylene.Used in connective tissue staining procedures to stain collagen. Used in differential staining. Snodgress et al., Lab Invest. 26:329, 1972.

RT **10840** 25g

► Auramine O, Certified, C.N. #DcAu-4

(Pyocyaninum aureum; Basic Yellow 2; Pyoktanin Yellow; Canary Yellow)
 $C_{17}H_{21}N_3HCl \cdot H_2O$ F.W. 321.86 CAS # 2465-27-2
 Solubility: 1.0% Water; 4.0% Alcohol; 1.2% Cellosolve; 1.75% Glycol; 0.05% Xylene

RT **10850** 25 g

► Azocarmine G, Certified, C.N. #50085

(Acid red 101; Basalan Carmine GE; Rosinduline)
 $C_{28}H_{17}N_3Na_2O_6S_2$ F.W. 601.57 CAS #25641-18-3
 Solubility: 1.0% Water; 0.1% Alcohol; 1.75% Cellosolve; 4.5% Glycol; 0.01% Xylene

RT **11150** 5 g

► Azur A, Certified, C.N. #52005

(Methylene Azur A)
 $C_{14}H_{14}ClN_3S$ F.W. 291.80 CAS #531-53-3
 Solubility: Water-soluble; Alcohol-soluble
 Used in nuclear staining; A polychromatic blood stain.

RT **11240** 10G

► Azur B, Certified, C.N. #52010

(Azur I; Methylene Azur B)
 $C_{15}H_{16}N_3S$ F.W. 305.83 CAS #531-55-5
 Solubility: Water-soluble; Alcohol-slightly soluble. An important component of Giemsa's stain for blood protozoa. Used for staining semi-thin sections of plant tissue. Hoefert, L.L. (1968). Polychromatic stains for thin sections of Beta embedded in epoxy resin.

Stain Tech. 43:145

RT **11200** 10g

► Azur II, C.N. #52010/52015

(Azur B/Methylene Blue 1:1) CAS #37247-10-2

RT **11210** 10g

► Azur II Eosin, C.N. #52010/52015/45380

(Azur B/Methylene Blue/Eosin 1:1:1) CAS #53092-85-6

RT **11220** 10g

► Basic Fuchsin, Certified, C.N. #DcFb-26

(Rasaniline Hydrochloride; Basic Violet 14, Dye Content: ~88% min.)
 $C_{20}H_{19}N_3 \cdot HCl$ F.W. 337.86 CAS #632-99-5
 Berkowitz et al., (1968). Selective staining of nervous tissue for light microscopy following preparation for electron microscopy. J. Histochem. Cytochem. 16:808.Sato, T., and Shamoto, M (1973). A simple rapid polychrome stain for epoxy-embedded tissue. Stain Technol. 48:223.

RT **11260** 25g

► Basic Green 4, Certified, C.N. #DcMg-11

(Malachite Green Oxalate; Diamond Green B; BX or P Extra; Light Green N, Solid Green O; Victoria Green B or WB; Dye Content ~90%, (oxalate form)
 $2(C_{23}H_{25}N_2) \cdot 2(C_2H_2O_4) \cdot C_2O_4$ F.W. 927.03 CAS #2437-29-8
 Solubility: 10.0% Water; 8.5% Alcohol; 5.5% Cellosolve; 7.0% Glycol; 0.0% Xylene.
 Used as a bacteria stain and a counterstain for botanical material.

RT **18100** 25g

STAINING CHEMICALS AND PREPARED SOLUTIONS

▶ Certified Dyes/Stains (continued)

▶ Biebrich Scarlet, Water Soluble, Certified, C.N. #26905

(Bonceau BS; Acid Red 66; Croceine Scarlet; Double Scarlet BSF)
 $C_{22}H_{14}N_4Na_2O_7S_2$ F.W. 556.49 CAS #4196-99-0
 Solubility: 5.0% Water; 0.25% Alcohol; 1.5% Cellosolve; 1.5% Glycerol; 0.0% Xylene

RT 11265 25 g

▶ Bismarck Brown Y, Certified, C.N. #21000

(Basic Brown 1; Basic Brown G, GX, GXP; Vesuvine; Leather Brown; Manchester Brown; Phenylene Brown)
 $C_{18}H_{18}N_8 \cdot 2HCl$ F.W. 419.32 CAS #10114-58-6
 Solubility: 1.5% Water; 3.0% Alcohol; 3.0% Cellosolve; 7.9% Glycerol; 0.05% Xylene

RT 11310 25 g

▶ Brilliant Cresyl Blue, Certified, C.N. #DcV-5

(Brilliant Blue C; Cresyl Blue 2RN)
 $C_{17}H_{21}N_4OCl$ F.W. 332.84 CAS #10127-36-3
 Solubility: 3.0% Water; 2.6% Alcohol; 2.25% Cellosolve; 8.0% Glycerol; 9.5% Xylene

RT 11465 10g

▶ Bromophenol Blue, Reagent, A.C.S.

(3',3'',5'-Tetrabromophenol-sulfonphthalein)
 $C_{19}H_{10}O_5SBr_4$ F.W. 669.97 CAS #115-39-9

RT 11470 5g

RT 11471 25g

▶ Carmine, Certified, C.N. #DcCa-16

Alum Lake of Carminic acid
 (Natural Red 4) CAS # 1390-65-4
 Solubility: 0.0% Water; 0.2% Alcohol; 0.5% Cellosolve; 4.0% Glycerol; 0.0% Xylene.

RT 12410 10g

▶ Cresyl Fast Violet, Certified, C.N. # DcW-5

(Cresyl Violet Acetate)
 $C_{18}H_{15}N_3O_3$ F.W. 321.33 CAS # 10510-54-0
 Solubility: 0.13% water Dye Contents ~ 75%
 Certified Stain. To differentiate DNA and Nissl bodies in spinal cord and brain tissues.
 For staining Nissl substances in nerve cells and for bulk staining of nerve tissue. Stain Technol., 30, 83 (1955)
 Stain for fresh tumor tissue for biopsy. J. Lab. Clin. Med., 8, 250 (1923). Biological Stains 9th Ed., 601 (1987)

RT 12780 5 g

▶ Crystal Violet, Certified, C.N. #DcC-38

(Basic Violet 3; Gentian Violet; Methyl Violet 10B; Hexamethyl Violet)
 $C_{25}H_{30}N_3Cl$ F.W. 407.99 CAS #548-62-9
 Solubility: 9.0% Water; 8.75% Alcohol; 7.5% Cellosolve; 7.0% Glycerol; 0.0% Xylene
 Dye Contents ~88% min.

Certified Stain. For differentiating between gram-negative and gram-positive bacteria. Using Safranin O as a counterstain.
 Certified for staining chromatin and nucleoli in plant tissue.

Biological Stains, 9th Ed. 586 (1977)

RT 12785 25 g

▶ Eosin Y, Certified, C.N. #DcE-40

(Acid Red 87, Eosin Yellowish)
 $C_{20}H_6Br_4Na_2O_5$ F.W. 691.88 CAS #17372-87-1

Solubility: 44.0% Water; 2.0% Alcohol; 25.0% Cellosolve; 27.5% Glycerol; 0.0% Xylene.

Used with Hematoxylin for showing cell nuclei in embryos and kidneys.
 Conn, "Biological Stain" 9th ed., The Williams and Wilkins Co., Baltimore 1977, pg. 7.

Component of Wright's stain for blood corpuscles.

Wright, J. Med. Res., 7, 138 (1902)

For staining bone marrow to show cell morphology. Bech, "Lab. Manual of Hematological Tech.", W. B. Saunders Co., Phila., 1908, p. 233

RT 14850 10g

RT 14851 25g

▶ Erythrosin B, Certified, C.N. #DcEr-5

(Acid Red 51, Erythrosin extra Bluish; Eosin J; Iodeosin B; Pyrosin B)
 $C_{20}H_6O_5I_4Na_2$ F.W. 879.87 CAS #16423-68-0
 Solubility: 10.0% Water; 5.0% Alcohol; 7.0% Cellosolve; 8.25% Glycerol; 0.0% Xylene.

RT 15100 10 g

▶ Fast Green FCF, Certified, C.N. #DcGf-12

(Food Green 3)
 $C_{37}H_{34}O_{10}N_2S_3Na_2$ F.W.808.86 CAS #2353-45-9
 Solubility:4.0% Water; 9.0% Alcohol; 8.0% Cellosolve; 6.25% Glycerol; 0.0% Xylene

The main advantage of this dye is its resistance to fading. Mammalian tissue stain for visualizing collagen, muscle, cytoplasm, cells and cornified epithelium. Kornhauser, Stain Tech., 18,95 (1943); 20, 23 (1945); Lillie, Arch. Path., 29, 705 (1940). Modified Feulgen stain for visualizing chromosomes in root tips and other meristematic tissue. DeTomas, Stain Tech., 11, 137 (1936). Used in plant histology. O. Conn, "Biological Stains" 9th ed., Williams & Wilkins Co., Baltimore, 1977, pp. 252-3; Haynes, Stain Tech., 3, 40 (1928).

RT 15500 5g

STAINING CHEMICALS AND PREPARED SOLUTIONS

➤ Certified Dyes/Stains (continued)

➤ Giemsa Solution, C.N. #DcGe-19

Ingredients:

Glycerin (cas# 56-81-5):	.....61%
Methyl Alcohol (cas# 67-56-1):	.....38.3%
Azur II (cas# 37247-10-2):	.....0.16%
Azur II Eosin (cas# 53092-85-6):	.....0.6%

Specific Gravity: 0.89

Differentiates types of leucocytes, bacteria and inclusion bodies. Giemsa, Centralbl. F. Publ., Abt. 1,37, 308 (1904) Stain for thick blood films; shows malarial parasites. Barber and Komp, Publ. Health Rep., 44, 2330 (1929) Bone marrow and stain for showing cell morphology; together with May-Grunwald Solution for pap staining. Pappenheim, Folia Haemat., 13, 338 (1912)

RT 15940	Giemsa Stain Solution	100ml
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➤ Giemsa Stain, Certified, Powder C.N. #DcGe-19

CAS #51811-82-6

RT 15942		10 g
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➤ Hematoxylin, Certified, C.N. #DcH-48

*(Natural Black I, Hydroxybrasilin)*C₁₆H₁₄O₆ F.W. 302.29 CAS #517-28-2

Solubility: 10.0% Water; 10.0% Alcohol; 9.5% Cellosolve; 10% Glycol; 0.0% Xylene. A certified biological stain used in histology and cytology and plastic embedded tissues.

Chen, Chang, S., J Arch. of Path., 93,334 (1972).

RT 16620		10g
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➤ Indigo Carmine, Certified, C.N. #Dcl-7

*(Acid Blue 74; Carmine Blue; Indigotine 1, 1A)*C₁₆H₈N₂O₈S₂Na₂ F.W.466.36 CAS #860-22-0

Dye content: approx. 85%

Solubility: 1.3% Water; 0.0% Alcohol; 4.0% Cellosolve; 2.85% Glycol; 0.0% Xylene

Shunway's stain for animal embryos. Used with Acid Fuchsin for staining Negri bodies. Stain Tech., 5, 34 (1928)

Counterstain to Hematoxylin for staining vaginal smears. Am. J. Anat., 61, 505 (1937).

RT 16910		25g
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➤ Indium Trichloride, Anhydrous

InCl₃ F.W. 221.18 CAS #10025-82-8

Chloride Content: 98%

A metal stain for nucleic acid.

J. Biophys Biochem Cytol, 11,257 (1961)

RT 16920		5g
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➤ Light Green SF Yellowish, Certified, C.N. #Dcl-30

*(Acid Green 5; Light Green 2G, S or 2GN; Acid Green F; Fast Acid Green N)*C₂₇H₃₄N₂Na₂O₉S₃ F.W. 792.86 CAS #5141-20-8

Solubility: 20.35% Water; 4.0% Alcohol; 5.25% Cellosolve; 12.0% Glycol; 0.0% Xylene

RT 17920		10 g
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➤ Malachite Green 4, Certified

Basic Green Oxalate

RT 18100		25g
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➤ Methylene Blue Chloride, Certified, C.N. #DcA-24

*(Basic Blue 9; Swiss Blue)*C₁₆H₁₈N₃SCl•3H₂O F.W. 373.86 CAS #7220-79-3

Solubility: 9.5% Water; 6.0% Alcohol; 6.5% Cellosolve; 10.0% Glycol; 0.0% Xylene.

■ Used to distinguish autonomic nerves. Richardson, K.C., (1969) Anat. Rec., 164, 231. General stain for animals, histology.

■ A simple rapid staining procedure for methacrylate embedded tissue sections using chromotrope 2R and Methylene Blue. Dougherty, M.M., and King, J.S., (1984) Stain Tech., 59, 149

■ An established routine method for differential staining of epoxy-embedded tissue sections. Schroeder, H.E., Rossinsky, K., and Muller, W., (1980) Microsc. Acta 83, 111

■ Used with Basic Fuchsin for stain epoxy-embedded tissue. Sato, T. and Shamoto, M. (1973). A simple rapid polychrome stain for epoxy-embedded tissue. Stain Technol., 48:223

RT 18600		25g
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➤ Methyl Green, Certified, C.N. #DcG-10

*(Zinc Chloride Salt; Ethyl Green)*C₂₇H₃₅N₃Cl₂•ZnCl₂ F.W. 608.79 CAS #7114-03-6

Solubility: 8.0% water; 3.0% Alcohol; 1.8% Cellosolve; 3.5% Glycol; 0.0% Xylene.

■ Used as a counterstain in Almann's aniline acid fuchsin technique for mitochondria; used in Kurnick's Methyl Green-Pyronin stain for nuclei and cytoplasmic granules of liver cells. Marker for DNA at acid and neutral conditions. J.B. Boyd, H.R. Mitchell, (1965) Anal. Biochem., 13, 28.

■ Used for epoxy-embedded thick sections. Sievers, J. (1971). Basic two-dye stains for epoxy-embedded 0.3-1 micron sections. Stain Technol., 46:195

RT 18700		25g
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➤ Methyl Violet 2B, Certified, C.N. #DcMv-5

*(Basic Violet 1; Dahlia B; Gentian Violet; Paris Violet;**Pyoktanium Coeruleum)*C₂₄H₂₈N₃Cl F.W. 393.96 CAS #8004-87-3

Solubility: 9.0% Water; 8.25% Alcohol; 9.0% Cellosolve; 8.5% Glycol; 0.01% Xylene; Dye content: 75% min.

Used with Methyl Green to stain Epoxy-embedded sections.

RT 18850		25g
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➤ Nigrosine, Certified, C.I. #50420, Water Soluble

(Acid Black 2; Gray R, B, BB; Indulin Black; Nigrosin W, WL; Silver Gray; Steel Gray)

CAS #8005-03-06

Solubility: 10.0% Water; 0.0% Alcohol; 1.0% Cellosolve; 11.0% Glycol; 0.0% Xylene

For negative staining of bacteria. With Basic Fuchsin, staining bacteria spores. Dorner, Le Lait, 6, 8 (1926).

Biochem. Biophys. Acta 69,159 (1963).

RT 19010		25g
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STAINING CHEMICALS AND PREPARED SOLUTIONS

► Certified Dyes/Stains (continued)

► Nile Blue A, Certified, C.I. #51180

(Basic Blue 12, Nile Blue Sulfate)

 $(C_{20}H_{20}N_3O)_2SO_4$ F.W. 732.84 CAS #3625-57-8

Solubility: 6.0% Water; 5.0% Alcohol; 5.0% Cellosolve; 5.0% Glycol; 0.25% Xylene. Dye content: approx. 65%

Differentiates melamins and lipofuscins; Used in fat staining.

Lillie, Stain Tech., 31,151 (1956); J. Histochem., 4,377;

Z. Anal. Chem. 260, 290 (1972).

For staining bone sections. Cytologia, 11, 261 (1940)

RT 19020 10g

► Oil Red O, Certified, C.N. #DcRo-3

(Solvent Red 27, Sudan Red 5B)

 $C_{26}H_{24}N_4O$ F.W. 408.49 CAS [1320-06-5]

Oil Red O is lysochrome (fat soluble dye) used demonstrate fat or lipids in fresh tissue sections. The polyoazo group of dyes include the Oil Red, Sudan Red and the Sudan Blacks – all these dyes are interchangeable.

RT 19056 10g

► Orange II, Certified, C.I. #15510

(Acid Orange 7; Acid Orange II, Y or A; Gold Orange; Mandarin G; Orange A, P or R; Orange Extra; Tropaeolin 000 No.2)

 $C_{16}H_{11}N_2O_4SNa$ F.W. 350.33 CAS #633-96-5

Solubility: 3.0% Water; 0.15% Alcohol; 2.5% Cellosolve; 8.0% Glycol; 0.0% Xylene; Dye Content: approx. 75%

A general tissue stain with Eosin and Azur-C. French, Stain Tech., 1, 79 (1926). Counterstain for Heidenhain's Hematoxylin in animal histology.

A substitute for Orange G if a stronger yellow is desired for contrast. J.

Lab. Med., 28, 995 (1943)

RT 19060 25g

► Orange G, Certified, C.N. #DcO-13

(Acid Orange 10, Wood Orange 2G)

 $C_{16}H_{10}N_2O_5S_2Na_2$ F.W. 452.38 CAS #1936-15-8

Solubility: 8.0% Water; 0.22% Alcohol; 1.7% Cellosolve; 3.0% Glycol; 0.0% Xylene; Dye Content: approx. 60%

Kornhauser's Quad stain for most elementary structures of tissues. Stain Tech., 18, 985 (1943) Mallory's tissue stain for connective tissue.

Mallory, J. Exper. Med., 5,15 (1900). Used with safranin and tannic acid for showing shoot apex in plant tissue. Stain Tech., 18, 105 (1943).

RT 19070 25g

► Phenol Red

(Phenolsulfonphthalein)

 $C_{19}H_{14}O_5S$ F.W. 354.38 CAS #143-74-8

A standard indicator for preparing buffers, pH range 6.4-8.2.

RT 19327 5g

► Phenol Red Sodium Salt

(Phenolsulfonphthalein Sodium Salt)

 $C_{19}H_{13}NaO_5S$ F.W. 376.37 CAS #34487-61-1

A standard indicator for preparing buffers, pH range 6.8-8.2.

RT 19328 5g

► Phloxine B, Certified, C.N. #DcPh-6

(Acid Red 92; Cyanosine; Eosin 10B; Phloxine TA, N, BP Super, RB, TB, or BB)

 $C_{20}H_2O_5Cl_4Br_4Na_2$ F.W. 829.66 CAS #18472-87-2

Solubility: 10.5% Water; 5.0% Alcohol; 9.0% Cellosolve; 4.5% Glycol; 0.0% Xylene

RT 19350 25 g

► Pyronin Y, Certified, C.N. #DcPy-2

(Pyronin G) $C_{17}H_{19}N_2OCl$ F.W. 302.81 CAS #92-32-0

Solubility: 9.0% Water; 0.5% Alcohol; 1.85% Cellosolve; 4.35% Glycol; 0.0% Xylene

RT 19560 5g

► Safranin O, Certified, C.N. #DcS-25

(Safranin T, Y or A; Basis Red 2; Cotton Red; Gossypimine)

 $C_{20}H_{19}N_4Cl$ F.W. 350.85 CAS #477-73-6

Solubility: 4.5% Water; 3.5% Alcohol; 5.0% Cellosolve; 3.5% Glycol; 0.0% Xylene

RT 20800 25g

► Sudan Black B, Certified, C.N. #DcZb-2

(Solvent Black 3) $C_{20}H_{24}N_6$ M.W. 456.56 CAS #4197-25-5

Solubility: Water-insoluble; Alcohol-soluble; 4.0% Cellosolve; 1.0% Glycol.

RT 21610 25g

► Toluidine Blue O, Certified, C.N. #DcU-10

(Basic blue; Methylene Blue T50 or T Extra)

 $C_{15}H_{16}N_3SCI$ FW 305.83 CAS #92-31-9

Dye Content: approx. 85% min.

Solubility: 3.25% Water; 1.75% Alcohol; 3.5% Cellosolve; 5.5% Glycol; 0.0% Xylene

■ A general stain for epoxy thick sections. Barajas et al.(1981)

Identification of renal neuroeffector junctions by electron microscopy of reembedded light microscopic autoradiograms of semithin sections. J. Ultrastruct. Res. 77: 379.Campbell, R.D., And Hermans, C.O.

(1972). A rapid method for resectioning 0.5 - 4.0 micron epoxy sections for electron microscopy. Stain Technol. 47:115.

RT 22050 50g

► Wright's Stain, Certified, C.N. #DcWr-38

CAS #68988-92-1

Solubility: 0.091% Water; 0.23% Alcohol

RT 22720 25g

STAINING CHEMICALS AND PREPARED SOLUTIONS

► Staining Solutions

We now offer a complete line of prepared, ready-to-use, high quality staining solutions for all standard staining procedures used by the Biological Staining Commission and the Armed Forces Institute of Pathology.

- All solutions and concentrations are packaged and prepared in convenient and precise quantities.
- Premixed ready-to-use; saves you time and effort.
- Consistently uniform results are obtained.

For a partial list of all of our stains, please see chart on pages 466-467, and for descriptions of the stains, see pages 468-471.

► Acid Fuchsin Aqueous Solutions

RT	26020-02	Acid Fuchsin, 0.2% Aqueous	500 ml
RT	26020-05	Acid Fuchsin, 0.5% Aqueous	500 ml
RT	26020-10	Acid Fuchsin, 1.0% Aqueous	500 ml
RT	26020-11	Acid Fuchsin, 1.0% in 1% Acetic Acid	500 ml

► Acridine Orange Aqueous Solution

RT	26024-01	Acridine Orange 0.1% Aqueous	500 ml
RT	26024-02	Acridine Orange 0.2% Aqueous	500 ml

► Alcian Blue Solutions

RT	26026-13	Alcian Blue, 1% in 3% Acetic Acid, pH 2.5	250 ml
RT	26026-11	Alcian Blue, 1% in 1% Acetic Acid	250 ml
RT	26026-01	Alcian Blue, 1% Aqueous	250 ml

► Alcoholic Stain Solutions

RT	26090-05	Alcoholic Congo Red, 0.2% Solution	500 ml
RT	26091-01	Alcoholic Hematoxylin, 1% in 95% Alcohol	500 ml
RT	26091-10	Alcoholic Hematoxylin, 10% in 95% Alcohol	500 ml
RT	26092-05	Alcoholic Iodine, 0.5% in 95% Alcohol	500 ml
RT	26092-06	Alcoholic Iodine, 0.5% in 85% Alcohol	500 ml
RT	26092-20	Alcoholic Iodine, 2% in 85% Alcohol	500 ml
RT	26093-60	Alcoholic Saffron, 6%	100 ml
RT	26094-05	Alcoholic Thionin, 0.5% in 20% Alcohol	500 ml
RT	26096	Aldehyde Fuchsin Solution	250 ml
RT	26097	Alum Hematoxylin Solution	500 ml

► Alum Celestine Blue
(Iron Alum – Celestine Blue)

Lendrum & McFarlane, (1940). J. of Pathology & Bacteriology, v. 50, pp 381
A stain solution for nuclei. A substitute for Hematoxylin/Eosin.

RT	26023-02	Alum Celestine Solution	250 ml
RT	26023-05	Alum Celestine Solution	500 ml

► Alum Hematoxylin Solution

For staining nuclei

RT	26097	Alum Hematoxylin Solution	500 ml
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► Aniline Blue Solution

RT	26027-10	Aniline Blue, 2.5% in 2% Acetic Acid	500 ml
RT	26027-20	Aniline Blue-Phosphomolybdic Acid Solution	500 ml
RT	26027-30	Aniline Blue-Orange G Solution	500 ml

► Basic Fuchsin Solution

RT	26031-02	Basic Fuchsin, 0.25% Aqueous	500 ml
RT	26031-05	Basic Fuchsin, 0.5% Aqueous	500 ml
RT	26031-10	Basic Fuchsin, 0.1% in 95% Methanol	500 ml
RT	26031-20	Basic Fuchsin Working Solution	500 ml

► Best's Carmine Stock Solution

Stain is used for selectively staining glycogen. (Keep Refrigerated)

RT	26025-02	Best's Carmine Stain Solution	250 ml
RT	26025-05	Best's Carmine Stain Solution	500 ml

► Biebrich Scarlet Solution

RT	26033-02	Biebrich Scarlet, 0.2% in 1% Acetic Acid	500 ml
RT	26033-10	Biebrich Scarlet, 1% in 1% Acetic Acid	500 ml
RT	26033-20	Biebrich Scarlet, 1% Aqueous	500 ml
RT	26033-25	Biebrich Scarlet – Acid Fuchsin	500 ml

► Congo Red Solution

RT	26090-05	Alcoholic Congo Red, 0.2% Solution	500 ml
RT	26090-20	Congo Red, 0.5% Aqueous	500 ml
RT	26090-25	Congo Red, 1% Aqueous	500 ml

► Cresyl Violet Acetate Solution

RT	26089-01	Cresyl Violet Acetate, 0.1% Aqueous	500 ml
RT	26089-20	Cresyl Violet Acetate, 2% Aqueous	250 ml

► Crystal Violet Solution

RT	26088-10	Crystal Violet, 1% Aqueous	500 ml
RT	26088-15	Crystal Violet, Hucker's Solution	500 ml
RT	26088-16	Crystal Violet, Lieb's Stock Solution	250 ml
RT	26088-17	Crystal Violet, Lilies Solution	250 ml
RT	26088-18	Crystal Violet, Stirling's Solution	250 ml

► EA Counterstain, Gill's Modified Solution

For use with Papanicolaou stain; a general tissue stain. Ready-to-use.

RT	26050-05	EA Counterstain, Gill's Modified	500 ml
RT	26050-06	EA Counterstain, Gill's Modified	1 L

► Ehrlich's Hematoxylin

Stain selectivity for nuclei. Ready-to-use.

RT	26040-05	Ehrlich's Hematoxylin	500 ml
RT	26040-06	Ehrlich's Hematoxylin	1 L

► Eosin Y Solution

RT	26051-01	Eosin Y, 0.1% Aqueous	500 ml
RT	26051-10	Eosin Y, 1% Aqueous	500 ml
RT	26051-11	Eosin Y, 1% Alcoholic	500 ml
RT	26051-20	Eosin Y – Eosin B Solution	500 ml
RT	26051-21	Eosin Y – Phloxine B Solution	500 ml

► Fast Frozen Stain Kit

See page 475 >>>>

► Fast Green FCF Solution

RT	26053-02	Fast Green FCF, 0.2% Aqueous	500 ml
RT	26053-05	Fast Green FCF, 0.5% Aqueous	500 ml
RT	26053-25	Fast Green FCF, 2.5% in 2% Acetic Acid	500 ml

STAINING CHEMICALS AND PREPARED SOLUTIONS

➤ Staining Solutions (continued)

➤ Fluorophore-Infiltrated Resin Microscopy (FIRM)

Rapid staining technique that provides high-contrast fluorescence microscopy imaging of resin embedded samples, reminiscent of low magnification transmission electron microscopy.

- Works with Epoxy and Acrylic type resins
- Simply mount your sections on glass slides, air dry, and overlay with 100 microliters FIRM for 30 seconds, wash and coverslip with water or an aqueous mountant. View in Rhodamine channel of a standard wide field Fluorescence Microscope.
- FIRM staining is unique in that the brightly fluorescent dye infiltrates the resin, revealing tissue structures in negative relief, with extremely high contrast and resolution.
- Perfect for previewing specimens prior to EM Analysis
- High Throughput, high contrast image phenotyping of model organisms such as drosophila
- Ideal for material and food science analytical microscopy

RT	12780-05	FIRM for Acrylic Resin Sections	10ml
RT	12780-06	FIRM for Epoxy Resin Sections	10ml

➤ Giemsa Solution

Ingredients:

Glycerin (cas# 56-81-5):61%
 Methyl Alcohol (cas# 67-56-1): 38.3%
 Azur II (cas# 37247-10-2) :0.16%
 Azur II Eosin (cas# 53092-85-6):0.6%
 Specific Gravity: 0.89

Differentiates types of leucocytes, bacteria and inclusion bodies.
 Giemsa, Centralbl. F. Publ., Abt. 1,37, 308 (1904) Stain for thick blood films; shows malarial parasites. Barber and Komp, Publ. Health Rep., 44, 2330 (1929) Bone marrow and stain for showing cell morphology; together with May-Grunwald Solution for pap staining. Pappenheim, Folia Haemat., 13, 338 (1912)

RT	15940	Giemsa Stock Solution	100 ml
RT	15941	Giemsa Stock Solution	500 ml

Giemsa for thin and thick film see page 478 >>>>

➤ Differential Quick Staining Kit (Modified Giemsa)

This kit is a Modified Giemsa Stain kit for quick turn around results The kit may be used for rapid blood smears for differential assessment, as well as for the detection of H. Pylori microorganisms. The kit comes complete with a fixative for air dried cell suspensions and or touch preparation slides.

Applications:

Fine Needle Aspirations, Frozen Sections, Blood Smears, Cytological Specimens, Cytopreps, Microorganism Detection, Bone Marrow Biopsies

This stain offers results in 15 seconds.

The Kit comes complete with 3 solutions and is available in 3 sizes.

RT	26096-25	Differential Quick Staining Kit 250 ml
RT	26096-50	Differential Quick Staining Kit 500 ml
RT	260096-75	Differential Quick Staining Kit Gallon

➤ Giemsa Stain, Certified, Powder

CAS #51811-82-6

RT	15942		10 g
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➤ Gill's Hematoxylin Staining Solution

Gill's Hematoxylin is a specially formulated solution for use as a biological stain for the nuclei and nuclear chromatin of normal and abnormal cells whether in whole or sliced cells. Our Gill's Hematoxylin is designed to use at its full strength. It is microfiltered prior to shipment; therefore, filtration before use is not required. For repeated use further filtration is recommended. At the discretion of the user, the Gill's Hematoxylin No. 2 and No. 3 may be diluted with ethylene glycol (25% is recommended) to produce a weaker stain solution.

RT	26030-10	Gill's Hematoxylin No. 1	1 L
RT	26030-14	Gill's Hematoxylin No. 1	4 L
RT	26030-20	Gill's Hematoxylin No. 2	1 L
RT	26030-24	Gill's Hematoxylin No. 2	4 L
RT	26030-30	Gill's Hematoxylin No. 3	1 L
RT	26030-34	Gill's Hematoxylin No. 3	4 L

➤ Goodpasture's Stain Solution (MacCallum)

RT	26031	Goodpasture's Stain Solution	500 ml
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➤ Gram's Iodine

For use as a bacterial, fungal and inclusion body stain.

RT	26054-05	Gram's Iodine Solution	500 ml
RT	26054-06	Gram's Iodine Solution	1 L

➤ Harris' Hematoxylin

Stain selectivity for nuclei, fat and lipids. Ready-to-use.

RT	26041-05	Harris' Hematoxylin	500 ml
RT	26041-06	Harris' Hematoxylin	1 L
RT	26041-20	Harris Hematoxylin without Mercury	500 ml

➤ Hematoxylin Solution

RT	26042-1	Hematoxylin, 1% Aqueous	500 ml
RT	26042-5	Hematoxylin, 5% in SD Alcohol	500 ml
RT	26042-10	Hematoxylin in 95% Alcohol	500 ml
RT	26042-20	Heidenhain's Hematoxylin	500 ml

➤ ImmunoSaver Antigen Retriever

ImmunoSaver allows for Immunostaining with quick and easy activation of cell membranes and the nucleus. ImmunoSaver provides efficient antigen retrieval for successful immunostaining of a wide variety of antigens under optimized conditions. Protocols for both Light and Electron Microscopy may be found with this reagent.

RT	64142	ImmunoSaver	100 ml
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➤ Jenner Stain Solution

RT	26033-05	Jenner Stain Solution	500 ml
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➤ Kinyoun's Solution

Kinyoun's carbol fuchsin staining solution for acid-fast bacteria.

RT	26087-05	Kinyoun's Solution	500 ml
RT	26087-06	Kinyoun's Solution	1 L

➤ Leshman's Stain

RT	26086-05	Leishman's Stain	500 ml
RT	26086-50	Leishman's Working Buffer	500 ml

➤ Light Green SF Yellowish Solution

RT	26085-05	Light Green SF Yellowish, 0.2% in 0.2% Acetic Acid	500 ml
RT	26085-06	Light Green SF Yellowish, 0.2% in 0.2% Acetic Acid	1 L
RT	26085-10	Light Green SF Yellowish, 1% Aqueous	500 ml

STAINING CHEMICALS AND PREPARED SOLUTIONS

➤ Staining Solutions (continued)

➤ Lissamine Fast Red Solution

RT	26034-05	Lissamine Fast Red Solution	500 ml
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➤ Lugol's Iodine

For use as a bacterial, fungal and inclusion body stain.

RT	26055-05	Lugol's Iodine Solution	500 ml
RT	26055-06	Lugol's Iodine Solution	1 L

➤ Luxol Fast Blue Solution

RT	26056-10	Luxol Fast Blue, 0.1% in 95% Alcohol w/Acetic Acid	500 ml
RT	26056-15	Luxol Fast Blue, 0.1% in 95% Alcohol	500 ml

➤ MacFarlane's Solution

RT	18035-05	MacFarlane's Stock Solution	500 ml
RT	18036-05	MacFarlane's Working Solution	500 ml

➤ Mayer's Hematoxylin

Stain selectivity for nuclei. Ready-to-use.

RT	26043-05	Mayer's Hematoxylin	500 ml
RT	26043-06	Mayer's Hematoxylin	1 L
RT	26043-10	Mayer's Hematoxylin	4 L

➤ Modified Mayer's Hematoxylin

Stock Solution, Ready to use. Ingredients: Hematoxylin 0.4%, Ammonium Aluminum Sulfate 0.5%, Sodium Iodate: 0.03%, Citric Acid 0.1%, Chloral Hydrate 5%

RT	26043-18	Modified Mayer's Hematoxylin	500ml
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➤ May-Grunwald Staining Solution

A ready-to-use stain for bone marrow staining.

RT	26064-05	May-Grunwald Stain Solution	500 ml
RT	26064-06	May-Grunwald Stain Solution	1 L

➤ Methenamine Solution

A stock solution for use in bacterial and fungal stains (Grocott's Method/GMS).

RT	26083-05	Methenamine, 3% Aqueous Solution	500 ml
RT	26083-06	Methenamine, 3% Aqueous Solution	1 L

➤ Methylene Blue Solution

RT	26075-10	Methylene Blue, 1% Aqueous	500 ml
RT	26075-14	Methylene Blue 1.4% in 95% Alcohol	500 ml
RT	26075-20	Methylene Blue Working Solution	500 ml

➤ Methyl Green - Pyronin, Purified Aqueous Solution

A stain solution is for demonstrate RNA and DNA.

RT	18710-02	Methyl Green-Pyronin Solution	250 ml
RT	18710-05	Methyl Green-Pyronin Solution	500 ml

➤ Miller's Elastic Stain

RT	26076-05	Miller's Elastic Stain	500 ml
RT	26076-10	Miller's Elastic Stain	1 L

➤ Mucicarmine

For use with hematoxylin and metanil yellow for the determination of carbohydrates and mucosubstances.

RT	26080-05	Mucicarmine Stock Solution	500 ml
RT	26080-06	Mucicarmine Stock Solution	1 L

➤ New Methylene Blue Solution

RT	26077-05	New Methylene Blue 0.50% Aqueous	500 ml
RT	26077-20	New Methylene Blue Solution (Reticulocyte Stain)	500 ml

➤ Nuclear Fast Red Solution

RT	26078-05	Nuclear Fast Red Solution	500 ml
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➤ Oil Red O Solution

RT	26079-05	Oil Red O Saturated in Isopropanol	500 ml
RT	26079-15	Oil Red O Saturated in Propylene Glycol	500 ml

➤ Orange G Solution

RT	26066-05	Orange G, 0.5% Aqueous	500 ml
RT	26066-15	Orange G-Phosphotungstic Acid Solution	500 ml

➤ Papanicolaou Stain, OG-6

RT	26048-05	OG-6 Stain Solution	500 ml
RT	26048-06	OG-6 Stain Solution	1 L

➤ Papanicolaou Stain, EA-50 (EA Counterstain)

RT	26049-05	EA-50 Stain Solution	500 ml
RT	26049-06	EA-50 Stain Solution	1 L

➤ Resorcin-Fuchsin Solution

RT	26067-05	Resorcin-Fuchsin Working Solution	500 ml
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➤ Safranin O Solution

RT	26069-05	Safranin O, 0.1% in 0.1% Acetic Acid	500 ml
RT	26069-15	Safranin O, 0.2% in 1% Acetic Acid	500 ml

➤ Toluidine Blue O Solution

RT	26074-05	Toluidine Blue O, 0.1% Aqueous Solution	500 ml
RT	26074-15	Toluidine Blue O, 1% Aqueous Solution	500 ml

➤ Van Gieson's Solution

To use with Weigert's Iodine or Weigert's Iron as a connective tissue stain.

RT	26046-05	Van Gieson's Solution	500 ml
RT	26046-06	Van Gieson's Solution	1 L

➤ Weigert's Iodine Solution

A histological stain. Demonstration of connective tissue is useful in cases of emphysema, arteriosclerosis and other vascular diseases.

RT	26045-05	Weigert's Iodine Solution	500 ml
RT	26045-06	Weigert's Iodine Solution	1 L

➤ Weigert's Iron Hematoxylin

Stain selectivity for nuclei, fungal, and general applications. Ready-to-use.

RT	26044-05	Weigert's Iron Hematoxylin A	500 ml
RT	26044-06	Weigert's Iron Hematoxylin A	1 L
RT	26044-15	Weigert's Iron Hematoxylin B	500 ml
RT	26044-16	Weigert's Iron Hematoxylin B	1 L

➤ Woodstain Scarlet-Acid Fuchsin Solution

RT	26061-05	Woodstain Scarlet-Acid Fuchsin Solution	500 ml
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➤ Wright Staining Solution

For use as a blood stain. Ready-to-use.

RT	26060-05	Wright Stain Solution	500 ml
RT	26060-06	Wright Stain Solution	1 L

STAINING CHEMICALS AND PREPARED SOLUTIONS

➤ Prepared Staining Kits for Histology and Pathology

➤ Fast Frozen Stain Kit

A rapid method to stain frozen tissue for permanent use. This kit includes a unique Fast Frozen Fix that is alcohol based, and will not interfere with immunohistochemical procedures and suitable for Laser Capture Microdissection (LCM). Kit consists of: 100 ml Fast Fix (15280-01), 100 ml Eosin Y 0,5% Solution (15285-02), 100 ml Gill Hematoxylin #3 (15285-03), 100 ml Scott's Bluing Solution (#15285-04) and one 100 ml CitraMount® Medium (#18005)



RT 15285-00 Fast Frozen Stain Kit 100 ml

➤ Neat Stain® Staining Kits

Neat Stain® Kits are specifically designed for stat procedures and/or laboratories using manual staining methods. Neat Stain® is available as a rapid three-step differential hematology stain, Gram stain and Trichrome stain staining kit. They are quite simple to use, just immerse your slides sequentially in each reagent for the correct time, air dry and read.

- Neat – Pre-filled multi-well vessels with self-contained foil sealed
- Fast – Immerse slides sequentially in each reagent for specified time, air dry and read
- Convenient – Additional foils for re-sealing containers.

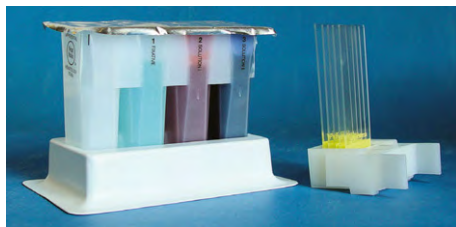
Neat-Stain™ kits are prepared for STAT procedures and /or laboratory using manual staining methods.

➤ Neat Stain® Hematology Stain Kit

This 3-step stain procedure is designed for differentiation of morphological cell types in peripheral blood smears. This kit is also useful in andrology labs staining microorganism and spermatozoa.

Staining characteristics are similar to the Wrights and Wright-Giemsa stains. Neat Stain offers the flexibility of a three dip staining format in both the stain and counter stain solution.

Kit Contains:
6 Reagent Packs,
One Plastic
Stand,
6 Re-seal Foils.
Kit performs
150 tests.



Slide Holder sold separately, Cat. #71411-01.

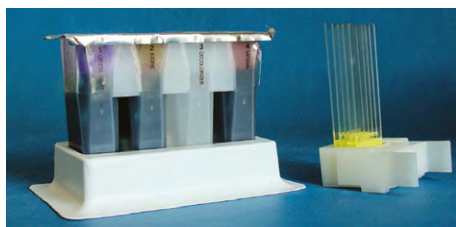
RT 27104-01 Neat Stain Hematology Stain Kit

➤ Neat Stain® GRAM Kit

This 4-step stain kit is prepared for staining bacteria from cultures or specimens by the differential Gram stain method.

This kit stains similar to the traditional Wright's and Wright-Giemsa stains. Neat Stain® offers the flexibility of the three dip staining sequence in both the stain and counter stain solution.

Kit Contains:
6 Reagent Packs,
one Plastic
Stand,
6 Re-seal Foils.
Kit performs
150 tests.



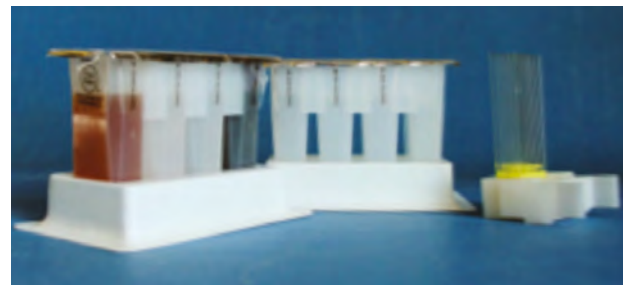
Slide Holder sold separately, Cat. #71411-01

RT 27100-01 Neat Stain® GRAM Stain Kit

➤ Neat Stain™ Trichrome Stain Kit

This seven-step stain procedure is designed for the staining of stool specimens. Based upon the Wheatley Trichrome technique is a rapid staining procedure providing good results for routine examination. Simplified method, use of mordant prior to staining is not necessary.

Staining characteristics are similar to the traditional Wright's and Wright-Giemsa stains.



Kit Contains: 3 Reagent Packs, One Plastic Stand, 6 Re-seal Foils. Kit performs 75 tests.

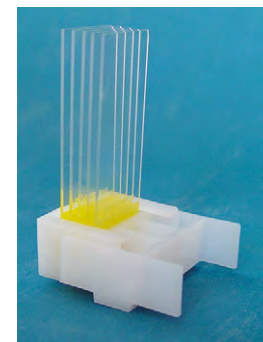
Slide Holder sold separately, Cat. #71411-01.

RT 27106-01 Neat Stain Trichrome Stain Kit

➤ Slide Holder

Molded from polypropylene. Adjustable to hold 2 to 5 3x1" slides, or 10 slides back-to-back firmly. This Slide Holder works well with all Neat Stain Kits above.

71411-01 Slide Holder



STAINING CHEMICALS AND PREPARED SOLUTIONS

➤ Prepared Staining Kits for Histology and Pathology (continued)

A.1 BACTERIAL STAINS

➤ Truant's Fluorescent Method for Acid Fast Organism

For bacterial stain.

Stain results:*Acid Fast:*Fluoresce reddish yellow*Artifacts:*Fluoresce yellow**REFERENCES:**

- Truant, J.P. Henry Ford Hospital Med. Bull., 10:287, 1962.
- AFIP Manual of Histological Staining Methods, 3rd ed. Ed. L. Luna: New York: McGraw Hill Publications. c. 1968. p. 219.
- Clark, G.: Staining Procedures. Williams and Wilkens Co., Baltimore. 3rd edition. c.1973. p. 225

RT	26102-1A	Weigert's Iron Hematoxylin Solution A	500 ml
RT	26102-1B	Weigert's Iron Hematoxylin Solution B	500 ml
RT	26102-02	Auramine-Rhodamine Staining Solution	250 ml
RT	26102-03	Acid Alcohol 1%	500 ml

➤ Brown and Brenn Method for Gram Positive and Gram Negative Bacteria

For bacteria stain: Gram + / Gram - bacteria and filaments of nocardia, etc.

Stain results:*Gram + Bacteria, Nocardia and Actinomyces Filaments:*Blue*Gram - Bacteria, Nuclei:*Red*Additional tissue elements:*Yellow

Note: Also see the Taylor Modification of the Brown and Brenn +/- technique noted for the varying differentiation available. Over-differentiation in the B&B sep 6 is a problem with some sections; run the control slides at varying rates to determine the amount for the specific organism.

REFERENCES:

- Brown J.H. and Brenn, L. Bull. Johns Hopkins Hosp., 48:69 (1931)
- AFIP Manual of Histologic Staining Techniques: 3rd. ed., ed. G. Luna; New York: McGraw-Hill Publications, c. 1968, p. 222

RT	26105-01	Crystal Violet Staining Solution, 1% Aqueous	500 ml
RT	26105-02	Sodium Bicarbonate, 5% Aqueous	500 ml
RT	26105-03	Basic Fuchsin Stock Solution, 0.25%, OR	250 ml
RT	26105-3A	Basic Fuchsin Working Solution	250 ml
RT	26105-04	Gram's Iodine Solution	500 ml
RT	26105-5A	Acetone:Alcohol, 1:1	500 ml
RT	26105-06	Picric Acid-Acetone Solution, 0.1%	500 ml
RT	26105-07	Acetone	1 qt
RT	26105-08	Acetone:Xylene	500 ml

➤ Brown-Hopps Method for Gram Positive and Gram Negative Bacteria

For bacterial stain.

Stain results:*Gram Negative Bacteria:*Red*Gram Positive Bacteria:*Blue*Background:*Yellow**REFERENCES:**

- AFIP Manual of Histologic Staining Methods; ed. G. Luna, McGraw-Hill Publications, 3rd. ed.; New York, c. 1968, p.224
- Brown, R.C. and Hopps, H.C., Geographic Pathology Division Armed Forces Institute of Pathology, Washington, D.C. 20305

RT	26106-01	Crystal Violet Staining Solution, 1% Aqueous	500 ml
RT	26106-02	Gram Iodine Solution	500 ml
RT	26106-03	Basic Fuchsin Staining Solution, 0.5% Aqueous	500 ml
RT	26106-04	Gallego's Differentiating Solution	500 ml
RT	26106-05	Cellosolve	500 ml
RT	26106-06	Tartrazine, 1.5% Aqueous	500 ml

➤ Taylor's Method for Gram Positive and Gram Negative Bacteria

For bacterial stain.

Stain results:*Gram-Positive Organism:*Blue to Blue-Black*Gram Negative Organism:*Bright Red*Nuclei:*Brownish Red*Erythrocytes:*Red to Yellow-Green*Necrotic Tissue:*Yellow-Green*Cytoplasm:*Yellow*Connective Tissue:*Red**REFERENCES:**

- AFIP Manual of Histological Staining Methods, 3rd ed., Ed. L. Luna: New York: McGraw Hill Publications, c. 1968, p.226
- Clark, G.: Staining Procedures, Williams and Wilkins Company, Baltimore, 3rd Ed, c.1973, p.320
- Taylor, R.D., Amer. J. Clin. Path. 46:472 (1966)

RT	26108-01	Harris Hematoxylin	500 ml
RT	26108-02	Crystal Violet, Hucker's	500 ml
RT	26108-03	Basic Fuchsin Stock Sol. 0.1%	500 ml
RT	26108-04	Gram's Iodine Solution	500 ml
RT	26108-05	Lithium Carbonate Solution (Saturated, aqueous)	500 ml
RT	26108-06	Acid Alcohol, 1%	500 ml
RT	26108-07	Acetone : Alcohol, 1:1	500 ml
RT	26108-08	Acetone	500 ml
RT	26108-09	Picric Acid-Acetone Sol., 0.1%	500 ml
RT	26108-10	Acetone-Xylene I	500 ml
RT	26108-11	Acetone-Xylene II	500 ml

➤ Gridley's Method for Endamoeba Histolytica

For bacteria stain: Amoebae, their nuclei and ingested erythrocytes

Stain results:*Erythrocytes (ingested):*Rose*Connective tissue:*Green*Amoebae:*Blue-green*Nuclei (amoebic):*Darker blue-green**REFERENCES:**

- Gridley, M.F.: Am. J. Clin. Pathology, 24:243 (1953)
- Luna, L.G.: Histologic Staining Methods, 3rd ed.: New York: McGraw-Hill Book Co., c.1968, p. 228

RT	26109-01	Harris Hematoxylin, OR	500 ml
RT	26109-1A	Weigert's Iron Hematoxylin Solution A, AND	500 ml
RT	26109-1B	Weigert's Iron Hematoxylin Solution B	500 ml
RT	26109-02	Aniline-Eosin Solution (Poison Pack)	250 ml
RT	26109-03	Naphtol Green B Staining Solution, 1%	250 ml
RT	26109-04	Acid Alcohol, 1% in 75% Alcohol Solution	500 ml
RT	26109-05	Ammonia Water, 0.3%	500 ml

STAINING CHEMICALS AND PREPARED SOLUTIONS

➤ Prepared Staining Kits for Histology and Pathology (continued)

A.1 BACTERIAL STAINS (continued)

➤ Giemsa for Helicobacter Pylori and Mast Cells

For bacterial, fungal stains.

Stain results:

Red Blood Cells:.....Pink
Nuclei:Blue
H-Pylori, fungi & other bacteria:.....Blue
Mast Cells:Purple
Rickettsia:Purple

REFERENCES:

- Helicobacter pylori in peptic ulcer disease, NIH Consensus Statement Online, January 1994, 12(1): 1:23
- Luna 1AFIP 3rd ed. McGraw Hill, 236
- Fail, Rena, AS, HT (ASCP) Medical University of South Carolina, Histologic. Vol. XXXIV, No 2, Nov. 2001, p. 32.

RT	26110-01	Methanol	1 qt
RT	26110-02	Giemsa Stock Solution	100 ml
RT	26110-03	Acetic Acid, 1%	500 ml

➤ May-Grunwald Giemsa for H-Pylori

For bacterial, fungal stain.

Stain results:

H-pylori:.....Blue
Background:.....Light purple

REFERENCES:

- Carson, F. Histotechnology: A Self-Instructional Text. 1980-109.

RT	26114-01	Jenner's Stain Stock Solution	250 ml
RT	26114-02	Giemsa Stock Solution	100 ml
RT	26114-03	Acetic Acid, 0.1% Solution	500 ml

➤ Genta, Robason and Graham Stain for H-pylori & Gastric Morphology

Stain results:

Muscle cells:.....Brownish yellow
Lamina propria ground substance:Light yellowish or grayish
Smooth muscle fibers:.....Light Pink
Cytoplasm of neutrophils:Pale Pink
Eosinophils:.....Intense red
Nucleus:Dark brown
Intestinal metaplasma:.....Bright blue

REFERENCES:

- Genta PM., Robason GO, Graham DY-Simultaneous Visualization of Helicobacter Pylon and Gastric Morphology A New Stain Hum Pathol. 25:22 1-226, 1994.

RT	26116-01	Uranium Nitrate, 1%	500 ml
RT	26116-02	Silver Nitrate, 1% Aqueous	250 ml
0-4C	26116-03	Gum Mastic, 2.5%	250 ml
0-4C	26116-04	Hydroquinone, 2%	250 ml
RT	26116-05	Silver Nitrate, 0.04%	250 ml
RT	26116-06	Alcian Blue, pH 2.5	250 ml
RT	26116-07	Harris Hematoxylin	500 ml
RT	26116-08	Acid Alcohol, 1%	500 ml
RT	26116-09	Ammonia Water, 0.25%	500 ml
RT	26116-10	Eosin Y, 1% Aqueous	500 ml

➤ Modified Steiner – Using Chapman’s Modification

For bacterial stain.

Stain results:

Spirochetes, Donovan Bodies, General Bacteria, Legionnaires Disease Bacteria:.....Dark Brown or Black
Background:.....Bright Yellow to light brown

REFERENCES:

- Margeson L.S. Chapman CM: Use of Zinc Formalin as a sensitizer in Silver Stain for Spirochetes. Journal of Histology 19:2, p 135-138, 6 –96 (1996)

RT	26119-01	Zinc Formalin	500 ml
RT	26119-02	Silver Nitrate, 1% Aqueous	250 ml
0-4C	26119-03	Gum Mastic, 2.5%	500 ml
0-4C	26119-04	Hydroquinone, 2%	500 ml
RT	26119-05	Silver Nitrate, 0.04%, Aqueous	250 ml

A.2 FUNGAL STAINS

➤ GRIDLEY’S METHOD FOR FUNGI

For stain fungal mycelia, conidia, morphological detail of yeast forms and hyphae.

Stain results:

Mycelia, Conidia:Deep Purple
Elastic Tissue & Mucin Background:Yellow

REFERENCES:

- Gridley, M.F.: American J. Clin. Path., 23:303 (1953)
- AFIP Manual of Histologic Staining Techniques: 3rd., Ed. ED. L. Luna, New York: McGraw-Hill Publications, c. 1968, p. 229

RT	26120-01	Chromic Acid, 4%, Aqueous	500 ml
0-4C	26120-02	Coleman’s Feulgen Reagent	250 ml
RT	26120-03	Aldehyde Fuchsin Solution	250 ml
RT	26120-04	Metanil Yellow, 0.25%	500 ml

➤ A Combined Hematoxylin and Eosin/ Methenamine Silver Stain for the Histological Diagnosis of Fungi in Tissue Sections

For bacterial, fungal stains.

Stain results:

Organism:Blue-Black
Background:Rose

REFERENCES:

- Lamps, Laura W. et al A Combined Hematoxylin and Eosin/ Methenamine Silver Stain for the Histological Diagnosis of Fungi In Tissue Sections., J. of Histotechnology 23:4 p.341 – 345, 2000.

RT	26123-01	Chromic Acid, 10%	500 ml
RT	26123-02	Sodium Bisulfite, 1%	500 ml
RT	26123-03	Silver Nitrate, 5% Aqueous	250 ml
RT	26123-04	Methenamine, 3% Aqueous	500 ml
RT	26123-05	Sodium Borate, 5% Aqueous	500 ml
RT	26123-06	Gold Chloride, 0.2%	250 ml
RT	26123-07	Sodium Thiosulfate, 0.2% Aqueous	500 ml
RT	26123-08	Harris’ Hematoxylin	500 ml
RT	26123-09	Acetic Acid 3%	500 ml
RT	26123-10	Ammonia Water, 0.25%	500 ml
RT	26123-11	Eosin Y, 1% Alcoholic	500 ml

STAINING CHEMICALS AND PREPARED SOLUTIONS

► Prepared Staining Kits for Histology and Pathology (continued)

A.3 INCLUSION BODY STAINS

► Pinkerton's Method for Rickettsia

For inclusion body stain.

Stain results:

Rickettsia:Bright Red
Nuclei:Blue

REFERENCES:

■ Simmons, J.S. and Gentzkow, C.J., *Laboratory Methods of the United States Army 5th Ed.*, Lee & Febiger, Philadelphia, p. 572, 1944

■ Luna, L.G., (ed) *Manual of Histologic Staining Methods or the AFIP, 3rd Ed.*, McGraw-Hill, N.Y., p. 237, c 1968

RT	26131-01	Methylene Blue Solution, 1% Aqueous Sol	500 ml
RT	26131-02	Basic Fuchsin Solution, 0.25%, Aqueous Sol	500 ml
RT	26131-03	Citric Acid, 0.5% Aqueous Sol	500 ml
RT	26131-04	Gram's Iodine Solution	500 ml
		OR	
RT	26131-4A	Lugol's Iodine	500 ml
RT	26131-05	Sodium Thiosulfate, 5% Aqueous Sol	500 ml

► Wolbach's Giemsa Method

Wolbach, Todd, and Palfrey (1922)

Nuclei, collagen.

Stain results:

Nuclei, Bacteria:Blue
Rickettsia:Purple
Collagen, other tissue elements:Pink to rose

REFERENCES:

Wolbach, S.B., Todd, J.L. and Palfrey, F.W., *The Etiology of Pathology Typhus*, Harvard University Press, Cambridge, MA., p. 13 – 14, c 1922

Luna, L.G., (ed), *Manual of Histologic Staining Methods of the AFIP, 3rd Edition*, McGraw-Hill, NY, p. 119, c. 1968

RT	26132-01	Giemsa Stock Solution	250 ml
		OR	
RT	26132-1A	Giemsa Working Solution	500 ml
RT	26132-02	Rosin Alcohol Stock Solution, 10%	500 ml
		OR	
RT	26132-2A	Rosin Alcohol Working Solution	500 ml
RT	26132-03	Lugol's Iodine	500 ml
		OR	
RT	26132-3A	Gram's Iodine	500 ml
RT	26132-04	Sodium Thiosulfate, 5% Aqueous	500 ml

B. STAIN FOR BLOOD AND HEMATOLOGIC ELEMENTS

► Wright-Giemsa Stain

Lillie (1972)

For differentiation of blood corpuscles.

Stain results:

Erythrocytes:Pink-Tan
Eosinophiles -Granules:Red
Lymphocytes -Granules:Red-Purple
-Cytoplasm:Blue
Neutrophils -Granules:Purple-Pink

REFERENCES:

■ Lillie, R.D.: Factors influencing the staining of blood films and the role of methylene violet. *J. Lab. Clin. Med.* 29:1181, 1944.

■ Lillie, R.D., H.J. Conn's *Biological Stains*, 8th Ed, William's & Wilkins, Baltimore, p. 438, 1972.

RT	26149-01	Wright-Giemsa Stain	500 ml
RT	26149-02	Phosphate Buffer, pH 6.5	500 ml

► Giemsa Thin Film Stain

Lillie (1965); Giemsa (1904)

Differentiation of leucocytes, rickettsia, bacteria and inclusion bodies.

Stain results:

Nuclei, additional leukocyte features are similar to
Wright Stain results:Reddish Purple
Plasmodic cytoplasm:Blue
Chromatin:Red

REFERENCES:

■ Clark, G., *Staining Procedures*, Williams & Wilkins Co., Baltimore, 3rd Ed., p. 125, c. 1973

RT	26153-01	Giemsa Thin Film Staining Solution,	250 ml
		OR	
RT	26153-02	Phosphate Buffer, pH 6.5	500 ml
RT	26153-03	Giemsa Stock Solution	250 ml

► Giemsa Thick Film Stain

Lillie (1965); Barber and Komp (1929)

Stain malarial parasites.

Stain Results:

Malarial Parasites:Clear Red Chromatin
Cytoplasm:Clear Blue
Red Corpuscles:Not seen due to lacking of hemoglobin during dying

REFERENCES:

■ Clark, G. *Staining Procedures*, Williams and Wilkins Company, Baltimore, 3rd Ed., p. 126, c. 1973

■ Lillie, R.D. *Histologic Technic and Practical Histochemistry*, 3rd Ed., McGraw-Hill, New York, 1965.

■ Barber, M.A. & Komp, H.W., *Pub. Health Rep.*, 44:2330-41, c. 1929

RT	26154-01	Giemsa Thick Film Staining Solution,	250 ml
		OR	
RT	26154-02	Phosphate Buffer – pH 7.0	500 ml
RT	26154-03	Giemsa Stock Solution	250 ml

STAINING CHEMICALS AND PREPARED SOLUTIONS

► Prepared Staining Kits for Histology and Pathology (continued)

B. STAIN FOR BLOOD AND HEMATOLOGIC ELEMENTS (continued)

► Thomas Method for Malarial Parasites

Thomas (1953)

Stain Results:

Nuclei:Blue
 Plasma Cell Cytoplasm:Blue
 Malarial Parasites:Blue
 Erythrocytes:Pink
 Other Tissue Elements:Shades of Rose to Red

REFERENCES:

Thomas, J.T. Stain Techn., 28:311-312, 1953.
 Luna, L.G. (ed.) Manual of Histologic Staining Methods of the AFIP, 3rd Ed. McGraw-Hill, New York, P.129, c.1968

RT	26155-01	Phloxine B Solution, 0.5%	500 ml
RT	26155-02	Methylene Blue – Azur B Staining Solution	500 ml
RT	26155-03	Acetic Acid, 0.2% Aqueous	500 ml

► Price’s Giemsa Stain

Stains for hematologic elements.

Stain results:

Malarial Parasites:Blue
 Tissue Nuclei:Blue
 Bacteria:Dark Blue
 Malarial Pigment:Black
 Schistosomic egg shells:Blue
 Collagen, etc.:Pale Pink
 Erythrocytes:Pink Rose

REFERENCES:

■ AFIP Manual of Histological Staining Methods, 3rd ed., L. Luna: New York: McGraw Hill Publications, c. 1968, p. 127
 ■ Price, D.L., Mil. Med., 133: 363-367, 1968.

RT	26156-01	Giemsa Stock Solution	250 ml
RT	26156-02	Phosphate Buffer, pH 7.0	500 ml
RT	26156-03	Acetic Acid, 0.2%, Aqueous	500 ml
RT	26156-04	Alcoholic Iodine, 2%	500 ml

► Prussian Blue Stain for Non-Hemoglobin Iron

Sundberg and Broman (1955)

Stain results:

Particulate Iron and Non-granular cytoplasm of many Macrophages:Blue to Blue-green
 Other:Comparable to original films stained with Wright Staining Solution

REFERENCES:

Clark, G.: Staining Procedures, Williams & Wilkins Co. Baltimore, 3rd Ed., c.1973, p.130. Sunberg, R.D. and Broman, H., Blood, 10160-6, 1955.

RT	26161-1A	Potassium, Ferrocyanide, 2%, Aqueous	500 ml
RT	26161-1B	Hydrochloric Acid, 1%	500 ml
RT	26161-02	Wright Staining Solution	500 ml
RT	26161-03	Phosphate Buffer – pH 6.5	500 ml

► Rhodinile Blue Stain

Stains for hematologic elements.

Stain results:

Heinz BodiesDeep Purple
 ErythrocytesYellow-Orange to Blue-Green
 ReticulocytesBlue

REFERENCES:

■ Simpson, C.F., Carlisle, J.W., and Mallard, L.: Stain Technology, 45:22 (1970)
 ■ Clark, G.: Staining Procedures, Williams and Wilkins Company, Baltimore, 3rd Ed., C. 1973, p. 131.

RT	26162-01	Rhodinile Blue Stain Sol.	500 ml
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► Prussian Blue Method for Hemosiderin

Lillie (1965); Highman (1962); Perls (1867)

Stain Results:

Hemosiderin:Blue or Green
 Nuclei:Red
 Background:Pink

REFERENCES:

■ Perls, M., Virchow’s Arch. F. Path. Anat., 39:42-48, 1867
 ■ Highman, B., Arch. Path., 33:937-938, 1942
 ■ Lillie, R.D., Histopathologic Technic & Practical Histochemistry, 3rd Ed., McGraw Hill, N.Y., 1965
 ■ Clark, G., (ed.), Staining Procedures, 3rd Ed., Williams & Wilkins, Baltimore, p. 157, c. 1973.

RT	26170-01	Potassium Ferrocyanide, 2% Aqueous	500 ml
RT	26170-02	Hydrochloric Acid, 2%	500 ml
RT	26170-03	Safranin O, 0.2%	500 ml
RT	26170-04	Acetic Acid, 1% Aqueous	500 ml

► 3-Amino-9-Ethyl Carbazole Method for Leukocyte Peroxidase

Stains for hematologic elements.

Stain results:

Sites of Peroxidase activityRed-Brown Granules
 NucleiBlue

REFERENCES:

■ Williams, W.j., Beutler, E., Erslev, A.J. and Rundles, R.W. Hematology, 2nd Ed. McGraw-Hill, YY, c 1977, pp 1627-1628.

RT	26173-01	Formalin-Acetone Fixative	500 ml
RT	26173-02	3-Amino-9-Ethylcarbazole Staining Solution	500 ml
RT	26173-03	Mayer Hematoxylin	500 ml

STAINING CHEMICALS AND PREPARED SOLUTIONS

► Prepared Staining Kits for Histology and Pathology (continued)

C. BONES AND CALCIUM STAINS

► Canaliculi and Lacunae Stain

Powers, Rasmussen and Clark (1951)

For bones and teeth.

Stain results:

Canaliculi, lacunae, odontoblast and
dental tubules:Bluish to purplish black

REFERENCES:

- Powers, M.M., Rasmussen, G.L., and Clark, G., *Anat. Rec.*, 111:117-6, (1951)
- Clark, G. (ed), *Staining Procedures*, 3rd edition, William & Wilkins, Baltimore, c 1973, p. 136
- Bodian, D., *Anat. Rec.*, 65:89 – 97, 1936
- Bodian, D., *Anat. Rec.*, 69:153 – 62, 1937

RT	26201-01	Cupric Nitrate, 1% Aqueous	500 ml
RT	26201-02	Protargol Solution, 1% Aqueous	500 ml
RT	26201-03	Copper Shot	50 g
0-4°C	26201-04	Hydroquinone Reducing Solution	500 ml
RT	26201-05	Gold Chloride, 1% Aqueous	250 ml
RT	26201-06	Oxalic Acid, 2% Aqueous	500 ml
RT	26201-07	Sodium Thiosulfate, 5% Aqueous	500 ml

► Modified Alizarin Red S for Fetal Specimens

Cumley, Crow, and Griffin (1939)

For Minute bones and fetal ossification in mammalian embryos

Stain results:

Bone:Red
Soft Tissue:Transparent and unstained

REFERENCES:

- Cumley, R.W., Crow, J.F., and Griffin, A.B., *Stain Techn.*, 14:7 – 11, 1939
- Dawson, A.B., *Stain Techn.*, 1:123 – 124, 1926
- Richmond, G.W. and Bennett, L., *Stain Techn.*, 13:77 – 79, 1938
- Clark, G., (ed), *Staining Procedures*, 3rd ed., William & Wilkins, Baltimore, p. 138, c. 1973

RT	26204-01	Alizarin S, 0.01% Aqueous	500 ml
RT	26204-02	Potassium Hydroxide, 1% Aqueous	500 ml
RT	26204-03	Potassium Hydroxide, 10% Aqueous	500 ml
RT	26204-04	Glycerol-Potassium Hydroxide	500 ml

► Alizarin Red S and Toluidine Blue O

Williams (1941); Dawson (1926)

Distinction between bone and cartilage in mammalian embryos.

Stain results:

Soft Tissues:Transparent
Osseous Tissues:Deep Red
Cartilage:Dark Blue

REFERENCES:

- Dawson A.B., *Stain Techn.*, 1:123-4, 1926
- Williams, T.W., *Stain Techn.*, 16:23-5, 1941
- Clark, G., (ed), *Staining Procedures*, 3rd Ed., Williams & Wilkins Baltimore, p. 139, c. 1973

RT	26205-01	Alizarin Red S, 0.02%, Aqueous	500 ml
RT	26205-1A	Potassium Hydroxide, 4%, Aqueous	500 ml
RT	26205-02	Toluidine Blue O, 0.25%	500 ml
RT	26205-03	Ammonium Alcohol	500 ml
RT	26205-05	Potassium Hydroxide, 2%, Aqueous	500 ml
RT	26205-06	Sulfuric Acid Alcohol	500 ml

► Alizarin Red S for Calcium Deposits

Calcium deposits stain.

Stain Results:

Calcium Sites:Covered and surrounded by a heavy orange red precipitate which is birefringent between crossed polaroids

Background:Faint Pink

REFERENCES:

- McGee-Russell, S.M., *J. Histochem.*, 6:22-42, 1958.
- Clark, G., (ed), *Staining Procedures*, 3rd d., Williams & Wilkins, Baltimore, p. 140, c. 1973.

RT	26206-01	Alizarin S, 2% Solution, pH 4.2	250 ml
RT	26206-02	Reagent Alcohol, 50%	500 ml
RT	26206-03	Acetone	1 qt
RT	26206-04	Acetone – Xylene	500 ml

► Pizzolato's Method for Calcium Oxalate

For bone and its related stain.

Stain results:

Calcium oxalateBlack
All other tissue elements.....Red

REFERENCES:

- Pizzolato, P., *J. Histochem. Cytochem.*, 12:333-136, 1964.
- Luna, L.G., (ed), *Manual of Staining Methods of the AFIP*, 3rd Ed, McGraw-Hill, NY, c 1968, p 177.

RT	26212-01	Silver Nitrate, 5% Aqueous	250 ml
RT	26212-02	Hydrogen Peroxide, 30%	450 ml
RT	26212-03	Nuclear Fast Red (Kennechtrot) Solution	500 ml

STAINING CHEMICALS AND PREPARED SOLUTIONS

➤ Prepared Staining Kits for Histology and Pathology (continued)

D. BONE MARROW STAINS

➤ May-Grunwald/Giemsa Combined Stain

Beck (1938); Pappanheim (1912)

Stain results:

Nuclei, Bacteria:.....Blue
Cytoplasm:Pink-Rose

REFERENCES:

- Beck, R.C., Laboratory Manual of Hematological Technique, W.B. Saunders & Co., Philadelphia, c. 1938, pp 233 – 236
- Clark, G. (ed), Staining Procedures, 3rd ed. Williams & Wilkins, Baltimore, c. 1973, pp 131 – 132
- Strumia, M.M., J Lab Clin. Med 21:930 – 934, 1935 – 1936
- Luna, L.G., (ed) Manual of Histologic Staining Methods of the Armed Forces Institute of Pathology, 3rd ed. McGraw-Hill, NY, c. 1968, pp 121-122

RT	26250-01	May-Grunwald Staining Solution	500 ml
		OR	
RT	26250-1A	Jenner Staining Solution	500 ml
RT	26250-02	Giemsa Staining Solution	250 ml

➤ Maximow's Method for Bone Marrow

Mallory (1961)

Morphology details of marrow cells.

Stain results:

Nuclei:Blue
Basophile leukocyte, mast cell granules:Purple to Violet
Cartilage:Purple
Erythrocytes, eosinophile granules:Pink
Cytoplasm:Blue to Pink

References:

- AFIP Manual of Histologic Staining Methods, 3rd Ed, Ed. L. Luna: New York: McGraw Hill Publications, c. 1968, p. 120
- Mallory, F.B., Pathological technique, New York, Hafner Publishing Co., 1961, p.196

RT	26252-01	Mayer's Hematoxylin	500 ml
RT	26252-02	Eosin Y, 0.1%, Aqueous	500 ml
RT	26252-03	Azur II, 0.1%, Aqueous	500 ml
RT	26252-04	Phosphate Buffer, 0.1M, pH 6.8 – 7.0	500 ml

E. CARBOHYDRATE & MUCOSUBSTANCE STAINS:

E.1 Amyloid Stains

➤ Crystal Violet Stain for Amyloid

Stain results:

Amyloid.....Violet-Red
TissueBlue

REFERENCES:

- Clark, G.: Staining Procedures, Williams and Wilkin co., Baltimore 3rd Ed., c. 1973, p.48.
- Conn, H. J., Biological Stains 4th Ed. Biotech Publications, Geneva New York, 1940.

RT	26301-01	Crystal Violet Solution	500 ml
RT	26301-02	Acetic Acid, 1% Aqueous	500 ml

➤ Sweat-Puchtler Method for Amyloid

Stain results:

AmyloidPink-Red
NucleiBlue
ElasticaPink to Red
Background.....Unstained

REFERENCES:

- Sweat, F. and Puchtler, H.: Arch. Path. 80:613, 1965
- AFIP Manual of Histologic Staining Methods, 3rd edition, Ed L. Luna: New York: McGraw Hill Publication, c. 1968, p. 154

RT	26303-01	Sirius Red F3BA Solution, 1%	500 ml
RT	26303-02	Mayer Hematoxylin	500 ml
RT	26303-03	Borate Buffer, 0.1M – pH 9.0	500 ml
RT	26303-04	Alkaline Alcohol5	500 ml

➤ Laqueur's Method for Alcoholic Hyalin

Lacquer (1950)

For mallory bodies, erythrocytes, bile pigment and proteinaceous material in liver.

Stain results:

Mallory Bodies:.....Bright Red
Erythrocytes:.....Red
Cytoplasm:Pale Brown
Bile Pigment:Green
Proteinaceous material seen occasionally in some liver cells:Red
Hemosiderin and lipofichsin:Unstained

REFERENCES:

- Laqueur, G.I., Amer. J. Clin. Path., 20:689-690, 1950
- Luna, L.G. (ed), Manual of Hitopathologic Staining Method of the AFIP, 3rd ed, McGraw-Hill, NY, c. 1968, p 160
- Lillie, R.D., Fullmer, H.M., Histopathologic Technic and Practical Histochemistry 4th ed., McGraw-Hill, NY, 1976, p 670-671
- Clark, G., (ed) Staining Procedures, 3rd ed. WilliamS & Wilkins, Baltimore, p 51, c. 1973

RT	26306-01	Mayer's Hematoxylin	500 ml
RT	26306-02	Acid Fuchsin-Aniline Solution	500 ml
RT	26306-03	Light Green, 1% Aqueous	500 ml
RT	26306-04	Phosphomolybdic Acid, 1% Aqueous	500 ml
RT	26306-05	Alcoholic Picric Acid	500 ml

STAINING CHEMICALS AND PREPARED SOLUTIONS

► Prepared Staining Kits for Histology and Pathology (continued)

E. CARBOHYDRATE & MUCOSUBSTANCE STAINS: Continued

E.2 Glycogen Stains

► McManus' Method (PAS) for Glycogen

*McManus (1948)***Stain results:**

Nuclei:Blue
Fungi:Red
Background, when Light Green is used
as the counter-stain:Green, pale

REFERENCES:

- McManus, JFA: *Stain Tech.*; 23:99 (1948)
- AFIP Manual of Histologic Staining Techniques; L.G. Luna, 3rd Ed., New York: McGraw-Hill Publications, c. 1968, p. 160.
- Mowry, RW: *Annals of the New York Academy of Science*, 106:402 (1963).

RT	26312-01	Coleman's Feulgen, Refrigerated OR	500 ml
RT	26312-1A	Schiff's reagent, Refrigerated!	500 ml
RT	26312-02	Light Green Stock Solution, 0.2% OR	250 ml
RT	26312-2A	Light Green Working Solution OR	500 ml
RT	26312-2B	Harris Hematoxylin	500 ml
RT	26312-03	Periodic Acid, 0.5%, Aqueous	500 ml
RT	26312-04	Acid - Alcohol, 1%	500 ml
RT	26312-05	Ammonia Water, 0.3%	500 ml

E.3 Mucosubstance Stains

► Mayer Mucicarmine Method

For mucosubstances stains.

Stain results:

Mucin, Cryptococci CapsulaeDeep Rose to Red
Other Tissue ElementsYellow
NucleiBlack

Note: The rose color due to carmin staining will be obscured if sections are overstained with Weigert's Hematoxylin and/or Metanil Yellow solution

REFERENCES:

- Mallory, F.B.: *Pathological Technique*. Hafner Publishing Co., N.Y., c. 1961, p. 130.
- Luna, L.G., (ed), *AFIP Manual of Histologic Staining Methods*, 3rd. ed., McGraw-Hill Co., NY, C. 1968, pp161-162
- Sheehan, D.C. & Hrapenak, B.B., *Theory and Practice of Histochemistry*, 2nd ed., C.V. Mosby Co., St. Louis. C. 1980. pp 168-169

RT	26320-01	Mucicarmine Stock Solution	500 ml
RT	26320-02	Metanil Yellow, 0.25%	500 ml
RT	26320-03	Weigert's Hematoxylin Solution A	500 ml
RT	26320-04	Weigert's Hematoxylin Solution B	500 ml

► Modification of Mayer's Mucihematein

Lillie (1965); Laskey (1950)

For stain mucins, especially those derived from epithelial cells of glandular tissue.

Stain results:

Mucin:Deep Violet
Cell Nuclei:Pale Gray Blue
Connective Tissue:Pale Gray to colorless

REFERENCES:

- Laskey, Alice: *Stain Technology*, 25:33 (1959)
- Clark G.: *Staining Procedures*, Williams & Wilkins Co., Baltimore, 3rd Ed., c. 1973, p. 57.

RT	26321-01	Mayer's Mucihematein, Modified	500 ml
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► Alcian Blue Method (pH 2.5)

For stain weakly acidic sulfated mucosubstances, hyaluronic acid and sialomucins.

Stain results:

Weakly Acidic Sulfated Mucosubstances:Dark Blue
 Hyaluronic Acid:Dark blue
 Sialomucins:Dark blue

REFERENCES:

- AFIP Manual of Histological Stains Methods, 3rd Ed, Ed. L. Luna: New York McGraw Hill Publications, c. 1968, p. 163.
- Lev, R. & Spicer. S.S., *J. Histochem Cytochem*, 12:309, 1964

RT	26323-01	Alcian Blue, 1% - pH 2.5	250 ml
RT	26323-02	Nuclear Fast Red (Kernechtrot) Solution	250 ml
RT	26323-03	Acetic Acid, 3% Aqueous	500 ml

► Aldehyde-Fuchsin Method (pH 1.0)

For stain highly acid sulfated mucosubstances.

Stain results:

All mucins except the highly acidic sulfated mucosubstances are aldehyde fuchsin negative at pH values of 1.0 and below.

References:

- Johnson, W.C., Graham, J.H., and Helwig, E.B., *J. Invest. Derm.*, 42:215-224, 1964
- Luna, L.G., (ed), *Manual of Histologic Staining Methods of the AFIP*, 3rd Ed., McGraw-Hill, c.1968, p. 166

RT	26328-01	Aldehyde-Fuchsin Solution - pH 1.0	500 ml
RT	26328-02	Metanil Yellow Solution, 0.25%	500 ml
RT	26328-03	Alcohol Solution, 80% - pH 1.0	500 ml

STAINING CHEMICALS AND PREPARED SOLUTIONS

➤ Prepared Staining Kits for Histology and Pathology (continued)

F. CONNECTIVE TISSUE STAINS

F.1 Van Gieson and related Stains

➤ Van Gieson's Method for Collagen Fibers

Mallory (1938); Van Gieson (1889)

For collagen, muscle and cornified epithelium.

Stain results:

Collagen:.....Red
 Smooth and striated muscle:Yellowish to Brownish
 Cornified epithelium:.....Yellow
 Hyalin:Yellow
 Nuclei:Blue to Black

REFERENCES:

- Clark, G., (ed) Staining Procedures, 3rd Ed., Williams & Wilkins Co., Baltimore, c. 1973, p. 50
- Luna, L (ed) AFIP Manual of Histological Staining Methods, 3rd ED., New York: McGraw Hill Publications, c 1968, p.76
- Van Gieson, I., New York Med. J., 50:57-60, 1889.
- Mallory, F.B., Pathological Technique, Hafner Publishing., New York, c. 1961, p. 152

RT	26350-01	Van Gieson's Solution	500 ml
RT	26350-02	Weigert's Iron Hematoxylin A &	500 ml
RT	26350-03	Weigert's Iron Hematoxylin B	500 ml

➤ Puchtler-Sweat Method for Basement Membranes

Puchtler and Sweat (1964)

Stain results:

Basement Membranes:Black in cross section/
 Gray in tangential sections
 Nuclei:Pink to Red

REFERENCES:

- Puchtler, H. and Sweat, F.: Stain Technology, 39:163, 1964
- AFIP Manual of Histological Staining Methods, 3rd ed., Ed. L. Luna: New York, McGraw Hill Pub., c. 1968, p. 73

RT	26356-01	Resorcin-Fuchsin Solution	500 ml
RT	26356-02	Nuclear Fast Red (Kernechtrot) Solution	500 ml
RT	26356-03	Periodic Acid, 0.5% Aqueous	500 ml
RT	26356-04	Sodium Bisulfite Solution	500 ml

➤ Picrosirius Red Staining of Cardiac

Muscle Following Phosphomolybdic Acid Treatment

For connective tissue stains – Van Gieson stains and variants.

Stain results:

SeptaRed

REFERENCES:

- Dolber, Paul C. and Madison S. Spach. Picrosirius Red Staining of Cardiac Muscle Following Phosphomolybdic Acid Treatment, Stain Technology, Vol. 62 No 1 (1987) 23 – 26.

RT	26357-01	Phosphomolybdic Acid, 0.2% Aqueous	500 ml
RT	26357-02	Sirius Red, 0.1% in Saturated Picric Acid	100 ml
RT	26357-03	Hydrochloric Acid, 0.01N	500 ml

F.2 Stains with Poly-Acid Step

➤ Lillie Modification of Masson's Trichrome

Lillie (1940)

Stains cells, cytoplasm muscle and collagen of mammalian tissue

Stain results:

Nuclei:Black
 Cytoplasm:Brown to Pink
 Muscle:Red
 Erythrocytes:Brilliant Scarlet
 Collagen:Blue to Blue Green
 Myelinated fibers:Red
 Fibrin:Red to Pink

REFERENCES:

- Clark, G.: Staining Procedures. Williams & Wilkins Co., Baltimore, 3rd ed., c. 1973, p.59
- Lillie, R.D., Arch. Path., 29:705, 1940

RT	26364-01	Phosphomolybdic/Phosphotungstic Acid Solution	500 ml
RT	26364-02	Weigert's Iron Hematoxylin A &	500 ml
RT	26364-03	Weigert's Iron Hematoxylin B	500 ml
RT	26364-04	Biebrich Scarlet Solution, 1%	500 ml
RT	26364-05	Fast Green FCF Solution, 2.5%	500 ml
RT	26364-06	Acetic Acid, 1% Aqueous	500 ml
RT	26364-07	Lugol's Iodine OR	500 ml
RT	26364-7A	Gram's Iodine	500 ml
RT	26364-08	Sodium Thiosulfate, 5% Aqueous	500 ml

➤ Masson's Trichrome for Connective Tissue

Sheehan and Hrapchak (1980)

For stain nuclei, argentaffin granules, collagen, cytoplasm, keratin, etc.

Stain results:

Nuclei:Black
 Cytoplasm, Keratin, Muscle Fibers:Red
 Collagen, Mucin:Blue

REFERENCES:

- Sheehan and Hrapchak: Theory and Practice of Histotechnology, St. Louis. The Moxby Company 1980, p. 190

RT	26367-01	Bouin's Fixative	500 ml
RT	26367-02	Weigert's Iron Hematoxylin A	500 ml
RT	26367-03	Weigert's Iron Hematoxylin B	500 ml
RT	26367-04	Biebrich Scarlet Solution, 1%	500 ml
RT	26367-05	Phosphomolybdic/Phosphotungstic Acid Solution	500 ml
RT	26367-06	Aniline Blue Solution	500 ml
RT	26367-07	Acetic Acid, 1% Aqueous	500 ml

STAINING CHEMICALS AND PREPARED SOLUTIONS

► Prepared Staining Kits For Histology And Pathology (cont.)

F. CONNECTIVE TISSUE STAINS (cont.)

F.3 Elastic Tissue Stains

► Modified Verhoff Elastic Van Gieson Stain

For connective tissue stains – Stain with a poly-acid step

Stain results:

Nuclei	Grayish-Black
Collagen Fibers	Red
Elastic Fibers	Bluish-Black
Muscle	Greenish-Yellow

REFERENCES:

- Gravey, Winsome et al “A modified Verhoff Elastic Van Gieson Stain” *The Journal of Histotechnology*, Vol. 14, No. 2, pp113 –114. June 1991.

RT	26369-01	Alcoholic Hematoxylin, 3%	250 ml
RT	26369-02	Ferric Chloride, 2% aqueous	500 ml
RT	26369-03	Lugol's Iodine	500 ml
RT	26369-04	Ferric Chloride, 0.4% aqueous	500 ml
RT	26369-05	Van Geisons Solution	250 ml

► Weigert's Resorcin Fuchsin

Lillie (1965); Mallory (1938); Weigert (1898)

For stain elastic fibers in blood vessel walls, nuclei and collagen.

Stain results:

Elastic Tissues:	Dark Blue
Nuclei (red if Orth's Carmine used):	Dark Blue
Collagen:	Red-Pink
Miscellaneous Tissue Elements:	Yellow (with Van Gieson's stain)

REFERENCES:

- Mallory, FB: *Pathological Technique*; New York: Hafner Publishing Co., c. 1961, p. 168
- Clark G: *Staining Procedures*, Baltimore: Williams & Wilkins Co., 3rd ed. c. 1973, p.60
- Luna, I. G.: *AFIP Histologic Staining Methods*: New York: McGraw Hill Book Co., 3rd ed., c. 1968, p. 80

RT	26370-01	Resorcin-Fuchsin Solution	500 ml
RT	26370-02	Van Gieson's Solution	500 ml
RT	26370-03	Weigert's Iron Hematoxylin A	500 ml
RT	26370-04	Weigert's Iron Hematoxylin B	500 ml
RT	26370-05	Acid Alcohol, 1%	500 ml

► Verhoeff's Van-Gieson's (VVG Method)

Sheehan and Hrapchak (1980)

For stain elastic fibers, nuclei, collagen and other tissue elements.

Stain results:

Elastic Fibers:	Blue-black to Black—Fine elastic fibrils may not be stained with this method
Nuclei:	Blue to Black
Collagen:	Red
Other Tissue Elements:	Yellow

REFERENCES:

- Sheehan, Dezna C., Hrapchack, Barbara B.: *Theory and Practice of Histotechnology*, 2nd ed. The C.V. Mosby C., St Louis, p. 196-197, c. 1980

RT	26374-01	Alcoholic Hematoxylin, 5%	500 ml
RT	26374-02	Ferric Chloride, 10%	500 ml
RT	26374-03	Weigert's Iodine	500 ml
RT	26374-04	Ferric Chloride, 2%	500 ml
RT	26374-05	Sodium Thiosulfate, 5% Aqueous	500 ml
RT	26374-06	Van-Gieson's Solution	500 ml

► Carstairs Method for Fibrin and Platelets

Carstairs (1965)

For the staining of fibrin and platelets.

Stain results:

		48 hours or more	Less than 48 hours
Fibrin:	Bright Red	Orange to Orange-Red	
Platelets:	Gray blue to navy	Light Gray	
Collagen:	Bright Blue	Bright Blue	
Muscle:	Red	Red	
Red Blood Cells:	Clear Yellow	Red, Green or Yellow	

RT	26381-01	Ferric Ammonium Sulfate, 5% Aqueous	500 ml
RT	26381-02	Mayer's Hematoxylin	500 ml
RT	26381-03	Picric Acid-Orange G Solution	500 ml
RT	26381-04	Ponceau Acid Fuchsin Solution	500 ml
RT	26381-05	Phosphotungstic Acid, 1%	500 ml
RT	26381-06	Aniline Blue Solution	500 ml

► Modified Movat's Stain

For connective tissue stains – Elastic tissue stains.

Stain results:

Nuclei	Black
Cytoplasm	Red
Elastic Fibers	Purple to Black
Collagen and Bone	Yellow
Mucopolysaccharides	Blue-Green
Muscle	Red

REFERENCES:

- Movat, H.Z.:: *Demonstration of all connective tissue elements in a single section.* *Arch Path.*, 60:289 – 295, 1955
- Roman N., et al: *Orcein-hematoxylin in iodized ferric chloride as a stain for elastic tissue.* *Stain Technology*, 42:199 –202, 1967.

RT	26385-01	Alcian Blue, 1%	100 ml
RT	26385-02	Alkaline Alcohol	500 ml
RT	26385-03	Orcein, 0.2%	250 ml
RT	26385-04	Hematoxylin Alcoholic, 5%	250 ml
RT	26385-05	Ferric Chloride, 10%	500 ml
RT	26385-06	Lugol's Iodine	500 ml
RT	26385-07	Woodstain Scarlet-Acid Fuchsin Working Solution	250 ml
RT	26385-08	Acetic Acid, 0.5%	500 ml
RT	26385-09	Phosphotungstic Acid, 5%	500 ml
RT	26385-10	Alcoholic Saffron, 6%	100 ml

STAINING CHEMICALS AND PREPARED SOLUTIONS

➤ Prepared Staining Kits For Histology And Pathology (cont.)

F. CONNECTIVE TISSUE STAINS (cont.)

➤ Goldner's Trichrome Method

For connective tissue stains – Elastic tissue stain. Stain with a poly-acid step.

Stain results:

Nuclear chromatinBrownish-Black
 CytoplasmBright Red
 Erythrocytes.....Orange
 MuscleRed
 CollagenGreen

REFERENCES:

■ Luna, Lee G. Histopathologic Methods and Color Atlas of Special Stains and Tissue Artifacts. Johnson Printers, Downerts Grove, IL p151-152, c 1992.

RT	26386-01	Bouin's Fluid	500 ml
RT	26386-02	Weigert's Iron Hematoxylin A	500 ml
RT	26386-03	Weigert's Iron Hematoxylin B	500 ml
RT	26386-04	Ponceau Acid Fuchsin	100 ml
RT	26386-05	Acetic Acid, 1%	500 ml
RT	26386-06	Phosphomolybdic Acid Orange G Solution	250 ml
RT	26386-07	Light Green Stock, 0.2%	500 ml

F.4 Silver Methods

➤ Wilder Modification of Bielschowsky's Method

Wilder (1935)

For the staining of Collagen and reticulum.

Stain results:

Reticulum Fibers (If beading is observed and/or a dark background, replace the ammonium hydroxide silver Nitrate solution and the reducing solution):Black
 Collagen:Rose
 Other Tissue Elements:Red

REFERENCES:

■ Wilder, H.C., Amer. J. Clin. Path.: 11:817, 1935
 ■ Mallory, F.B.: Pathological Techniques, Phil., W.B. Saunders & Co. c. 1938
 ■ AFIP Manual of Histological Staining Techniques, NY, McGraw-Hill Publ., c. 1968/3rd ed, p. 92

RT	26392-01	Silver Nitrate, 10.2% Aqueous	250 ml
RT	26392-02	Ammonium Hydroxide, Conc.	500 ml
RT	26392-03	Sodium Hydroxide, 3.1% Aqueous	500 ml
RT	26392-04	Formalin, 40%, Neutralized	500 ml
RT	26392-05	Harris Hematoxylin OR	500 ml
RT	26392-5A	Van-Gieson Stain	500 ml
RT	26392-06	Nuclear Fast Red (Kernechtrot)	500 ml
RT	26392-07	Phosphomolybdic Acid, 10% Aqueous	500 ml
RT	26392-08	Uranium Nitrate, 1%	500 ml
RT	26392-09	Gold Chloride, 0.2%, Aqueous	250 ml
RT	26392-10	Sodium Thiosulfate, 5% Aqueous	500 ml

➤ Jones Method for Kidney - Silver Method

For the staining of basement membranes, reticulum fibers, collagen and nuclei.

Stain results:

Basement membranes, reticulum fibers:Black
 Nuclei:Blue
 Cytoplasm, collagen, connective tissue:.....Pink-Orange

REFERENCES:

■ Jones, D.B., Amer. J. Path. 27:99 (1951)
 ■ AFIP Manual of Histological Staining Methods, 3rd Ed., Ed. L. Luna: NY: McGraw-Hill Publications, c. 1968, p.97

RT	26396-01	Periodic Acid, 0.5%, Aqueous	500 ml
RT	26396-02	Methenamine Solution, 3%, Aqueous	500 ml
RT	26396-03	Silver Nitrate, 5% Aqueous Solution	250 ml
RT	26396-04	Borate Buffer Working Solution	500 ml
RT	26396-05	Gold Chloride, 0.2%, Aqueous	250 ml
RT	26396-06	Harris's Hematoxylin	500 ml
RT	26396-07	Alcoholic Eosin Y Staining Solution	500 ml
RT	26396-09	Sodium Thiosulfate, 3%, Aqueous	500 ml
RT	26396-11	Potassium Ferricyanide, 0.5%, Aqueous	500 ml
RT	26396-12	Sodium Metabisulfite, 3%, Aqueous	500 ml
RT	26396-13	Acid Alcohol, 1%	500 ml
RT	26396-14	Ammonia Water, 0.3%	500 ml

F.5 Keratin Stains

➤ Dane's Method for Prekeratin, Keratin, and Mucin

Keratin stain method for the staining of keratin, prekeratin, acid mucopolysaccharides and nuclei.

Stain results:

Acid Mucopolysaccharides:Blue
 Prekeratin and Keratin:Orange to Red
 Nuclei:Brown

REFERENCES:

■ Dane, E.T., and Herman, D.L.: Stain Technology, 38:97, 1963.
 ■ AFIP Manual of Histological Staining Methods, 3rd Ed., Ed L. Luna: New York: McGraw Hill Publications, c 1968, p.83.

RT	26401-01	Phloxine Solution, 1%, Aqueous	500 ml
RT	26401-02	Alcian Blue Solution, 0.5%	250 ml
RT	26401-03	Orange G Solution	500 ml
RT	26401-04	Mayer's Hematoxylin	500 ml

STAINING CHEMICALS AND PREPARED SOLUTIONS

► Prepared Staining Kits For Histology And Pathology (cont.)

G. CYTOPLASMIC GRANULE STAINS

G.1 Pancreatic Islet Cell Stains

► Mallory-Heidenhain Azan-Gomori's Modification for Islet Cells

For the staining of alpha, beta and D-cells of the islets of langerhans.

Stain results (Bouin Fixation):

	Human Tissue	Guinea Pig
Alpha granules	Red, bright	Orange - Tan
Beta granules	Orange-Brown, dull	Red, fiery
D-cell granules	Dark Blue	Deep Blue

REFERENCES:

- Clark, G., (ed): Staining Procedures 3rd Ed.; Baltimore: Williams & Wilkins Co., c. 1973, p. 171
- Gomori, G.: "Studies on the cells of the Pancreatic islets." Anat. Rec. 74:439 (1939)

RT	26450-01	Azocarmine Staining Solution, 0.1%	250 ml
RT	26450-02	Aniline-Alcohol, 1% Poison Pack	250 ml
RT	26450-03	Ferric Ammonium Sulfate, 5%, Aqueous	500 ml
RT	26450-04	Aniline Blue - Orange Solution	500 ml
RT	26450-05	Orange G, 0.2% in Alcohol	500 ml

G.2 Mast Cell Stains

► Toren's Method for Mast Cells

Cytoplasmic granule stains: Mast cell stains.

Stain results:

Mast Cell Granules	Deep Blue
Collagen & Cartilage	Blue-Green
Muscle & Elastic Fibers	Red
Fibrin	Purple
Bone	Green
Colloid, Keratin & Erythrocytes	Orange Red to Orange

REFERENCES:

- Toren, D.A.: Stain Techn., 38:249-250, 1963
- Luna, L., (ed.), Manual of Histologic Staining Methods of the AFIP, 3rd. ed., McGraw-Hill, New York, c. 1968, pp. 116-117

RT	26472-01	Giemsa Stain Solution	500 ml
RT	26472-02	Acetic Acid, 0.5%, Aqueous	500 ml
RT	26472-03	Pollacks's Trichrome Solution	100 ml

G.3 Other Granule Stains

► Methenamine Silver Method for Argentaffin Cells

For the staining of argentaffin granules of enterochromaffin cells.

Stain results:

Argentaffin Cells:Black
Coarse connective tissue
of the submucosa:Variable amount of blackening
by 3-3½ hr. of impregnation

Granules of eosinophil leukocytes,
nuclei, smooth muscle

& surface epithelium:show additional blackening
after incubation beyond 3-3½ hr.

Granules of mast cells:Remain red after nuclei
& reticulum are blackened

REFERENCES:

- Clark, G.: Staining Procedures, Williams and Wilkins Co., Baltimore, 3rd Ed., c. 1973, p. 161.
- Gomori, G., Arch. Path., 45:48, 1948.
- Burtner, H.J. and Lillie, R.D., Stain Techn., 24:225-7, 1949.

RT	26481-01	Weigert's Iodine Solution	500 ml
RT	26481-02	Sodium Thiosulfate, 5%, Aqueous	500 ml
RT	26481-03	Silver Nitrate, 5%, Aqueous	250 ml
RT	26481-04	Methenamine, 3%, Aqueous	500 ml
RT	26481-05	Borate Buffer, pH 7.8	500 ml
RT	26481-06	Gold Chloride, 0.1%, Aqueous	250 ml
RT	26481-07	Saffranin O Solution, 0.1%	500 ml

H. FAT AND LIPID STAINS

► Herxheimer's Technique

To stain fat and cholesterol.

Stain results:

NucleiBlue
FatOrange-Red
CholesterolRed

REFERENCE:

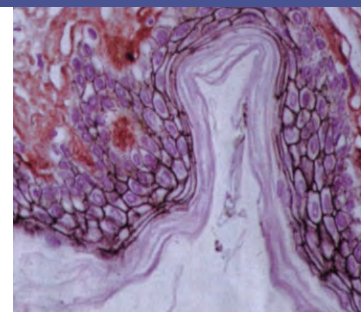
- Clark, G., Ed.: Staining Procedures; 3rd Ed.; Baltimore: Williams and Wilkins Co., c. 1973, p. 143
- Conn's, H.J.: Biological Stains; 8th Ed., Baltimore: Williams and Wilkins Co., c. 1969, p.100

RT	26500-01	Sudan IV Staining Solution (Herxheimer II)	500 ml
RT	26500-02	Harris' Hematoxylin	500 ml
RT	26500-04	Acetic Acid, 1%, Aqueous	500 ml

For ImmunoGold Reagents...

See Section 2, pages 72-90

Including not only the more commonly known reagents for EM and LM but, as well, a newly introduced line of products such as Silver Enhancement specifically for EM, Ultra-Small Fab fragments, Blocking Solutions, and even a line of donkey gold conjugates.



STAINING CHEMICALS AND PREPARED SOLUTIONS

➤ Prepared Staining Kits For Histology And Pathology (cont.)

➤ Fat Stains in Supersaturated Alcohol

For fat and lipid stain.

Stain results:

FatDeep orange-red with Oil Red O (lighter with Sudan IV) Orange-yellow with Sudan II
NucleiBlue
ErythrocytesSometimes Green
CytoplasmLighter Green

REFERENCES:

- Lillie, R.D., Histopathologic Technical and Practical Histochemistry, 3rd edition, McGraw-Hill, NY, 1965
- Clark, G., (ed) Staining Procedures, 3rd edition, Williams & Wilkins, Baltimore, p. 149, c. 1973

RT	26503-01	Sudan IV-Isopropanol Solution	500 ml
RT	26503-02	(or) Oil Red O-Isopropanol Solution	250 ml
RT	26503-03	(or) Sudam III-Isopropanol Solution	250 ml
RT	26503-04	Mayer Hematoxylin OR	500 ml
RT	26503-05	Erlich's Hematoxylin, Diluted	500 ml
RT	26503-06	Sodium Phosphate, 1%, Aqueous	500 ml

➤ Oil Red in Propylene Glycol Method

Fat Stain results:

FatRed
NucleiBlue

REFERENCES:

- AFIP Manual of Histologic Staining Methods, Ed. L. Luna, 3rd ed., New York, McGraw-Hill Publications, c. 1968, p. 140

	26504-01	Oil Red O Solution	500 ml
	26504-02	Mayer Hematoxylin OR	500 ml
RT	26504-2A	Harris Hematoxylene	500 ml
RT	26504-03	Propylene Glycol, 85%, Aqueous	500 ml
RT	26504-04	Hydrochloric Acid, 5%	500 ml
RT	26504-05	Ammonia Water, 0.3%	500 ml
RT	20350	Propylene Glycol, Absolute	450 ml

➤ Nile Blue A Stain

Lipid stain. Stain results:

LipofuscinsUnstained – Natural Yellow
Melanin'sGreen

RT	26511-01	Nile Blue A Staining Solution	500 ml
RT	26511-02	Sulfuric Acid, 1% Aqueous	500 ml

➤ Pearse's Method for Phospholipids

For the staining of phospholipids, early lipofuchsin, etc.

Stain results:

Phospholipids:Blue
Nuclei and Nucleoli:Red
Early lipofuchsin, eosinophil granules, keratin, keratohyalin, human elastic tissues:Blue to Purple

REFERENCES:

- Pearse, A. G.E., J. Pathl. Bact., 70:554-557, 1995
- Luna, L.G. (ed), Manual of Histologic Staining Methods of the Armed Forces Institute of Pathology, 3rd Ed., McGraw-Hill, c. 1968, p. 148.

RT	26516-01	Luxol Fast Blue MBS Solution, 0.1%	500 ml
RT	26516-02	Lithium Carbonate, 0.05% Aqueous	500 ml
RT	26516-03	Neutral Red Solution, 1%, Aqueous	250 ml

TECHNICAL TIP

When a stain is applied both en-bloc and as a post-stain for thin sections, maximum contrast will be achieved.

TECHNICAL TIP

Staining Tips With Hematoxylin

1. Check a slide from each batch of slides during times the workload is heavy to insure good staining by the Hematoxylin.
2. Do not allow the slides to dry out at any point during your staining procedure.
3. Increase your staining time in Hematoxylin for tissues that have been in fixative longer than normal.
4. Increase your staining time by at least 1/3 for autopsy tissues.
5. Do not agitate the slides if you are using Ammonia water to Blue. The tissues are more susceptible to washing off if you agitate the slides.
6. Check the pH of the Hematoxylin daily.

TECHNICAL TIP

To eliminate section contamination during the staining procedure please refer to:

- Mollenhauer, H.H. and Morre', D.J. (1978). Contamination of thin sections, cause and elimination. Proc. 9th Int. Cong. Electron. Microsc., Vol.II, p.78
- Mollenhauer, H.H. (1986b). Stain contamination and embedding in electron microscopy. Proc. 44th Ann. Meet. EMSA, p.50. San Francisco Press, San Francisco
- Kuo, J., et al (1981). Forming and removing stain precipitates on ultrathin sections. Stain Technol., 56:199

TECHNICAL TIP

Stability Of Special Staining Solutions

General Guidelines Concerning Solutions

1. Check stock solutions regularly for signs of deterioration.
2. All solutions should be dated and initialed by the person who prepared the solution.
3. Use caution to prevent cross solution contamination.
4. Use distilled or double distilled water to prepare solutions.
5. Use reagent grade chemicals.
6. Use dyes which are certified .
7. Keep solutions in well stoppered bottles at all times.
8. Refrigerated solutions should be poured into the staining jar, and the bottled solution returned to the refrigerator before it warms to room temperature.
9. Return all staining solutions to shelves soon after use to prevent mix-up.
10. Always use clean glassware.
11. Make sure that balance, pH meter, etc., are in proper working order.

STAINING CHEMICALS AND PREPARED SOLUTIONS

➤ Prepared Staining Kits For Histology And Pathology (cont.)

I. MINERAL AND PIGMENT STAINS

➤ Rhodanine Method for Copper

Mineral and Pigment stain.

Stain results:

CopperBright Red to Red Yellow
NucleiLight Blue

REFERENCES:

■ Sheehan and Hrapchack, Theory and Practice of Histotechnology. St. Louis, The Mosby Company 1980 p. 230.

RT	26602-01	Rhodanine Saturated Solution	100 ml
RT	26602-02	Mayer's Hematoxylin	500 ml
RT	26602-03	Sodium Borate, 5% Aqueous	500 ml

➤ Johnson's Method for Iron - (Microincineration)

Mineral and Pigment stain.

Stain results:

Iron OxideBlue

REFERENCES:

■ Fenton R.H., Johnson, F.B., and Zimmerman, L.E., J. Histo-chem. Cytochem., 12:153-155, 1964.

■ Luna, L.G., (ed.), Manual of Histologic Staining Methods of the AFIP, 3rd edition, McGraw-Hill, NY, p.181, c 1968.

RT	26603-01	Potassium Ferrocyanide Sol, 5%	500 ml
RT	26603-02	Hydrochloric Acid, 5%	500 ml

➤ Lillie's Method for Iron

For the staining of ferric and ferrous iron.

Stain results:

Ferric Iron:.....Dark Prussian Blue
Ferrous Iron:Dark Turnbull's Blue
Background:.....Light Red

REFERENCES:

■ Lillie, R.D., Histopathologic Technic & Practical Histo-Chemistry, 3rd Ed., McGraw-Hill, N.Y., p. 407, c.1965.

■ Luna, G., (ed) Manual of Histologic Staining Methods of the AFIP, 3rd Ed., McGraw-Hill, N.Y., p. 182, c. 1968.

RT	26604-01	Potassium Ferrocyanide (For Ferric Iron)	50 g
RT	26604-1A	Potassium Ferricyanide (For Ferrous Iron)	50 g
RT	26604-02	Hydrochloric Acid, 0.5%	250 ml
RT	26604-03	Basic Fuchsin, 0.5% Solution	250 ml
RT	26604-04	Acetic Acid, 1%, Aqueous	500 ml

➤ Oil Red O Method for Lipofuscin

Pigment stain.

Stain results:

LipofuscinRed
NucleiBlue

REFERENCES:

■ Luna, L.G., (ED.), manual of Histologic Staining Methods of the AFIP, 3rd Edition. The AFIP, 3rd Edition, McGraw-Hill, NY, p 186, c 1968.

RT	26609-01	Oil Red O Solution, 0.5%	500 ml
RT	26609-02	Propylene Glycol, 85%, Aqueous	500 ml
RT	26609-03	Mayer's Hematoxylin	500 ml

➤ Hall's Method for Bilirubin

Stain results:

Biliverdin:Green
Collagen:.....Red
Muscle:.....Yellow

REFERENCES:

■ Hall, M.J., Amer. J. Clin., 34:313 -316, 1960

■ Luna, L.G., (ed), Manual of Histologic Staining Methods of the AFIP, 3rd Ed. McGraw-Hill, N.Y., p. 174, c. 1968

RT	26611-01	Fouchet's Reagent Refrigerated!	250 ml
RT	26611-02	Van Gieson Solution	500 ml

➤ Prussian Blue Method for Hemosiderin

For the staining of deposits of hemosiderin.

Stain results:

Hemosiderin:Blue or Green
Nuclei:Red
Background:.....Pink

REFERENCES:

■ Perls, M., Virchow's Arch. F. Path. Anat., 39:42-48, 1867

■ Highman, B., Arch. Path., 33:937-938, 1942

■ Lillie, R.D. Histopathologic Technic and Practical Histo-chemistry, 3rd Ed. McGraw-Hill, N.Y., 1965

■ Clark, G., (ed), Staining Procedures 3rd Ed., Williams & Wilkins, Baltimore, p. 157, c. 1973

RT	26613-01	Potassium Ferrocyanide, 2%, Aqueous	500 ml
RT	26613-02	Hydrochloric Acid, 2%	500 ml
RT	26613-03	Safranin O, 0.2%	500 ml
RT	26613-04	Acetic Acid, 1%, Aqueous	500 ml

➤ Gomori's Methenamine Silver for Urate Crystals

Urate crystals.

Stain results:

Urate Crystals:Black
Background:Green

REFERENCES:

■ Sheehan, Dezna C. and Hrapchak, Barbara B.: Theory and Practice of Histotechnology, 2nd Ed.

■ The C.V. Mosby Company, St. Louis, p.225-226, c. 1980.

RT	26613-04	Acetic Acid, 1%, Aqueous	500 ml
RT	26614-01	Silver Nitrate, 5%, Aqueous	250 ml
RT	26614-02	Methenamine, 3%, Aqueous	500 ml
RT	26614-03	Sodium Borate, 5%, Aqueous	500 ml
RT	26614-04	Gold Chloride, 0.1%	250 ml
RT	26614-05	Sodium Thiosulfate, 3%, Aqueous	500 ml
RT	26614-06	Light Green Working Solution	500 ml

STAINING CHEMICALS AND PREPARED SOLUTIONS

➤ Prepared Staining Kits For Histology And Pathology (cont.)

J. NEUROLOGICAL TISSUE STAINS

Method for Supporting Elements

➤ Ptah Method for Central Nervous Tissue

For staining microglia, fibroglia, fibrin and coarse fibrils.

Stain results:

Nuclei, Fibrin, Fibroglia, Microglia:Blue
Elastic Fibrils, Coarse:Purple

REFERENCES:

■ AFIP Manual of Histologic Staining Techniques; (ed) G. Luna, 3rd Ed. McGraw-Hill Publications, c. 1968, p. 199

RT	26658-01	Potassium Permanganate, 1%, Aqueous	500 ml
RT	26658-02	Phosphotungstic Acid Hematoxylin (Ptah)	500 ml
RT	26658-0	Oxalic Acid, 5%, Aqueous	500 ml
RT	26658-04	Lugol's Iodine Solution	500 ml
RT	26658-05	Russel's Modified Zenker's Fluid	500 ml

Methods for Nerve Cells, NISSL, Granules, Negri Bodies, and Chromatolysis

➤ Vogt's Method for Nerve Cell Products

Stain results:

Nissl Substance:Intense Purple
Nuclei:Purple
Background:Clear

REFERENCES:

■ AFIP, Manual of Histological Staining Methods, 3rd Ed., Ed. L. Luna: New York: McGraw-Hill Publications, c. 1968, p. 212

RT	26671-01	Cresyl Violet Acetate, 2%, Aqueous	100 ml
RT	26671-02	Acetate Buffer	500 ml
RT	26671-1A	Cresyl Violet Acetate Working Solution	250 ml

Methods for Myelin Sheaths

➤ Kluver-Barrera Method for Myelin and Nerve Calls

Relation of nerve cells to neuroglia, etc.

Stain results:

Myelin, including phospholipids:Blue to Green cells
Cells and Cell products:Pink to Violet

REFERENCES:

■ Kluver, H., and Barrera, E.: A method for the combined staining of cells and fibers in the nervous system. J. Nueropath. Exp. Neurol. 12:400 – 403, 1953

■ AFIP, Lab Methods in Histotechnology, ed. Edna B. Prophet, Bob Mills. Jacquelyn B. Armyl, Leslie H. Sobin, M.D. Wash, D.C. American Registry of Pathology, c. 1992, p. 94-95.

RT	26681-01	Luxol Fast Blue MBS Solution, 0.1%	250 ml
RT	26681-02	Cresyl Violet Acetate Solution, 0.1%, Aqueous	250 ml
RT	26681-03	Acetic Acid, 10%, Aqueous	250 ml
RT	26681-04	Lithium Carbonate Solution, 0.05%, Aqueous	250 ml

➤ Woelcker's Method for Myelin Sheath

Stain for myelin sheath, glial cells and nucleoli of neurons

Stain results:

Glial Cells, Nucleoli of neurons:Black
Myelin sheath:Blue
Background:Clear

REFERENCES:

■ AFIP: Manual of Histological Staining Methods, 3rd ed., Ed. L. Luna: New York: McGraw Hill Publications, c. 1968, p. 206.

RT	26684-01	Ferric Ammonium Sulfate, 2.5% Aqueous	500 ml
RT	26684-02	Alcoholic Hematoxylin Stock Solution, 10%	500 ml
RT	26684-03	Lithium Carbonate Solution, Saturated Aqueous	500 ml

Methods for Nerve Fibers and Nerve Endings

➤ Bodian's Protargol Method

For neurological tissue stains: Nerve fiber and nerve endings.

Stain results:

Nerve Fibers, NucleiBlack
Myelinin, Muscle, Erythrocytes, Lissamine
Fast Red CounterstainRed
Background-Lissamine Fast Red CounterstainYellow
Background-Aniline Blue CounterstainBlue

REFERENCES:

■ Luna, L.G.,(ed), Manual of Histologic Staining Methods of the AFIP 3rd Edition, McGraw-Hill, NY, c 1968, p.195.

■ Clark, G., (ed.). Staining Procedures, 3rd Edition, Williams & Wilkens Co., Baltimore, c. 1973, 98.

RT	26693-01	Protargol Solution, 1% Aqueous	500 ml
RT	26693-02	Cooper Shot	50 g
RT	26693-03	Gold Chloride, 1% Aqueous	250 ml
RT	26693-04	Aniline Blue Solution, or	500 ml
RT	26693-05	Lissamine Fast Red Solution	500 ml
RT	26693-06	Oxalic Acid, 2% Aqueous	250 ml
RT	26693-07	Sodium Thiosulfate, 5% Aqueou	500 ml
RT	26693-08	Phosphomolybdic Acid, 1% Aqu.	500 ml
RT	26693-09	Artrazine Solution, 1.5%	500 ml
RT	26693-10	Hydraquinone Reducing Solution	250 ml

➤ Hirano-Zimmerman Method for Nerve Cells and Fibers (1962)

For the staining of nerofibrils, dendrites, axis cylinders, senile plaques, etc.

Stain results:

Nucleolus and nuclear membrane: Black
Neurofibrils, dendrites and axis cylinders: Black
Cytoplasm of astrocytes and the cytoplasmic membranes of macrophages: Gray
Senile plaques Black

REFERENCES:

■ AFIP Manual of Histological Staining Methods, 3rd ed., Ed. L.Luna: New York: McGraw-Hill Pub., c 1968, p. 198

■ Hirano, A. and Zimmerman, H.M., Arch. Neurol., 6:114-122, 1962

RT	26698-01	Silver Nitrate, 10% Aqueous	250 ml
RT	26698-02	Ammonia Water, 0.1%	500 ml
RT	26698-03	Formalin Solution, 50%	500 ml
RT	26698-04	Gold Chloride, 0.05% Aqueous	500 ml
RT	26698-05	Sodium Thiosulfate, 5% Aqueous	500 ml

STAINING CHEMICALS AND PREPARED SOLUTIONS

► Prepared Staining Kits For Histology And Pathology (cont.)

K. NUCLEAR STAINS

Hematoxylin Method

► Ehrlich's Hematoxylin

Mallory (1938); Ehrlich (1886)

Nuclei

REFERENCES:

- Ehrlich, P., Biol. Centralbl., 6:214, 1886
- Mallory, F.B., Pathological Technique, W.B. Saunders Co Philadelphia, p 73, 1938
- Clark G., (ed.) Staining Procedures, 3rd edition, Williams & Wilkins, Baltimore, c. 1973, pp 33-34
- Luna, L.G., (Ed.), Manual of Histologic Staining Methods of the AFIP, 3rd ed, McGraw-Hill, NY, pp35 and 38, c 1968

RT	26753-01	Ehrlich's Hematoxylin Solution	500 ml
RT	26753-02	Acid Alcohol, 1%	500 ml
RT	26753-03	Sodium Acetate, 1% Aqueous	500 ml
RT	26753-3A	Ammonium Water, 0.3%	500 ml
RT	26753-3B	Lithium Carbonate, Saturated Aqueous	500 ml

► Harris Hematoxylin (1900)

Nuclei

RT	26754-01	Harris Hematoxylin Solution	500 ml
RT	26754-1A	Harris' Hematoxylin without Mercury	500 ml
RT	26754-03	Acid Alcohol, 1%	500 ml
RT	26754-04	Sodium Acetate Solution, 1% Aqueous	500 ml
RT	26754-4A	Ammonia Water, 0.3%	500 ml
RT	26754-4B	Lithium Carbonate, Sat'd, Aqueous	500 ml

► Weigert's Iron Hematoxylin with Methachromic Dyes

For Nuclear stain.

Stain results:

Nuclei.....Black
 Cytoplasm.....Gray-Green
 Mucus, Cartilage andYellowish Brown, Deep Red or
 Mast Cell GranulesOrange-Red depending on dye used

REFERENCES:

- Weigert, K., Z. Wissen. Mikro., 21:1-5, 1904
- Lillie, R.D., Histopathologic Technical and Practical Histochemistry, 3rd edition, McGraw-Hill, NY, 1965
- Clark, G., (ed.), Staining Procedures, 3rd Edition, Williams & Wilkins, Baltimore, p.40, c 1973.

RT	26758-01	Weigert's Iron Hematoxylin, Sol A	500 ml
RT	26758-02	Weigert's Iron Hematoxylin, Sol B	500 ml
RT	26758-03	Fast Green FCF Solution, 0.02%	500 ml
RT	26758-04	Bismark BrownY Solution, 0.1%,	500 ml
RT	26758-05	Safranin O, 0.1%	500 ml
RT	26758-06	Acetic Acid, 1% Aqueous	500 ml

Counterstains for Hematoxylin

► Eosin Y

RT	26762-0	Eosin Y Staining Solution, 1%, Alcoholic	500 ml
RT	26762-1A	Eosin Y Staining Solution, 1% Aqueous	500 ml

► Eosin-Phloxine Counterstain

RT	26763-01	Eosin Y Stock Solution, 1% Aqueous	500 ml
RT	26763-02	Phloxine B Stock Solution, 1% Aqueous	500 ml
RT	26763-03	Eosin-Phloxine Solution, Alcoholic	500 ml

Nuclear Stains – Others

► Wolbach's Giemsa Method

Wolbach, Todd, and Palfrey (1922)

For the staining of : nuclei, collagen, rickettsia and bacteria.

Stain Results:

Nuclei, Bacteria:.....Blue
 Rickettsia:.....Purple
 Collagen, other tissue elements:.....Pink to rose

REFERENCES:

- Wolbach, S.B., Todd, J.L., and Palfrey, F.W., The Etiology of Pathology Typhus, Harvard University Press, Cambridge, MA, p. 13-14, c. 1922
- Luna, L.G., (ed) Manual of Histologic Staining Methods of the AFIP, 3rd edition. McGraw-Hill, NY, p. 119, c. 1968

RT	26773-01	Giemsa Stock Solution,	250 ml
RT	26773-1A	Giemsa Working Solution	500 ml
RT	26773-02	Rosin Alcohol Stock Solution, 10%,	250 ml
RT	26773-2A	Rosin Alcohol Working Solution	500 ml
RT	26773-03	Lugol's Iodine,	500 ml
RT	26773-3A	Gram's Iodine	500 ml
RT	26773-04	Sodium Thiosulfate, 5% Aqueous	500 ml

► Lillie's Method for Nucleic Acids (1965)

Stain: Nuclear chromatin, and chromatin of plasmodia, etc.

Stain Results: Cells:

Nuclear chromatin.....Deep red-purple
 Cytoplasm:Light Green
 The chromatin of plasmodia, sarcosporidia toxoplasmata
 and histoplasmata.....Pale Red

REFERENCES:

- Lillie, R.D., Histopathologic Technic and Practical Histochemistry, 3rd ed, McGraw-Hill, NY, pp 149-150, c. 1965
- Luna, L.G., (ed) Manual of Histologic Staining Methods of the AFIP, 3rd ed. McGraw-Hill, NY, p. 131, c. 1968.

0-4°C	26774-01	Schiff's Reagent	500 ml
RT	26774-02	Hydrochloric Acid, 1N	500 ml
RT	26774-03	Sodium Bisulfite Solution 0.05M, Aqueous	500 ml
RT	26774-04	Fast Green FCF Solution, 0.01%	500 ml

► Taft's Method for Nucleic Acid (1951)

Stain DNA & RNA

Stain Results:

DNA, Deoxyribonucleic Acid:Blue Green
 RNA, Ribonucleic Acid:Bright Red

REFERENCES:

- Taft, E.B., Stain Tech., 26:205-212, 1951

RT	26777-01	Methyl Green – Pyronin Solution	500 ml
RT	26777-02	Differentiating Solution	500 ml

STAINING CHEMICALS AND PREPARED SOLUTIONS

➤ Prepared Staining Kits For Histology And Pathology (cont.)

L. PAPANICOLAOU STAINS

➤ Papanicolaou Stain for Membrane Filters

Stain results:

NucleiDeep Blue to Purple

REFERENCES:

- Gill, G.W., *ActaCytol.*, 18:300-311, 1974
- *Diagnostic Cytology by Membrane Filter*, Application Bulletin 100, Gelman Instrument Co., Ann Arbor, Michigan, 1978

RT	26801-01	Gill's Hematoxylin No 1	500 ml
RT	26801-02	Hydrochloric Acid, 0.05%	500 ml
RT	26801-03	Scott's Water Solution	500 ml
RT	26801-04	Modified Orange G Staining Sol.	500 ml
RT	26801-05	Modified EA Staining Solution	500 ml

M. GENERAL AND MISCELLANEOUS STAINS

➤ Periodic Acid Leucofuchsin Method – (PAS)

For General tissue stain. Stain results:

NucleiBlack on Blue
Cytoplasm ..Gray, Yellow or Orange (depending on the counter stain)
CollagenPink (Orange if Picric Acid is used as counterstain)
ReticulumPurplish Red (Orange red if Picric acid is used)
Glycogen-Dark Purplish Red
Epithelial mucinRed-Purple to Violet
Filbrin-Pink (Pink to violet if the Weigert Fibrin variantwas used as a counterstain)

REFERENCES:

- Clark, G.: *Staining Procedures*, Williams & Wilkins Co., Baltimore, 3rd Ed., c. 1973, p.156.

RT	26853-01	Schiff's Reagent	500 ml
RT	26853-02	Periodic Acid, 1%, Aqueous	500 ml
RT	26853-03	Sodium Bisulfite, 0.05M, Aque	500 ml
RT	26853-04	Mayer's acid Hemalum Sol., or	500 ml
RT	26853-05	Weigert's Iron Hematoxylin A	500 ml
RT	26853-06	Weigert's Iron Hematoxylin B	500 ml
RT	26853-07	Picric Acid, Saturated, Aque,	500 ml
RT	26853-08	Orange G Solution, 1%	500 ml

➤ Relative Acidophilia Stain

Stain results: The least acidophilic elements stained in the phloxine control slide lose the red color after 2 minutes in the tartrazine solution. The most acidophilic retain the phloxine after 20 minutes in the tartrazine.

REFERENCES:

- Lendrum, A.C, *J. Path. Bact.*, 59:399-404, 1947
- Clark, G., (ed.), *Staining Procedures*, 3rd Edition, Williams & Wilkins, Baltimore, p. 163, c. 1973.

RT	26901-01	Phloxine B Staining Solution	500 ml
RT	26901-02	Tartrazine Saturated Sol. in Cellosolve	500 ml
RT	26901-03	n-Butyl Alcohol	450 ml

➤ Leukocyte Alkaline Phosphatase

Phosphatase stain.

REFERENCES:

- Williams, W.J., Beutler, E., Erslev, A.J. and Rundles, R.W., *Hematology*, 2nd ed., McGraw-Hill, NY, C. 1977, p 1628-1629
- Kaplow, L.S., *AM. J. Clin. Pathol.*, 39:439, 1963
- Kaplow, L.S. and Burstone, M.S. *Nature*, 200:690, 1963

RT	26913-01	Buffered Acetone Fixative	500 ml
RT	26913-02	Naphthol AS-BI Phosphate	100 mg
RT	26913-03	Dimethyl Formamide	25 ml
RT	26913-04	Fast Red Violet Salt LB, or	100 mg
RT	26913-05	Fast Violet B Salts	100 mg
RT	26913-06	Propanediol Buffer	100 ml
RT	26913-07	Hematoxylin Counter Stain	500 ml

➤ AB/PAS/CG Stain

Adenohypophyseal stain. Stain results:

ACTH/MSH CellsPurple, Red and Orange- Red
TSH CellsLight to dark Purple-Blue
Gonadotropin Cells.....Intense Red, Blue-purple, Blue-turquoise
GH Cells.....Orange

REFERENCES:

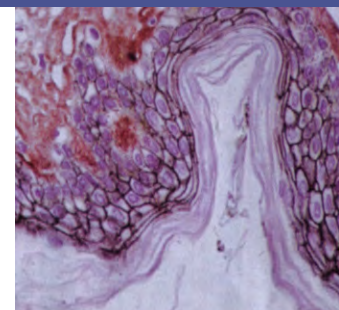
- McManus, J.F.A. and Mowry, R.W., *Staining Methods, Histologic and Histochemical*, P.B. Hoeber, NY, 1960
- Clark, G., (ED.), *staining Procedures*, 3rd Edition, Williams & Wilkins, Baltimore, p. 166, c 1973.

RT	26920-01	Alcian Blue 8GX Solution 1%, pH 2.6-3.0	500 ml
RT	26920-02	Sodium Carbonate, 0.3% Aque	500 ml
RT	26920-03	Periodic Acid, 1% Aqueous	500 ml
RT	26920-04	Schiff's Reagent	500 ml
RT	26920-05	Phophomolybdic Acid/Orange G Sol.	500 ml

For ImmunoGold Reagents...

See Section 2, pages 72-90

Including not only the more commonly known reagents for EM and LM but, as well, a newly introduced line of products such as Silver Enhancement specifically for EM, Ultra-Small Fab fragments, Blocking Solutions, and even a line of donkey gold conjugates.



► Embedding Media

► Paramat and Paramat Extra

Paramat is the original British blend of paraffin wax and plastic polymers and it has been used in histology labs throughout the world for over 20 years. It has been found that when plastic polymers are added to the paraffin the elasticity of the final block is greater as compared with paraffin alone. As well the mixture offers improved tissue penetration, easier ribboning of sections, reduced tendency to crumble, and improved overall results with fibrous tissue.

A recent development to Paramat is the addition of a very small amount of dimethyl sulfoxide (DMSO) which produces PARAMAT EXTRA. This formulation offers additional advantages, such as faster penetration of the tissue with a more homogeneous matrix to support the specimen.

TECHNICAL INFORMATION

■ **Appearance:** Milky-white, pastilles.

■ **Crystalline Structure under the microscope:** Needles & Platelets.

■ **Effect of heating (@ 60°C/ 100g):** Clear melt within max. 16 hrs.

■ **Solubility in Xylene (@ 20°C/ 1g in 50ml):** Clear solution within max. 16 hrs.

■ **Cutting results for 4mm sections:** Over 75% usable single; over 65% usable serial.

■ **Solubility in Xylene (section):** Max. 45 sec.

■ **Melting Point:** 56-58°C.

■ **Solidification Point:** 58-56°C.

■ **Tears and Vascoles:** None.

■ **Adhesion of sections Very good;** protein, to microscope slides: glycerol etc. is not required to hold the section in place.

■ **Free acid content:** Max. 0.01%.

■ **Block Structure:** No mottling, no shrinking.

■ **Block Solidification (Room Temperature):** About 2 hrs.

■ **DMSO content (Paramat Extra-only):** Less than 0.1%.

RT	19286-01	Paramat	1 kilo
RT	19286-10	Paramat	10 kilo

RT	19287-01	Paramat Extra	1 kilo
RT	19287-10	Paramat Extra	10 kilo



► Tissue-Tek® V.I.P.™

Sakura Finetek - High-quality paraffin for processing and embedding. Quality prepared wax - allows optimal sample preparation

■ **Allows reduced compression in sections as thin as 2µ**

■ **Melts at 56°C to protect samples from excessive heat**

■ **Will not discolor or produce resin precipitate**

■ **Small pellets for rapid melting in tissue processors/embedding centers.**

■ **Leaves no plasticizer residue to clog paraffin lines**

SPECIFICATIONS:

Medium Composition Purified paraffin and synthetic resin blend

Applications Processing/Embedding

Additives None

Melting Point 56°C

High Temperature Stability 65°C

Solid Product Range Pellets

Sectioning Range Down to 2µ

Cat.#	Tissue-Tek	Description	Pack
RT 62580-01	4005	Process/Embedding Wax	1 kg
RT 62580-08	4005	Process/Embedding Wax	8x1 kg



► Paraplast Embedding Medium

► Paraplast X-tra

Handy pellet form melts rapidly. Melting Point 53-54°C. Cuts to 2 micron thickness with exceptional ribbon continuity. Extra compression resistance provides total support of tissues.



RT	19214	Paraplast X-tra	1 kg
RT	19215	Paraplast X-tra	8 kg

► Paraplast Plus

Reduces infiltration time by one-third. Cuts to 2 micron thickness with excellent ribbon continuity. Convenient pellet form melts rapidly. Melting point 56°C. Double filtered. No need for filtration before use.

RT	19216	Paraplast plus	1 kg
RT	19217	Paraplast plus	8 kg

► Paraplast Medium

Handy pellet form melts rapidly. Melting Point 56°C. Cuts to 4 micron thickness with excellent ribbon continuity – no crumbling or cracking. Double filtered. No need for filtration before use.

RT	19218	Paraplast Medium	1 kg
RT	19219	Paraplast Medium	8 kg

► Carbowax, Polyethylene Glycol $H(OCH_2CH_2)_nOH$ CAS #25322-68-3

An embedding medium for microscopy and histochemistry.

Cat.#	Carbowax	M.W.	Average Density		Melting/Freezing Range, °C	Pack
			@ 20°C	@ 60°C		
RT 19700	PEG 200 viscous liquid	190-210	1.2390	1.0922	set to glass <-65	450ml
RT 19710	PEG 300 viscous liquid	285-315	1.1250	1.0928	-15 to -8	450ml
RT 19720	PEG 400 viscous liquid	380-420	1.1254	1.0930	4 to 8	450ml
RT 19730	PEG 600 viscous liquid	570-630	1.1257	1.0930	20 to 25	450ml
RT 19740	PEG 1000 Waxy	950-1050	—	1.0926	37 to 40	1 kilo
RT 19750	PEG 1450 Waxy	1300-1600	—	1.0919	43 to 46	1 kilo
RT 19760	PEG 3350 Waxy	3000-3700	—	1.0926	54 to 58	1 kilo
RT 19770	PEG 8000 Flakes	7000-9000	—	1.0845	60 to 63	1 kilo

Gao, K.X., (1993). Polyethylene Glycol as an Embedment for Microscopy and Histochemistry. CRC Press; ISBN# 0-8493-4323-2.

► Peel Away Paraffin Embedding Wax

A New low melting point polymer paraffin is introduced in the Peel-A-Way line for routine Histology work.



- This new paraffin formulation is more translucent and allows for small dermatological and biopsy specimens to be seen and sectioned easier.
- Its lower polymer content is easier to remove with all cleaning agents. (deparaffinization)
- Its lower viscosity allows for complete infiltration using routine times established for most tissue processors.

These new paraffins are sold in 2.5 kg lined paper and re-closable with a clip bag, and 4 bags per case.

RT	19300-01	Melting Point 52 – 54°C	2.5 kg
RT	19300	Melting Point 52 – 54°C	4x2.5 kg
RT	19302-01	Melting Point 56 – 58°C	2.5 kg
RT	19302	Melting Point 56 – 58°C	4x2.5 kg
RT	19304-01	Melting Point 62 – 64°C	2.5 kg
RT	19304	Melting Point 62 – 64°C	4x2.5 kg

Peel away embedding molds see page 554 >>>>

► Polyester Wax

A synthetic polyester wax with a very low melting point (37°C). Invented by Dr. H.F. Steedman, as a ribboning embedding medium. Its main advantage over paraffin and ester waxes is its low melting point, which reduces tissue hardening, shrinkage, and eliminates the need for infiltration ovens.



The wax is soluble in most organic solvents, including alcohol, ethers, esters, ketones and hydrocarbons. The wax is water tolerant, almost opaque, and sections easily. No electrification of ribbons occurs during sectioning. Sections of 2 microns and more may be cut at room temperatures between 10 and 22°C. It is advantageous to keep the wax in its solid state prior to use.

RT	19312	Polyester Wax	500 g
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► Polyfin™

Polyfin is a mixture of highly refined paraffins and co-polymer alloys in a convenient wax pellet. This unique formulation provides optimal tissue support while maintaining exceptional clarity. Our Polyfin™ has been institutionally tested and found to function flawlessly in pressure/vacuum fluid flow processors. Its low melting point (55°C) eliminates any tissue distortion caused by excessive heat during processing. In a recent study conducted by a Medical Center Histologist, monitored by a CPA firm using standard blind protocols, POLYFIN™ clearly demonstrated the least compression of seven popular paraffins.



RT	19280-01	Polyfin Embedding Medium	1 kilo
RT	19280-08	Polyfin Embedding Medium	8x1 kilo
RT	19280-15	Polyfin Embedding Medium	15 kilo

► Para/Gard™

A paraffin repellent for countertops as well as equipment. Just spray and wipe away. No more paraffin build up around your work area. Para/Gard™ is a pleasant smelling, non-toxic spray which is safe for use on metal, wood, and plastic surfaces. Comes in a 4 oz. pump bottle.

RT	64140-01	Para/Gard	4 oz.
RT	64140-06	Para/Gard	6x4 oz./cs



► Tissue Freezing Medium; TFM™

An embedding matrix for frozen sections. TFM™ is an ultra pure formulation of water-soluble glycols and resins that provides a solid bond between the tissue and the object holder with the following features:

- Less Ice Artifacts: TFM's reduced water content minimizes freeze-fracturing.
- Less Curling: TFM allows you to pick up flat serial sections with ease.
- Freezes Faster: TFM freezes very fast and offers better turn-around time.
- Completely water soluble: TFM reduces tissue dislodging.
- Now available in 5 colors: clear, yellow, green, red and blue.

RT	72592	Tissue Freezing Medium, Clear	4 oz
RT	72593	Tissue Freezing Medium, Clear	12x4 oz
RT	72592-Y	Tissue Freezing Medium, Yellow	4 oz
RT	72593-Y	Tissue Freezing Medium, Yellow	4x4 oz
RT	72592-G	Tissue Freezing Medium, Green	4 oz
RT	72593-G	Tissue Freezing Medium, Green	4x4 oz
RT	72592-R	Tissue Freezing Medium, Red	4 oz
RT	72593-R	Tissue Freezing Medium, Red	4x4 oz
RT	72592-B	Tissue Freezing Medium, Blue	4 oz
RT	72593-B	Tissue Freezing Medium, Blue	4x4 oz



► Tissue-Tek® O.C.T. Compound

Sakura Finetek - This is a well known water soluble glycol's and resins compound that provides an excellent specimen matrix for cryostat sectioning at temperatures of -10°C and below. It leaves no residue during the staining procedure.

Cat.#	Tissue-Tek	Description	Pack
RT	62550-01	4583 O.C.T. Compound	4 oz
RT	62550-12	4583 O.C.T. Compound	12/cs



► Cryogenic-Gel

- It replaces the messy "runny" embedding media.
- It's easy to use.
- Sticks to where you want it.
- Will not run – No waste.

This gel is highly viscous, water-soluble embedding medium for frozen sections that "stays put". The gel is packaged in a pump-dispenser bottle that instantly dispenses the gel in any desired position. The dispenser has a built-in "guillotine" that cleanly severs the gel from the pump spout and prevents any "stringy" medium from pulling away when the bottle is removed. Simply dispense gel on a room temperature block-holder. Use cold heat extractor to form a base layer. Dispense additional gel. Place the tissue on top of gel. Use cold heat extractor to freeze tissue and form block.



Cat.#	Description	Pack
62806-01	Cryo-Gel™ 4.3oz	each
62806-06	Cryo-Gel™ 4.3oz	12/cs

► Tissue-Tek® NEUTRA-GUARD™ Aldehyde Control Systems

These products offer a safe, efficient and economical solution for the control of aldehyde wastes and/or spills:

- 4 unique products for fast, safe and efficient aldehyde neutralization
- Eliminates exposure to potentially hazardous conditions
- It is a certified technology for treating formalin waste
- Complies with federal, state, and local ordinances

► Neutralex™

- CAL/EPA certified technology
- Complete aldehyde neutralization in 15 minutes
- No drain-clogging polymer by-products
- Final neutralization levels down to 10 ppm
- No pH adjustment
- Easy to use: Pre-measured pouches are ready to use convenient to store and will not leak or freeze during the winter months.
- Neutralex® Starter Kit consists of:
 - 16 Neutralex® pre-measured pouches, each pouch neutralizes 4 liters (1 gallon) of aldehyde
 - Aldehyde Test Kit consisting of 100 analytical test strips
 - 9.5 L (2.5 gallon) Reaction Container



Cat. #	Tissue-Tek	Description	Pack
63330-SK	4046	Neutralex™ Starter Kit	each
63330-16	4047	Pre-measured Pouches	16/pk.
63330-10	4050	Aldehyde Test Kit	100/pk.
63330-25	4276	9.5 L Reaction Container	each

JB-4 Embedding and Mounting Chucks, See Specimen Preparation, page 250 >>>>

JB-4 Mounting Medium, See Chemicals section, page 94 >>>>

Histocryl Embedding Resin, See Embedding Media Kits, page 95 >>>>

Tissue Tack Adhesive for JB-4, See Adhesives and Mountants, Chemicals section page 21 >>>>

► Neutra Pads™

- Revolutionary grossing pad that absorbs and neutralizes 10% formalin
- Significantly reduces the effects of noxious vapors
- Unique pad design encapsulates formalin and promotes neutralization
- Exclusive plastic pad backing prevents escape of harmful liquids; keep grossing area drier, cleaner and safer

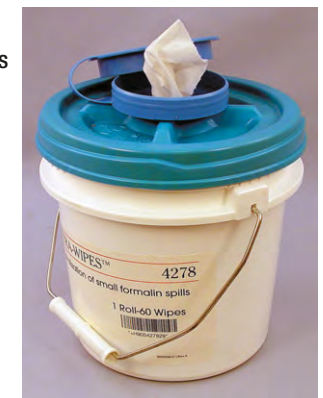


- Neutra-Pads™ come packaged: 10 pads per bag, 10 bags per case, each pad measures 20.3 x 25.4 cm (8" x 10")

Cat. #	Tissue-Tek	Description	Pack
63332-01	4295	Neutra-Pads™	10/pk.
63332-10	4295	Neutra-Pads™	100/pk.

► Neutra-Wipes™

- Rapidly absorbs and neutralizes small formalin spills
- Significantly reduces the effects of noxious vapors
- Perfect liner for tissue transporting trays
- Ideal as a shelf liner in tissue storage areas
- Convenient pop-up dispensing container provides fast accessibility to wipes
- Neutra-Wipes™ Starter Pack consists of:
 - 1 dispenser
 - 1 roll of Neutra-Wipes™



- Four-Roll Packs consists of: 4 rolls, 60 wipes per roll; Wipe size: 30.5 cm x 31.8 cm or (12" x 12.5")

Cat. #	Tissue-Tek	Description	Pack
63334-SP	4278	Starter Pack	each
63334-04	4279	4-Roll Pack	each

► Neutra-Form™

- Fast, effective control agent for accidental aldehyde spills
- Diminishes harmful vapors
- Neutralizes hazardous aldehydes
- Neutra-Form™ Sets consist of: 2 containers; each container neutralizes larger spills of 10% formalin or 2% glutaraldehyde.



Cat. #	Tissue-Tek	Description	Pack
63335-02	4304	Neutra-Form™ Set	each

► Histocryl Resin

Histocryl acrylic resin has been specially formulated for light microscopy. It is water clear, and because it is hydrophilic (polar) it permits the use of most routine staining techniques without prior removal or etching.



RT	14390	Kit consists of:	
		500ml Histocryl resin	
		25gm Histocryl Catalyst	
		10ml Histocryl Accelerator	Complete Kit

► GMA, Water Soluble

Glycol Methacrylate embedding medium provides excellent preservation (especially enzymatic autoradiographic studies). Good for E.M., L.M., and Histo. Leduc. & Bernard, (1967) J. Ultrastr. Res., 4, 196-99.

RT	14200	Kit consists of:	
		450ml GMA	
		225ml n-Butylmethacrylate	
		15g Benzoyl Peroxide paste.	Kit

► GMA/PEG

Polyethylene Glycol - Glycol methacrylate mixture. A water miscible embedding medium for cytochemical studies and enzyme localization when light and electron microscopy need to be correlated.

Spaur, R.C. & Moriarty, G., (1977) J Histochem. Cytochem., 23:163.

RT	14250	Kit consists of:	
		450ml Glycol methacrylate, GMA	
		225ml n-Butyl methacrylate	
		50ml Ethylene glycol dimethacrylate	
		15g Benzoyl Peroxide Paste	
		20ml Polyethylene Glycol 400	Kit

► Immuno-Bed™ Embedding Resin

■ A low viscosity media for light microscopy and immuno- histo-chemistry techniques.

■ It allows for the penetration of large immunoglobulins through the plastic sections for demonstration of antigenic sites.

J. Histochem, Cytochem., 35:595 (1987)

	14260-00	Kit consists of:	
		800 ml Solution A	
		30 ml Solution B	
		12 g Catalyst	
0-5C	14260-01	Immuno-Bed Solution A only	800 ml
RT	14260-04	Immuno-Bed Solution B only	30 ml
RT	14260-06	Immuno-Bed Catalyst only	12 g

For all of our Methacrylate Embedding Kits including our complete Technovit line see pages 94, 97, 98-100 >>>>

► JB-4™ Embedding Kit

A water soluble embedding media which is based on Glycol Methacrylate (GMA) plastic embedding. It is intended for use in preparing samples for high resolution microscopes (HRLM). The catalyzed monomer acts as a dehydration and infiltration agent; therefore, complete dehydration through 100% ethanol is not necessary (although recommended for large or dense tissues). Conventional paraffin sections have a greater degree of shrinkage and produce inadequate morphology when compared to JB-4.

FEATURES:

- Thin sections (.5-2.0 micron) with excellent morphological structure preservation.
- Water-clear blocks; casts in 90 minutes max. at room temp.
- Good lipid and enzyme retention when processing at low temperatures (4°C).
- Removal of JB-4 resin prior to staining is not necessary.
- Clearing agents such as xylene and chloroform are not needed.
- Higher clarity and contrast than with paraffin sections.
- Easy processing of difficult specimens such as calcified bone and delicate embryonic tissue.

References:

1. Hofman E.O. & Flores, T.R., High Resolution LM in Renal Path., Amer. J. of Clin. Path., 76:5 (1981)
2. Beckstead, J.H., Blood, 57(6):1008 (1981)
3. Brinn, N & Pickett, P., J. Histochem., 2(5):125-130 (1979)
4. Block, Matthew H., et al., Lab. Med., 13(5)(1982)
5. Helander, K.G., J. Microscopy, 132:223 (1983)
6. Cole, M.B., J. Microscopy, 127:139 (1982)
7. Higuchi, S., et al., Stain Tech., 54(1):5-12 (1979)
8. Van DeVeldt, S., Am. J. Clin. Path., 73:121 (1980)
9. Horton, W.A., J. Histochem. Cytochem., 31:417 (1983)
10. Tacha, D.E. & Richard, T.C., J. Histochem., 4(2):59 (1981)

RT	14270-00	JB-4 Kit Consists of:	
		800 ml Solution A	
		30 ml Solution B	
		12 g Catalyst	Kit
RT	14270-01	JB-4 Solution A only	800ml
RT	14270-04	JB-4 Solution B only	30ml
RT	14270-06	JB-4 Catalyst	12gm

► JB-4 Plus™ Embedding Kit

JB-4 Plus offers all of the same features as JB-4 with the following additions:

- It produces less of an exothermic reaction than JB4 which is good for temperature sensitive tissues.
- It produces harder blocks which is ideal for dense samples, such as bone.

RT	14272-00	JB-4 Plus Kit Consists of:	
		500 ml Solution A	
		15 ml Solution B	
		8 g Benzoyl Peroxide Catalyst	Kit
RT	14272-01	JB-4 Plus Solution A only	500ml
RT	14272-04	JB-4 Plus Solution B only	15ml
RT	14272-06	JB-4 Plus Catalyst	8g

For all other Embedding Media Kits see page 92-102 >>>>

► Feather™ Scalpel Blades Selection

► 1. Scalpel Handle with Blade; Disposable

Made by Feather. Sterile, stainless steel disposable scalpels with a handle. They are packed in aluminum foil, and are available in a variety of sizes.



Cat.#	Description	Qty/Box
72042-10	Disposable Scalpel Set #10	20/bx
72042-11	Disposable Scalpel Set #11	20/bx
72042-12	Disposable Scalpel Set #12	20/bx
72042-15	Disposable Scalpel Set #15	20/bx
72042-20	Disposable Scalpel Set #20	20/bx
72042-21	Disposable Scalpel Set #21	20/bx
72042-22	Disposable Scalpel Set #22	20/bx
72042-23	Disposable Scalpel Set #23	20/bx
72042-24	Disposable Scalpel Set #24	20/bx

► 2. Scalpel Blades/Feather

Sterile, stainless steel surgical scalpel blades, wrapped individually.



Cat.#	Description	Qty/Box
72044-10	Sterile Scalpel Blades #10	100/bx
72044-11	Sterile Scalpel Blades #11	100/bx
72044-12	Sterile Scalpel Blades #12	100/bx
72044-15	Sterile Scalpel Blades #15	100/bx
72044-20	Sterile Scalpel Blades #20	100/bx
72044-21	Sterile Scalpel Blades #21	100/bx
72044-22	Sterile Scalpel Blades #22	100/bx
72044-23	Sterile Scalpel Blades #23	100/bx
72044-24	Sterile Scalpel Blades #24	100/bx

► 3. Feather; Sterile MicroScalpels; Stainless Steel

- Micro precision, ultra sharp, points.
- Sure-grip aluminum or plastic handle-color coded for easy angle identification.
- Sterilized by gamma irradiation.
- Disposable.
- Available in 3 angle styles: 15, 30 and 45°.
- Comes in a carbonate plastic case.



Cat.#	Description	Blade Thickness	Qty
72045-15	Feather Micro Scalpel, 15°, Al Handle	0.1mm	5/bx
72045-30	Feather Micro Scalpel, 30°, Al Handle	0.1mm	5/bx
72045-45	Feather Micro Scalpel, 45°, Al Handle	0.1mm	5/bx
72046-15	Feather Micro Scalpel, 15°, Plastic Handle	0.1mm	5/bx
72046-30	Feather Micro Scalpel, 30°, Plastic Handle	0.1mm	5/bx
72046-45	Feather Micro Scalpel, 45°, Plastic Handle	0.1mm	5/bx

► 4. Scalpel Handles/Feather

- Handle #3; 100mm long, flat with corrugated grip. For use with scalpel blades #10, #11, #12 and #15.
- Handle #4; 105mm long, flat with corrugated grip. For use with scalpel blades #20, #21, #22, #23, and #24.
- Handle #7; 140mm long, slender, contoured with corrugations. For use with scalpel blades #10, #11, #12, and #15



Cat. #	Description	Qty.
72040-03	Scalpel Handle #3	each
72040-04	Scalpel Handle #4	each
72040-07	Scalpel Handle #7	each

► 5. Microsurgical Knife - Premier Edge™

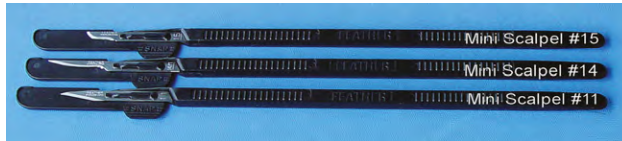
Made from tool steel wire. Sharpened to microsurgical quality. The knife-edges are available in three different configurations: 45, 30 and 15 degrees angle. The handle is plastic and they come sterile and in a blister pack individually, 6 blister packs to a box.



Cat.#	Description	Blade Thickness	Qty
72047-15	Microsurgical Knife, 15°	0.11–0.19mm	6/bx
72047-30	Microsurgical Knife, 30°	0.11–0.19mm	6/bx
72047-45	Microsurgical Knife, 45°	0.11–0.19mm	6/bx

► Disposable Mini Scalpel - Sterile

Feather® Disposable Mini Scalpels are made from heat-treated stainless steel. The blades are smaller than standard blades, come with chemical resistant, slender plastic handle. Handle is 5¼" (145mm) long. Available in three popular styles: #11, #14 and #15, and packaged in a sterile pouch, 20 per box. ISO 14001 compliant, ISO 9001 certified and ISO13485 certified.



Cat. #	Description	Qty.
72041-11	Disposable Scalpel, Mini, #11	20/pk.
72041-14	Disposable Scalpel, Mini, #14	20/pk.
72041-15	Disposable Scalpel, Mini, #15	20/pk.

► Feather® Safeshield™

Disposable Scalpel – Sterile

Made from heat-treated stainless steel, these scalpels are excellent for delicate precise procedures. They fit the hand comfortably and are designed with safety in mind. They reduce injury and transmitted disease from contaminated blades. They feature a clear protective, retractable shield and have a color coded button on the protective shield which assists with blade size identification.

Individually packaged, 10 per box.



Cat. #	Description	Qty.
72043-10	Feather® Safeshield™ Blade #10	10/pk.
72043-11	Feather® Safeshield™ Blade #11	10/pk.
72043-14	Feather® Safeshield™ Blade #14	10/pk.
72043-15	Feather® Safeshield™ Blade #15	10/pk.
72043-15C	Feather® Safeshield™ Blade #15C	10/pk.
72043-20	Feather® Safeshield™ Blade #20	10/pk.
72043-21	Feather® Safeshield™ Blade #21	10/pk.
72043-22	Feather® Safeshield™ Blade #22	10/pk.
72043-23	Feather® Safeshield™ Blade #23	10/pk.
72043-24	Feather® Safeshield™ Blade #24	10/pk.
72043-25	Feather® Safeshield™ Blade #25	10/pk.

► BD* Carbon Steel Scalpel Blade 60

Made from surgical carbon steel, size 60 with convex cutting edge. The most useful in histology labs.



These scalpel blades are 2½" (6cm) long and ribbed for extra rigidity. They are non-sterile and are wrapped individually. Bard-Parker brand.

72050-10 #60 Scalpel Blade (BD #371340) 150/cs

► BD* Disposable Blade Knife Handles



These strong, molded plastic handles provide a secure palm-fitting grip for postmortem work, trimming light plaster casts, and similar forceful cutting. Handle size #6 and #8 Bard-Parker* brand. Handles are sold separately from the interchangeable listed above.

Use blade sizes 10, 11, 12, 15 for handle size 5. Use blade sizes 20, 21, 22, 23 for handle size 6. Use blade size 60 for handle size 8

Cat.#	Size/Length	Pack
72040-05	#5/ 4¾" (12.4cm)	each
72040-06	#6/ 5⅝" (13.1cm)	each
72040-08	#8/ 5½" (13.4cm)	each

► Graduated Scalpel Handle #3



This #3 scalpel handle comes with metric graduations.

72040-30 #3 Graduated Scalpel Handle each

► Scalpel Handles

Made from carbon steel for the blades below.

Cat. #	Description	Qty
72051-3	Scalpel Handle #3	1/pk
72051-4	Scalpel Handle #4	1/pk

► Scalpel Blades

Premiere® Blades are made from carbon steel, individually foil wrapped and gamma radiation sterilized. They are exceptionally strong and relatively uniformly sharp, ideal for routine laboratory dissecting, tissue mincing and where you do not need high cost blades.



Cat. #	Description	Qty
72049-10	Premiere® Blade #10	100/pk
72049-11	Premiere® Blade #11	100/pk
72049-12	Premiere® Blade #12	100/pk
72049-15	Premiere® Blade #15	100/pk
72049-20	Premiere® Blade #20	100/pk
72049-21	Premiere® Blade #21	100/pk
72049-22	Premiere® Blade #22	100/pk
72049-23	Premiere® Blade #23	100/pk
72049-24	Premiere® Blade #24	100/pk
72049-25	Premiere® Blade #25	100/pk

► Tissue-Tek® Accu-Edge® Disposable Scalpel



(1) Handle; (2) Blade #61; (3) Blade #62

Sakura Finetek—These reusable handles and disposable blades are ideal for surgical specimens and dissecting work. These sterile stainless steel blades are available in size #61 and #62 and are approximately 2 inches long. The durable plastic handles are autoclavable.

Cat.#	Tissue-Tek	Description	Pack
62566-01	4791	Scalpel Handle	each
62566-61	4792	Scalpel Blades #61	20/pk
62566-62	4793	Scalpel Blades #62	20/pk

► Tissue-Tek® Accu-Edge® Semi-Disposable Autopsy Knife System



Sakura Finetek—These semi-disposable autopsy knives are made of high quality stainless steel with autoclavable plastic handle which accommodates all three sizes of blades while maintaining optimal balance and control.

Cat.#	Tissue-Tek	Description	Pack
62572-01	4781	Autopsy Knife Handle	each
62572-10	4782	Autopsy Blade, 100mm	5/pk
62572-17	4783	Autopsy Blade, 170mm	5/pk
62572-20	4784	Brain Blades	5/pk

► One Piece Scalpel Blade with Handle



An all metal, carbon steel scalpel with a black enamel handle. Blade length: 1½". Overall length: 6" (165 mm).

Cat.#	Description	Pack
72048-01	Scalpel Blade with Handle	each

► Disposable Scalpel Sets

High quality carbon steel is mounted on plastic handle, individually foil wrapped and sterilized by gamma irradiation. Packed 10 each /box. They are exceptionally strong and relatively uniformly sharp, ideal for routine laboratory dissecting, tissue mincing and where you do not need high cost blades

Cat. #	Description	Qty
72052-10	Scalpel Handle Set #10	10/pk
72052-11	Scalpel Handle Set #11	10/pk
72052-15	Scalpel Handle Set #15	10/pk
72052-20	Scalpel Handle Set #20	10/pk
72052-22	Scalpel Handle Set #22	10/pk

► Tissue-Tek® Accu-Edge® Trimming Knife Handles and Disposable Blades



Sakura Finetek - Extremely sharp and light weight. Designed for surgical grossing and autopsy procedures. Extremely sharp edge allows a wide variety of sectioning and trimming tissue samples. Disposable blades can be easily inserted into handle.

Cat.#	Tissue-Tek	Description	Pack
Handles:			
62560-01	4786	Short, Straight	each
62560-04	4790	Long, Straight	each
62560-10	4787	Short, Right Handed	each
62560-14	4788	Short, Left Handed	each
Disposable Blades:			
62561-10	4785	Short Blade, (130 mm L x 18mm W)	50/pk
62561-20	4789	Long Blade, (260 mm L x 18 mm W)	50/pk

► Tissue-Tek® Accu-Edge® Replacement Blade Scissors



Sakura Finetek—These Accu-Edge® replaceable blade scissors are sharp and prevent cross contamination every time a scissor is used for tissue processing. Blades are made from stainless steel and are autoclavable, corrosion free and easily inserted and removed with the use of an enclosed tool. Blades are available separately or as a pair. They are sold 5 pairs per package: sharp-sharp, sharp-blunt, blunt-blunt.

Cat.#	Tissue-Tek	Description	Pack
62570-01	4794	Replacement Blade Scissors	each
62570-05	4795	Blades, Sharp-Sharp	5/pk
62570-06	4796	Blades, Sharp-Blunt	5/pk
62570-07	4797	Blades, Blunt-Blunt	5/pk

For more Forceps and Fine Tweezers see Tweezers and Tools section page 756-852 >>>>

Dissecting Forceps and Needles see Tweezers and Tools section pages 818-825 >>>>

► Lighted Forceps and Scissors: Illuminated and Ergonomic

- Increases the visibility of the specimen
- Minimizers Floaters
- Allows for accurate orientation of tissue and specimen
- Reduces embedding and prep time

77905-01	Lighted Forceps, 13CM Smooth Fine Tip	kit
77905-02	Lighted Forceps, 15CM Smooth Fine Tip	kit
77905-03	Lighted Forceps, 18CM Smooth Fine Tip	kit
77905-04	Lighted Forceps, 14CM, Smooth, Fine Tip, Ergonomic Embedding Forceps	kit
77905-05	Lighted Forceps, 16CM Serrated Blunt Tip	kit
77905-06	Lighted Forceps, 20CM Serrated Blunt Tip	kit
77905-07	Lighted Mayo Scissor 17CM Blunt/Blunt Tip	kit
77905-07	Lighted Surgical Scissor 17CM Blunt/Blunt Tip	kit

(Each kit includes: one instrument, power pack & battery charger)



Scissors



Forceps

See your samples and your embeddings in a whole new light! These lighted forceps ease identification and location of otherwise undetectable tissue fragments, while reducing embedding time. Increases the visibility of specimen allowing for more accurate work. Made of German stainless steel, are submersible and light longevity approx. 20,000 hours.

► Halstead Mosquito Forceps

Stainless Steel hemostatic forceps with box lock joint and serrated jaws. It measures: 5" (127mm) long.

72942-5S	Halstead Mosquito Forceps, Straight	each
72942-5C	Halstead Mosquito Forceps, Curved	each



72942-5S



72942-5C

► Baby Metzenbaum Scissors

Very delicate stainless steel scissors.

72943-5S	Metzenbaum Scissors 5½", (146mm), Straight	each
72943-5C	Metzenbaum Scissors 5½", (146mm), Curved	each
72943-7C	Metzenbaum Scissors 7", (178mm), Curved	each



72943-5S



72943-5C

► Doyen Scissors

Stainless Steel Scissors with two heavy blunt points; 7" (178mm) long.

72944-7S	Doyen Scissors, Straight	each
72944-7C	Doyen Scissors, Curved	each



72944-7S



72944-7C

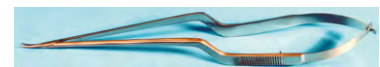
► Yasargil Bayonet Scissors

Delicate stainless steel scissors with a spring handle; 8" (203mm) long.

72936-8S	Yasargil Bayonet Scissors, Straight	each
72936-8C	Yasargil Bayonet Scissors, Curved	each



72936-8S



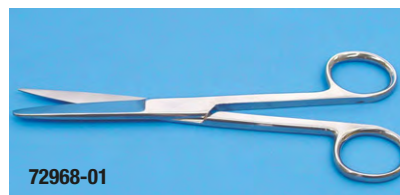
72936-8C

► Dissecting Scissors - Operating Scissors

Made from stainless steel. They come in a variety of styles and lengths:

- S/B - One sharp point and one blunt point
- S/S - Two sharp points
- B/B - Two blunt points

72964-01	Scissors, Straight, 4½", B/B.	each
72964-02	Scissors, Curved, 4½", S/B..	each
72964-03	Scissors, Curved, 4½", B/B..	each
72966-01	Scissors, Curved 5½", S/B.	each
72966-02	Scissors, Straight, 5½", S/S.	each
72966-03	Scissors, Curved, 5½", S/S..	each
72966-04	Scissors, Straight, 5½", B/B..	each
72966-05	Scissors, Curved, 5½", B/B..	each
72968-01	Scissors, Straight, 6½", S/B..	each
72968-02	Scissors, Curved, 6½", S/B..	each
72968-03	Scissors, Straight, 6½", S/S..	each
72968-04	Scissors, Curved, 6½", S/S..	each
72968-05	Scissors, Straight, 6½", B/B..	each
72968-06	Scissors, Curved, 6½", B/B..	each



72968-01



72964-02



72966-02



72964-03



72964-01



72966-03

► Steel Ruler



Stainless steel ruler. 1 millimeter thick, 1 centimeter wide, 1 decimeter long. Its volume is 1 cubic centimeter and its weight in grams is the specific gravity. One edge is graduated in millimeters.

72909 Steel Ruler each

► Perfect Loop; Light Microscopy



70940

Using our perfect loop you can pick up your freshly cut thick sections easily onto the grid mesh without creases. The outside diameter of the loop is 7mm.

70940	LM set of handle & Loop	set
70941	LM loop only	each
70942	LM loop only	5/pk
70943	LM handle	each

For a more detailed description of the Perfect Loop see page 260 >>>>

► Crucible Tongs

Stainless steel tongs with tapered tips which meet precisely when closed. Length: 9½" (241mm).



72906 Crucible Tongs each

► Seeker/Probe



Stainless steel with a hexagonal handle.

- Single end probe which comes with one fine point curved tip.
- Double ended probe which comes with one end tapered to a point and one end curved with a rounded tip.

72945-01	Single-End Seeker/Probe	each
72945-02	Double-End Seeker/Probe	each

► Stainless Steel Probes



These probes are scalpel sharp for fine probing. They are useful for many applications, such as micro positioning, solder probing, and band inspection.

62125-10	Stainless Steel Probes	4/set
62125-11	Stainless Steel Probes #1	each
62125-12	Stainless Steel Probes #2	each
62125-13	Stainless Steel Probes #3	each
62125-14	Stainless Steel Probes #4	each

► Mall Probe



63324-20

6" long, Chrome plated with one blunt bent end and hexagonal shape handle

Cat. #	Description	Qty
63324-20	Mall Probe, 6" L,	each

► Probe with Eye



Stainless steel, 5" long, 2mm diameter. Flat one end with eye.

Cat. #	Description	Qty
63324-30	Probe With Eye, 5" L	each
63324-32	Probe With Eye, 6" L	each
63324-33	Probe With Eye, 7" L	each
63324-34	Probe With Eye, 8" L	each

► Huber Probe



63324-10

Chrome Plated. 6" long, one blunt bent end, and one chisel finish on the other end

Cat. #	Description	Qty
63324-10	Huber Probe 6" L	

► Forceps Jar

Made of stainless steel with wide base and polished finished.



Cat. #	Description	Qty
63313-03	Forceps Jar, 3" Dia x 3" High	each
63313-04	Forceps Jar, 4" Dia x 4" High	each
63313-05	Forceps Jar, 3" Dia x 4" High	each
63313-06	Forceps Jar, 4" Dia x 5" High	each
63313-07	Forceps Jar, 4" Dia x 8" High	each

► Combination Probe Set

Probe set include two-way handle and four probe heads. These probe heads (A, B, C, D) are easily screwed into the handle (H). This set is very convenient for field work or on the move.

All packed in a handy plastic zippered case. Handle is 6.5 inch long.



63325-00

Cat. #	Description	Qty
63325-00	Combination Probe Set	each

► Probe and Hook



63324-40

Chrome plated, 6" long with pointed probe in one end and pointed sharp curved hook on the other end

Cat. #	Description	Qty
63324-40	Probe and Hook, 6" L,	each

► Disposable Delta Spreaders

- **Edgeless Design** — Soft, rounded corners won't tear agar.
- **Even Pressure** — Unique delta shape smoothly distributes media.
- **Ripple Handle** — Allows for easy and comfortable manipulation.
- **Sterile** — May be used right out of the box.
- **Measurements** — 172mm x 37mm, 4mm diameter.



Cat. #	Description	Qty
70498-40	Purple, Delta Spreader	500/case

► Disposable L-Shaped Spreaders

- **Smooth Surface** — Will not tear agar or disrupt media layer.
- **ABS Plastic** — Spreaders are durable and lightweight.
- **Sterile** — No flaming required.
- **Measurements** — 146mm x 38mm, 4mm diameter.



Cat. #	Description	Qty
70498-45	Green, L Spreader	500/case

► Dissecting T-Type Pins

Stainless steel, with T shapes head pin and pointed end.



63307-60

Cat. #	Description	Qty
63307-60	Dissecting T-Type Pins,	6/pk



62420-10

► Bacti-Cinerator IV

Features:

- Sterilizes loops and needles safely and conveniently.
- Prevents infectious spatter and/or cross contamination.
- Safeguard laboratory personnel -no open flame -no hazardous gas.
- Ideal for use in anaerobic chambers.

The Bacti-Cinerator IV sterilizes by infrared heat (Heater Element contains no asbestos) - organic material is incinerated deep inside the ceramic tunnel. To use, simply insert loop or needle into the tunnel. Complete sterilization takes only 5 to 7 seconds at optimum sterilizing temperature of 1,500°F. There is no need to wait for the loops or needles to turn red. Unit does not require oxygen so it can be used in anaerobic chambers. Operates on 120 Volt, 60 Hz. UL approved.

Cat.#	Description	Qty/pk
62420-10	Bacti-Cinerator IV , 115 Volt	each
62420-20	Bacti-Cinerator IV , 220 Volt	each
62420-40	Bacti-Cinerator IV , 240 Volt	each
62420-52	Replacement Switch	each
62420-51	Replacement Bacti III Heater Element, 115V	each
62420-53	Replacement Bacti III Heater Element, 220V	each
62420-54	Replacement Bacti III Heater Element, 240V	each
62420-55	Replacement Bacti IV Heater Element, 115V	each
62420-56	Replacement Bacti IV Heater Element, 220V	each
62420-57	Replacement Bacti IV Heater Element, 240V	each

► Inoculating Loop/Needle



72952-10



72952-20

Nichrome wire. An 8" aluminum handle with a 3" nichrome wire, 25 gauge. Loop O.D. is 4mm; loop I.D. is 2.5 mm. Available with a loop or a needle.

72952-10	Inoculating Loop	12/pk
72952-20	Inoculating Needle	12/pk

► Calibrated Loops



The 0.01 ml loops are calibrated to A.P.H.A. Standards and are made from 19 gauge B&S platinum wire with 5% rhodium. The 0.001 ml loops is made from 26 gauge B&S platinum with 15% iridium.

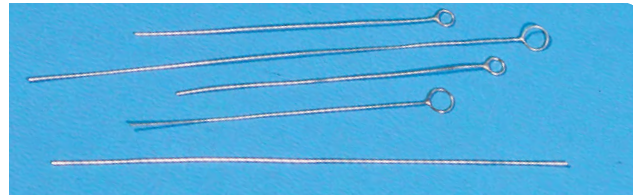
Cat.#	Contained Volume	Loop Diameter	Length	Pack
62430-10	0.01 ml	4 mm	25 mm	each
62430-20	0.01 ml	4 mm	70 mm	each
62430-30	0.001 ml	1.45 mm	70 mm	each

► Inoculating Needle

Made from 26 gauge B&S platinum wire with 15% iridium to provide rigidity with thinner wire for delicate work. Both ends are ground smooth.

62432-01	Inoculating Needle, 70 mm	each
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► Inoculating Loops



Our high quality inoculating loops are made from platinum wire. The 15% iridium adds necessary rigidity permitting thinner wire for delicate work. The loop section is welded and smoothly finished to form a "perfect circle".

Cat.#	Loop Dia. mm	B & S Gauge	Length mm	Pack
62433-02	2	24(0.5106 mm)	45	each
62433-03	3	24 (0.5106 mm)	45	each
62433-05	5	24 (0.5106 mm)	45	each
62434-02	2	26 (0.4038 mm)	45	each
62434-03	3	26 (0.4038 mm)	45	each
62434-05	5	26 (0.4038 mm)	45	each
62435-02	2	28 (0.3206 mm)	45	each
62435-03	3	28 (0.3206 mm)	45	each
62436-03	3	24 (0.5106 mm)	70	each
62436-05	5	24 (0.5106 mm)	70	each
62437-02	2	26 (0.4038 mm)	70	each
62437-03	3	26 (0.4038 mm)	70	each
62437-05	5	26 (0.4038 mm)	70	each
62438-02	2	28 (0.3206 mm)	70	each
62438-03	3	28 (0.3206 mm)	70	each

► BIOLOOP Disposable Incubation Loops and Needles



- Eliminate the need for flaming metal loops and exposure to airborne pathogens.
- Precision molded from biological inert polymers.
- Three color coded designs: Blue - 1µl loop/needle
Natural - 10µl loop/1µl loop
Yellow - 10µl loop/needle
- Irradiation sterilized.
- Available either individually wrapped or in zip seal bags.

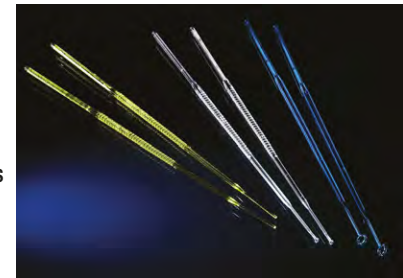
Ordering:

Cat.#	Description	Qty/cs
62446-01	10µl Loop/Needle, Yellow, Individually Wrapped, 500/bag	500/cs
62446-02	10µl Loop/Needle, Yellow, 50 Bags of 10	500/cs
62446-03	10µl Loop/Needle, Yellow, 50 Bags of 10	500/cs
62447-01	10µl/1µl Natural, Individually Wrapped	500/cs
62447-02	10µl/1µl Natural, 10 Bags of 50	500/cs
62447-03	10µl/1µl Natural, 50 Bags of 10	500/cs

► Loop and Needle - Disposable

Made from Polystyrene

- Eliminates the need for flaming metal loops and exposure to air-borne pathogens
- Cross contamination due to improper sterilization is eliminated
- Surface treated for enhanced droplet adhesion
- Supplied sterile in easy-to-open packs of 10 or 25
- Color coded for product identification
- Problem-free inoculation with smooth loop surface
- Precision molded
- Made from virgin raw material which complies with USP class VI requirements
- Calibration certificate available
- Total length: 22.7cm



Cat.#	62448-25	62448-10	62449-50	62449-12	62450-50	62450-12
Description	White Needle	White Needle	Blue Loop	Blue Loop	Yellow Loop	Yellow Loop
Unit per pack/case	25/1000	10/1000	25/1000	10/1000	25/1000	10/1000
Total Volume	N/A	N/A	1 µl	1 µl	10 µl	10 µl

► Needle and Knife Interchangeable Handle

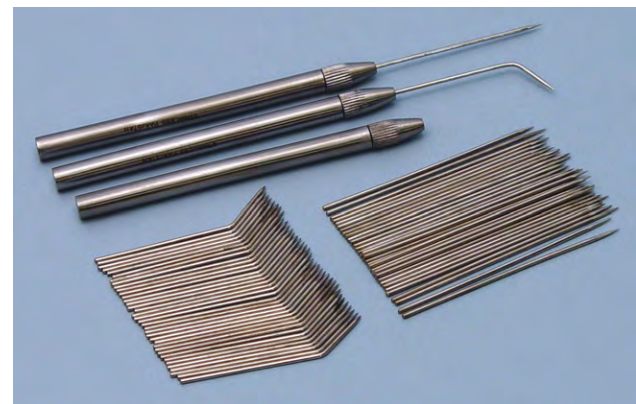
Made from stainless steel, pin-vise type Handle, which accepts either dissecting needles or a knife.

Handle: 92 mm (3 $\frac{3}{8}$ ") L x 6 mm ($\frac{1}{4}$ ") diameter

Needle: available with straight or bent, 60 mm (2 $\frac{1}{2}$ ") long

Knife: spear type with single or double edge, 75 mm (3") long

Cat.#	Description	Qty/pk
72953-HD	Handle	each/pk
72953-10	Needle, Straight	36/pk
72953-11	Needle, Bent	36/pk
72953-20	Spear Shape Knife, Single Edge	36/pk
72953-21	Spear Shape Knife, Double Edge	36/pk



► Inoculating Loop and Needle Holders

Made from durable, heat resistant brass with a fiberglass insulating sleeve over the gripping area. The threaded collet type collar holds all wire gauge.

62440-06	Loop & Needle Holder 6 in. (152mm)	each
62440-08	Loop & Needle Holder 8 in. (203mm)	each



► The EMS Germinator 500 – The Germ Terminator™

Dry Sterilizer

The GERMINATOR 500™ is a convenient effective way to quickly decontaminate your micro-dissecting instruments. No more need for messy chemicals or open flames in the lab, and the small footprint saves bench space! Very effective

The GERMINATOR 500 is a simple, inexpensive way to quickly decontaminate your micro-dissecting instruments between procedures. The unique stainless steel glass bead bath remains at a constant 500 degrees F, allowing you to insert the tips of your instruments whenever you wish to decontaminate them. And it's fast...most micro-dissecting instruments decontaminate within 15 seconds!

- The operating temperature for the unit is 500°F 15° (233°C)
- No messy chemicals and no need for open flames in the lab.

The unit measures 6.75" x 5.25" x 5.25" (H x W x D) and the Stainless Steel Well measures: 2.0" diameter x 4.0" deep(ID). The unit only weighs 4.5lbs and it is available in 110 or 220 volt. (UL Listed)

The GERMINATOR 500 has the following features:

- Easy to use
- Fast, effective decontamination
- Small footprint saves bench space
- Proven durable design
- Perfect for micro-dissecting scissors and forceps
- Glass Beads: 1.5mm lead free glass balls
- U.L. Listed
- 1 YEAR WARRANTY!
- Modular Cord
- Exclusive Well Collar

66118-10	EMS Germinator 500™ 110 Volt	each
66118-20	EMS Germinator 500™ 220 Volt	each



► Glass Bead Sterilizers

These glass bead sterilizers are quick and easy to use and they are compact and light weight which makes them suitable for table tops or workbenches. They are used to sterilize instruments used in most laboratories and doctors' offices, dentists' offices, clinics, hospitals etc, killing spores and bacteria within 10 seconds!

All units are supplied with one filling of glass beads. Glass beads size ranging 1.5 – 2.0 mm diameter.



BS500 #66116-5



BS1000 #66116-10



BS2000 #66116-20

Model	BS300*	BS500	BS1000	BS2000
Cabinet Size (L x W x H, mm)	185x125x135	140x142x202	150x195x225	140x142x202
Crucible Size, mm Diameter x Depth	50 x 50	50 x 75	50 x 137.5	50 x 162.5
Preset Temperature Range, °C	230 – 250	230 – 250	245 – 265	230 - 250
Initial Stabilization Time	30 minutes	30 minutes	30 minutes	30 minutes
Weight (Inclusive Glass Beads)	2.60 kg	2.90 kg	4.13 kg	4.15 gm
Wattage	75, single phase	150, single phase	250, single phase	250, single phase
Electrical	220V or 110V	220V or 110V	220V or 110V	220V or 110V

We suggest that glass beads be replaced at least once in three months.

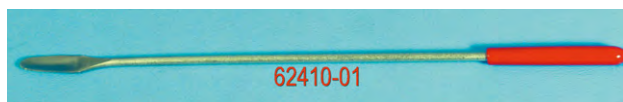
Clean the glass beads at least once every 2 weeks. Remove glass beads when the unit is completely cool. Wash with mild soap, rinse and dry thoroughly before re-use.

Ordering:

66116-3*	Glass Bead Sterilizer, Model BS300 (Available in Blue, Black, Red, Green, Brown and Gray)	each	66116-20	Glass Bead Sterilizer, Model BS2000	each
66117-3			66117-3	Glass Beads Replacement, Model BS300	each
66116-5	Glass Bead Sterilizer, Model BS500	each	66117-5	Glass Beads Replacement, Model BS500	each
66116-10	Glass Bead Sterilizer, Model BS1000	each	66117-10	Glass Beads Replacement, Model BS1000	each
			66117-20	Glass Beads Replacement, Model BS2000	each

*Model BS300 is available in colors: Black, Red, Green, Brown, Blue and Gray. Please indicate your color when ordering. If you're not mentioned your color, we automatically ship color Blue.

► Micro Spoon with Resin Coated Handle



A micro spoon and spatula made from nickel stainless steel and coated with a glazed finish resin on the handle. The wire is 0.103" (2.62 mm) in diameter.

Overall length: 6-1/2" (165 mm).

The spoon end length: 1" (25 mm) x 1/4" (6.35 mm) wide.

Cat.#	Description	Pack
62410-01	Micro Spoon with Resin Coated Handle	each

► Micro Spoon Heyman Type A



A Heyman type micro spatula made from nickel stainless steel with a glazed finish. The wire diameter is 0.103" (2.62 mm).

Overall length: 6-1/4" (159 mm).

Flat end: 1-1/4" (31.35 mm) long.

The spoon end: 1/2" (12.5 mm) long x 1/8" (3 mm) wide.

Cat.#	Description	Pack
62411-A	Micro Spoon Heyman Type A	each

► Micro Spoon Heyman Type B



A Heyman type micro spatula made from nickel stainless steel with a glazed finish. The wire diameter is 0.103" (2.63 mm).

Overall length: 6-1/4" (159 mm).

Sharpened bent end: 1-1/2" (37.5 mm) long.

V-Shaped formed other end: 1/2" long.

Cat.#	Description	Pack
62411-B	Micro Spoon Heyman Type B	each

► Stainless Steel Spatulas



We offer a selection of stainless steel spatulas - a "must tool" when handling embedding wax.

Cat.#	Description	Qty
63320-03	SS Spatula 3" Long x 9/16" Wide Blade	each
63320-04	SS Spatula 4" Long x 1/2" Wide Blade	each
63320-05	SS Spatula 5" Long x 13/16" Wide Blade	each
63320-06	SS Spatula 6" Long x 7/8" Wide Blade	each
63320-08	SS Spatula 8" Long x 1 1/8" Wide Blade	each
63320-10	SS Spatula 10" Long x 1 1/16" Wide Blade	each
63320-12	SS Spatula 12" Long x 1 1/2" Wide Blade	each



► Flexible Spatulas

This is a sword type spatula, made from stainless steel with a wooden handle. This spatula is very thin and has bendability toward the end and very stiff towards the handle. It offers flexibility when working with soft materials, such as embedding waxes. The overall length is 6 3/4"

Cat.#	Description	Qty
63321	Flexible Spatulas	each

Be sure to check out...

Harris Micro-Punch™ and Harris Uni-Core™

The Harris Micro-Punch™ and Uni-Cores are designed to serve research scientists with a dissection tool for small pre-defined regions of the tissue or the specimen.

Many applications in:

- Forensics**
- Biomedical Pharmacology**
- Anatomy and more!**
- Electrophysiology**



For more information, see page 305-307 >>>>

► Cartilage Knife



A heavy duty stainless steel blade with a riveted wooden handle.
Blade length: 3½" (90mm), Total length: 8½" (216mm)

72990 Cartilage Knife each

► Autopsy Instruments

EMS now offers these premium grade, hardened stainless steel autopsy instruments, featuring a protective coating for extra durability and protection from rust and corrosion. Satin-matt finish reduces eye-fatiguing glare.

A. Brain Knife

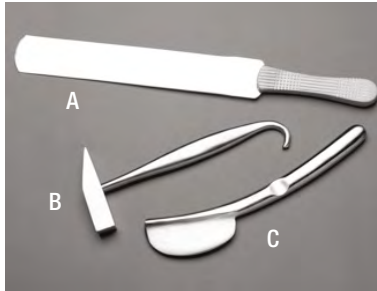
Double-sided edged knife for precision brain sectioning.

B. Skull Breaker

Fracturing hammer for brain access. Available with chisel bottom or hook bottom.

C. Rachitome

Curved rachitome. For specific skull fracturing.



Cat No.	Description	Qty.
70566-10	A. Brain Knife, 9-1/2" (241 mm) Blade	each
70566-11	B. Skull Breaker 5-1/2" (140 mm), Hook End	each
70566-12	B. Skull Breaker 5-1/2" (140 mm), Chisel End	each
70566-13	C. Rachitome 8-3/4" (222 mm)	each

► Brun's Metacarpal Saw

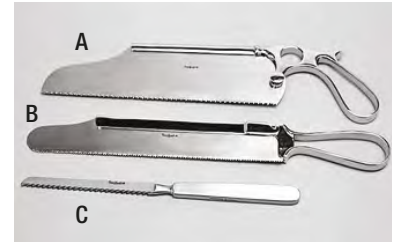


A stainless steel saw. Its overall length is 190mm and its cutting edge is 70mm.

72895-30 Brun's Metacarpal Saw each

► Saws

Three styles of manual bone saws are available. The broad bladed Satterlee Saw (**A**), the thinner rounded tip Charriere Saw (**B**), and the solid handle Langenbech Metacarpal Saw (**C**). Each saw has serrated teeth.



Cat No.	Description	Qty.
70566-30	B. Charriere Saw 10-1/2" (267 mm)	each
70566-31	A. Satterlee Saw 11-1/2" (292 mm)	each
70566-32	Satterlee Saw Replacement Blade	each
70566-33	C. Langenbech Metacarpal Saw 9" (229 mm)	each

► Bone Saw



A rounded end, 203mm blade. The inside handle grip is 70mm and the finger opening is 25mm.

72895-20 Bone Saw each

► Bone Shears



Made from stainless steel with a removable bar spring; perfect for cutting cartilage and bone.

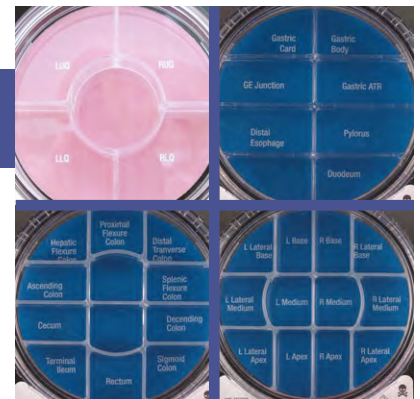
72894-05 Bone Shears, 5½"(L) (140mm) each
72894-08 Bone Shears, 8"(L) (203mm) each

CoreDish™

Multiple Biopsy Containers Half Prefilled with 10% Formalin

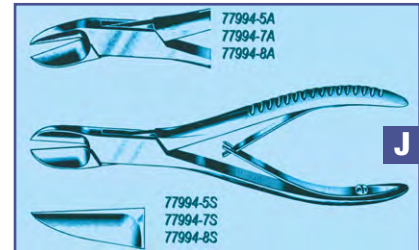
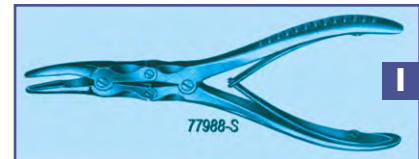
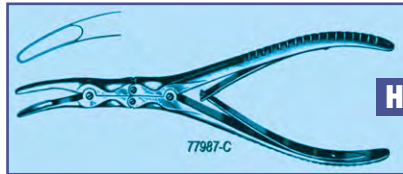
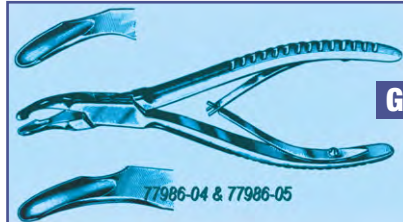
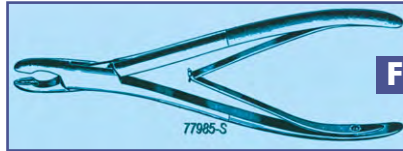
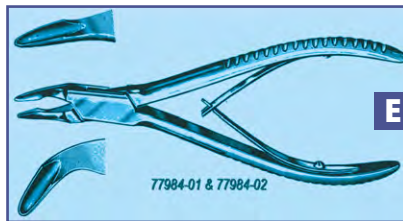
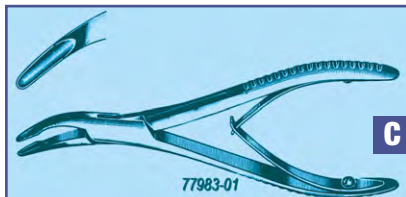
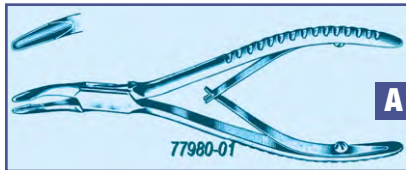
We are proud to offer a multi-compartment container in the shape of a dish and half prefilled with 10% Neutral buffered Formalin, for holding and transporting biopsies. It is supplied with a leak-proof closure with O-ring ensuring total protection of contents. It conforms to OSHA directives.

For more information, see page 42. >>>>



► **Bone Rongeurs and Cutters**

Made from stainless steel with a polished finish



► **A. Friedman**

Mini Bone Rongeur, Curved. The jaw width is 2mm and it is 5½" long.

77980-01 Friedman Bone Rongeur each

► **B. Micro-Friedman**

Bone Rongeur, curved.

Very delicate. The jaw width is 1.3mm. and it is 5½" long.

77981-01 Micro-Friedman Bone Rongeur each

► **C. Luer**

Bone Rongeur, curved. Delicate

The jaws width is 3mm. and it is 6" long.

77983-01 Luer Bone Rongeur, 3mm Blade each

► **D. Lempert**

Bone Rongeur. The jaw width is 2.5mm and the length is 6½".

Available either straight or slightly curved

77982-S Lempert Bone Rongeur, Straight each

77982-C Lempert Bone Rongeur, Slightly Curved each

► **E. Blumenthal**

Bone Rongeur. The jaw width is 3mm and it is 6" long.

77984-01 Blumenthal Bone Rongeur, Light Curved each

77984-02 Blumenthal Bone Rongeur, Full Curved each

► **F. Adson**

Bone Rongeur. The jaw width is 7mm and it is 8" long.

77985-S Adson Bone Rongeur, Straight each

77985-C Adson Bone Rongeur, Slightly Curved each

► **G. Micro Cleveland**

Bone Rongeur. Curved jaws. They are available with a 4mm jaw width 5½" long or 5mm jaw width and 7" long.

77986-04 Micro Cleveland Bone Rongeur, 4mm each

77986-05 Micro Cleveland Bone Rongeur, 5mm each

► **H. Beyer**

Bone Rongeur. Double action

– They are curved and have

a jaw width of 3.5mm and

are 7" long

77987-C Beyer Bone Rongeur, Double Action each

► **I. Bohler**

Bone Rongeur. Double action. The jaw width is 3mm and they are 6" long.

77988-S Bohler Bone Rongeur, Double Action, Straight each

77988-C Bohler Bone Rongeur, Double Action, Curved each

► **J. Liston**

Bone Cutting Forceps. Box joint and they are available either straight or angled.

77994-5S Liston Bone Cutting Forceps, 5½" Straight each

77994-7S Liston Bone Cutting Forceps, 7½" Straight each

77994-8S Liston Bone Cutting Forceps, 8½" Straight each

77994-5A Liston Bone Cutting Forceps, 5½" Angled each

77994-7A Liston Bone Cutting Forceps, 7½" Angled each

77994-8A Liston Bone Cutting Forceps, 8½" Angled each

► **K. Bohler**

Double action bone cutting forceps. They are 6" long.

77995-6S Bohler Bone Cutting Forceps, 6" Straight each

77995-6A Bohler Bone Cutting Forceps, 6" Angled each

► **L. Bone Nipper**

A delicate straight 4" long nipper.

77996-6S Bone Nipper, 4" Straight each

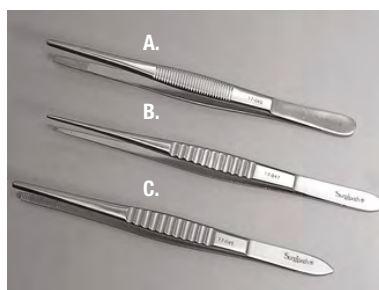
► **M. Bone Cutting Forceps**

These forceps are chrome plated and they are 5½" long.

77997-5S Bone Cutting Forceps, 5" Straight each

► Thumb Dressing Forceps

These conventional forceps are very popular and are available in a variety of length, tip, and handle styles.

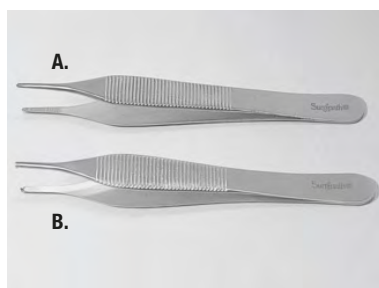


- Made of premium grade, hardened stainless steel
- Feature a protective coating for extra durability and protection from rust and corrosion
- Satin-matt finish reduces eye-fatiguing glare

Cat No.	Description	Qty.
77937-21	4" (102 mm) Serrated Tips, Fine Grip	each
77937-22	5" (127 mm) Serrated Tips, Fine Grip	each
77937-23	A. 5-1/2" (140 mm) Serrated Tips, Fine Grip	each
77937-24	B. 6" (152 mm) 2 mm Smooth Tips, Broad Grip	each
77937-25	7" (178 mm) 2 mm Smooth Tips, Broad Grip	each
77937-26	6" (152 mm) Serrated Tips, Fine Grip	each
77937-27	C. 6" (152 mm) Serrated Tips, Broad Grip	each
77937-28	7" (178 mm) Serrated Tips, Broad Grip	each
77937-29	8" (203 mm) Serrated Tips, Broad Grip	each
77937-30	12" (305 mm) Serrated Tips, Fine Grip	each

► Adson Forceps

Available in 4 styles. All feature a paddle-style, fine-grooved handle.



- Made of premium grade, hardened stainless steel
- Feature a protective coating for extra durability and protection from rust and corrosion
- Satin-matt finish reduces eye-fatiguing glare

Cat No.	Description	Qty.
77937-35	A. 4-3/4" (121 mm) Adson Tissue Forceps, Serrated	each
77937-36	6" (152 mm) Adson Tissue Forceps, Serrated	each
77937-37	7" (178 mm) Adson Tissue Forceps, Serrated	each
77937-38	B. 4-3/4" (121 mm) Adson Tissue Forceps, 1 x 2 Teeth	each

► 7" (178 mm) Ergonomic Paddle Handle Forceps

Available with either smooth, serrated, needle tips, or with 1 x 2 teeth.



178mm versions are for those preferring a longer forcep and a wider variety of tip choices.

Curved styles are well suited for retrieving specimens from the inside perimeter of transport jars and tissue separation in the water bath.

- Made of premium grade, hardened stainless steel
- Feature a protective coating for extra durability and protection from rust and corrosion
- Satin-matt finish reduces eye-fatiguing glare

Cat No.	Description	Qty.
77937-44	7" (178 mm) Ergonomic Forceps, Paddle Handle, 3 mm Smooth Tips	each
77937-45	7" (178 mm) Ergonomic Forceps, Paddle Handle, 3 mm Serrated Tips	each
77937-46	7" (178 mm) Ergonomic Forceps, Paddle Handle, 3 mm 1 x 2 Teeth	each
77937-47	7" (178 mm) Ergonomic Forceps, Paddle Handle, 1.5 mm Smooth Tips	each
77937-48	7" (178 mm) Ergonomic Forceps, Paddle Handle, 1.5 mm Serrated Tips	each
77937-49	7" (178 mm) Ergonomic Forceps, Paddle Handle, Needle Tip	each
77937-54	7" (178 mm) Ergonomic Forceps, Paddle Handle, 1.5 mm Curved 30° Serrated Tip	each
77937-55	7" (178 mm) Ergonomic Forceps, Handle, 1.5 mm Curved 30° Smooth Tips	each

► 5-1/2" (140 mm) Ergonomic Forceps

Available with smooth, serrated, or needle tips.



5 1/2" (14 cm) ergonomic versions for those who prefer a shorter forcep.

- Made of premium grade, hardened stainless steel
- Feature a protective coating for extra durability and protection from rust and corrosion
- Satin-matt finish reduces eye-fatiguing glare

Cat No.	Description	Qty.
77937-56	5-1/2" (140 mm) Ergonomic Forceps, 1.5 mm Smooth Tips, Straight	each
77937-57	5-1/2" (140 mm) Ergonomic Forceps, 1.5 mm Smooth Tips, Curved 30°	each
77937-58	5-1/2" (140 mm) Ergonomic Forceps, 1.5 mm Serrated Tips, Curved 30°	each
77937-59	5-1/2" (140 mm) Ergonomic Forceps, 1.5 mm Serrated Tips, Straight	each
77937-60	5-1/2" (140 mm) Ergonomic Forceps, 1.5 mm Serrated Tips, Needle Tip	each

► Forceps



► SEMKEN

These forceps are available in Serrated/Straight tips with either a 1.3mm or a 1.7mm tip width.

78608-5S	Semken Forceps, 1.3mm Tip, 5" Long	each
78608-6S	Semken Forceps, 1.7mm Tip, 6" Long	each



► IRIS – Dressing Forceps

Made from stainless steel, 4" long. The forceps are delicate and the tips are serrated (1mm wide). Comes complete with a guide pin.

78610-4S	Iris Dressing Forceps, Straight	each
78610-4HC	Iris Dressing Forceps, Haft Curved	each
78610-4FC	Iris Dressing Forceps, Full Curved	each



► IRIS – Tissue Forceps

Same as above but with 1x2 Teeth and they are extra delicate. Made from stainless steel and they are 4" long. The tips are 1.2mm wide.

78611-4S	Iris 1x2 Teeth Tissue Forceps, Straight	each
78611-4HC	Iris 1x2 Teeth Tissue Forceps, Haft Curved	each
78611-4FC	Iris 1x2 Teeth Tissue Forceps, Full Curved	each



► HARMS – Micro Suturing Forceps

These forceps are delicate with a 6mm parallel platform. They are 4" long. And they are available with either straight tips or curved tips.

78614-4S	Harms Micro Suturing Forceps, Straight	each
78614-4C	Harms Micro Suturing Forceps, Curved	each



► MICROSURGERY FORCEPS– With Tying Platform

These are very delicate forceps with a knurling handle and are 5" long

78622-5S	Microsurgery Forceps, Straight	each
78622-5C	Microsurgery Forceps, Curved	each


78615-4S

78615-4A

► MCPHERSON – Tying Forceps

Available with straight or angled tips with 5mm tying platform (parallel gripping platform). 4" long.

78615-4S	Mcpheerson Tying Forceps, Straight	each
78615-4A	Mcpheerson Tying Forceps, Angled	each



► KELMAN-MCPHERSON – Tying Forceps

These forceps are angled with a 7.5mm tying platform (parallel gripping platform) and they are 4" long.

78616-4A	Kelman-Mcpherson Tying Forceps, Angled	each
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► CASTRO-VIEJO – Micro-Dissecting Forceps with Tying Platform

These forceps are available with straight tips and in 4 configurations. All of them are 4½" long.

78620-4A	Castro-Viejo w/Tying Platform, 0.12mm Teeth	each
78620-4B	Castro-Viejo w/Tying Platform, 0.3mm Teeth	each
78620-4C	Castro-Viejo w/Tying Platform, 0.5mm Teeth	each
78620-4D	Castro-Viejo w/Tying Platform, Smooth Jaw	each

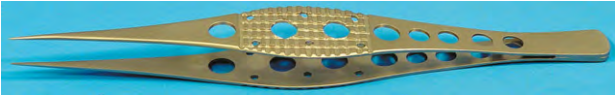
► Non Slip Grip Forceps – Ergonomic



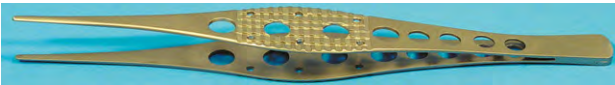
78300-S and 78300-C



78301-S; 78301-C, and 78301-B



78303-S



78304-S

This outstanding design fits nicely into all hands with perfect functionality. These forceps offer a light touch and they are non-slip and have high precision finish tips. They are the choice of all histologists. These ergonomic forceps come in 7 different configurations.

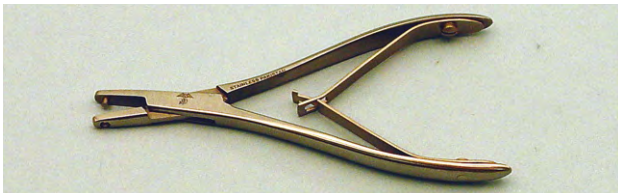
Cat.#	Description	Pack
78300-S	140mm long. Tip width: 1.0mm. Serrated and Straight Tips	each
78300-C	Same as #78300-S but Curved Tips	each
78301-S	175mm long. Tip width: 0.75mm. Serrated and Straight Tips	each
78301-C	Same as #78301-S. Serrated and Curved Tips	each
78301-B	Same as #78301-S Serrated and Bent Tips	each
78303-S	175mm long. Tip Width: 0.05mm. Fine and Smooth Straight Tipseach	each
78304-S	175mm long. Tip width: 2.0mm. Smooth, Round and Straight Tips	each

► DIEFFENBACH Serrefine

Stainless steel, serrated jaws.



Cat.#	Description	Pack
63326-S	Serrefine, 1½", Straight	each
63326-C	Serrefine, 1½", Curved	each
63327-S	Serrefine, 2¼", Straight	each
63327-C	Serrefine, 2¼", Curved	each



► Ear Punch

Made from stainless steel. Allows for you to make a 2mm hole through the animal ear in just one second. It also can be used as a specimen puncher.

Cat.#	Description	Qty
72893-01	Ear Punch	each

► Curved Forceps



6" (152mm), Stainless Steel, Medium fine tips, curved smooth points.

72910	Curved Forceps	each
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► Curved Forceps



EMS Brand, Swiss made forceps from low carbon austenitic steel, corrosion resistance, high quality, curved tips, available with different length and tips style

■ Curved Forceps with medium tips

Cat. #	Description	Qty
72910-6	6" (152mm L) Medium, Non-serrated Tips	each
72910-6S	6" (152mm L) Medium, Serrated Tips	each
72910-7	7½" (180mm L) Medium, Non-serrated Tips	each
72910-7S	7½" (180mm L) Medium, Serrated Tips	each

► Curved Forceps with Fine Tips



Cat. #	Description	Qty
72911-6	6" (152mm L) Fine, Non-serrated Tips	each
72911-6S	6" (152mm L) Fine, Serrated Tips	each
72911-7	7½" (180mm L) Fine, Non-serrated Tips	each
72911-7S	7½" (180mm L) Fine, Serrated Tips	each

► Magic Wands

Magic Wands are made from PEEK, a high performance plastic, with excellent chemical resistance and withstands high temperatures (up to 300°C).



Magic wand is ideal for use for electronic high-tech areas to laboratories, from preparation of samples to applying adhesives, using it as a stirring rod, or evendosing samples etc.

Cat.#	Description	Qty	Price
63323-01	Fine tip and Flat strong tip, 6" (150mm)	each	
63323-02	Curved tip and flat strong tip, 6" (150mm)	each	
63323-03	Flat fine tip and flat sharp tip, 5" (130mm)	each	

► For a complete line of Tweezers, Scissors, Forceps and other related tools,

See Tweezers, Tools and Gadgets, pages 756-852. >>>>

► Dissecting Kit, 8 pieces, Stainless Steel

Kit includes:

- | | | |
|--|---|---|
| 1 4½" Dissecting forceps with curved and serrated tips | 1 4½" Dissecting forceps straight and serrated tips | 1 4½" Dissecting scissors, sharp, straight points |
| 1 Curved dissecting needle | 1 Dissecting scalpel, 6" long, 1½" cutting edge. | 1 Plastic ruler 6", ¼" div., millimeter and centimeter. |
| 1 Glass pipette with rubber bulb | | |

72950

Dissecting Kit

set



► Large Dissecting Kit

Kit includes:

- | | | |
|--------------------------------------|---|--|
| 12 Scalpel Blades #11 with #3 Handle | 4½" Iris Scissors | Jaws Forceps |
| 6" (15mm) Clear Ruler | 5½" Dissecting Scissors | 5½" Straight Blunt tip Serrated Jaws Forceps |
| 6" long Light Small Probe, Blunt | Suture Hook | 2 mm Diameter Stainless Steel Punch |
| 5½" Kelly Hemostat, Straight | Set of Dissecting Needle, one Straight and one Bent | Large Wood Handle Spatula |
| 6¼" Kelly Hemostat, Straight | 4½" Straight Fine Point Serrated | |

72951-15

Large Dissecting Kit

set



► Dissecting Kit for Botany

Kit includes:

- | | | |
|---|--|--|
| Dissecting teasing needle angular with metal chuck brass-chromed | Dissecting forceps 4.5" curved fine point with guide-pin | Glass dropper |
| Dissecting teasing needle straight with metal chuck brass-chromed | Dissecting forceps medium point 4.5" with guide-pin | Replacement dissecting needle straight, 6/pk |
| Ruler 6" | Dissecting Iris scissors 4.5" | Replacement dissecting needle angular, 6/pk |
| | Dissecting scalpel handle #3 | Vinyl storage, zippered case with liner. |
| | No. 10 scalpel blade, 10 pcs | |

72951-20

Dissecting Kit for Botany

set



► Anatomy Dissecting Kit 1

Kit includes:

- | | | |
|--|--|---|
| Cartilage knife 2" blade | Iris dissecting scissors, 4.5" | Dissecting mall probe chrome, 6" |
| Dissecting scalpel 1.5"L blade | Dissecting scissor, 4.5", sharp/blunt points | Ruler 6" plastic, metric/English markings |
| Narrow blade scalpel 1.5"L blade | Dissecting teasing needle, straight, metal chuck | Dissecting chain & hook chrome |
| Dissecting forceps 4.5" with guide pin, medium points | Dissecting teasing needle, angular, metal chuck | Dissecting blow pipe, 6" |
| Dissecting forceps 4.5" with guide pin, curved, fine points. | | Double folded, vinyl storage case |

72951-25

Anatomy Dissecting Kit

set



► Anatomy Dissecting Kit 2

Kit includes:

- | | | |
|--|--|---|
| Cartilage knife 2" blade | Iris dissecting scissors, 4.5" | Probe and hook, chrome |
| Dissecting scalpel handle #4 | Dissecting teasing needle, straight, metal chuck | Ruler 6" plastic, metric/English markings |
| Dissecting scalpel handle #3 | Dissecting teasing needle, angular, metal chuck | Dissecting chain & hook chrome |
| Scalpel blade #10, 1 piece | Dissecting forceps 4.5" with guide pin, fine points. | Dissecting blow pipe, 6" |
| Scalpel blade #24, 1 piece | Dissecting forceps 5" | Double folded, vinyl storage case |
| Dissecting scissor, 5.5", sharp/blunt points | | |

72951-30

Anatomy Dissecting Kit 2

set



► Biology Dissecting Kit

Kit includes:

- | | |
|--|--|
| Dissecting mall probe, chrome, 6" | Dissecting forceps, 4.5", chrome plated |
| Dissecting teasing needle, straight with metal chuck | Glass dropper |
| Dissecting teasing needle, angular with metal chuck | Ruler 6", plastic, metric/English markings |
| Dissecting scissors, 4.5" | Single folded vinyl storage case |
| Dissecting scalpel | |

72951-35

Biology Dissecting Kit

set



► Acrytol Mounting Media

Acrytol is a rapid-drying mounting medium which enables slides to be screened immediately. It has a low viscosity, allowing the medium to flow easily. It also prevents air bubbles from becoming trapped.

Acrytol contains an antioxidant to inhibit stain fading and prevent the formulation of annual rings. A thin coating of Acrytol is all that is needed to adhere a coverglass to a microscope slide.

It is soluble in xylene, toluene and most xylene substitutes.

13518 Acrytol Mounting Medium Pint



► Biomount™

Some mounting media oxidize rapidly upon exposure to air, forming carboxyl groups. This can be more pronounced when sections have been cleared in a solution containing aldehyde. It is

sometimes observed that the immunogold/silver signal fades after a few weeks, or even in a shorter time, from sections that have been mounted with these media under cover slips. The silver is still present, but has formed translucent silver carboxylate salts. Visibility can be retrieved by removing the cover slip and washing in xylene and then immersing the slide in photographic developer, but this is a tedious procedure.

BIOMOUNT is a specially formulated mounting medium that reduces fading of immunogold/silver signals in sections on glass slides. It is suitable for resins as well as wax embedded sections of tissue.



RT **17894** BioMount 100ml

For all of our other Adhesives and Mountants, see pages 9-21 >>>>

► Biomed™ Substitutes

► Clear-Mount (A Direct Substitute for BioMed™ Crystal Mount)

Clear-Mount is a water based mounting medium designed for the permanent mounting of hydrated tissues, which may be damaged by organic solvents. Such samples include cell smears, with peroxidase and alkaline phosphatase chromogens.

This mounting medium preserves Fast Red, Aminoethylcarbazole (AEC), NBT/BCIP, INT/BCIP chromogens and is also compatible with counter-stain such as Hematoxylin and Nuclear Fast Red. It is also suitable for chromogens like DAB and DAB with Nickel and Cobalt. It is not compatible with H & E staining.

Application: Mounting of Immunohisto slides.

For our original formula:

0-5°C	17985-12	Clear-Mount, (with Tris Buffer)	30 ml
0-5°C	17985-15	Clear-Mount, (with Tris Buffer)	250 ml

For a more stable pH:

0-5°C	17985-16	Clear-Mount, (with PIPE Buffer)	30 ml
0-5°C	17985-17	Clear-Mount, (with PIPE Buffer)	100 ml

► Limonene-Mount (A Direct Substitute for BioMed™ Clarion Mount)

This mounting medium is made with limonene, a natural product from orange peels. It preserves tissues and cell smears that can be dehydrated with organic solvents in immunohistochemistry, e.g. DAB and DAB with nickel or cobalt. Our Limonene-Mount also works well with alkaline phosphatase chromogens, and organic solvent resistant Supper Fast Red. It is also a good choice for mounting H & E stained slides.

Application: Mounting tissues and cell smears.

0-5°C	17987-01	Limonene-Mount	100 ml
0-5°C	17987-06	Limonene-Mount	6x100 ml/bx
0-5°C	17987-25	Limonene-Mount	250 ml

► EMS-Mount

EMS-Mount is a non-permanent, low viscosity an aqueous mounting medium designed for mounting of tissue sections and cell smears with peroxidase and alkaline phosphatase chromogens that cannot be dehydrated with organic solvents. This mounting medium preserves Fast red, Aminoethylcarbazole (AEC), BCIP/NBT, BCIP/INT chromogens and is also compatible with counterstain like Hematoxylin and Nuclear fast red (NFR). It is also suitable for chromogens like DAB and DAB with nickel and cobalt. (It is not compatible with H and E staining). Refractive Index: 1.372 +/- 0.002

Application: Mounting of chromogens that cannot be dehydrated with organic solvents.

Reagent: Ready to use mounting medium

Storage: 2-8°C is recommended

2-8°C	17985-05	EMS-Mount	30 ml	2-8°C	17985-07	EMS-Mount	250 ml
2-8°C	17985-06	EMS-Mount	100 ml	2-8°C	17985-08	EMS-Mount	1000 ml

► EMS Shield Mount

EMS Shield Mount is an aqueous non-permanent, low viscosity mounting medium for immunofluorescence. This unique formula prevents rapid photobleaching of FITC, Texas Red, AMCA, Cy2, Cy3, Cy5, Alexa fluoro 488, Alexa fluoro 594, Green fluorescent protein (GFP), tetramethyl rhodamine and Redox. The fluorescence is retained during storage at 4°C in the dark. This medium does not contain phenylenediamine, which destroys immunofluorescence of Cy dyes. Refractive Index : 1.380 +/- 0.002

Application: Immunofluorescence, confocal microscopy.

Reagent: Ready to use mounting medium for Immunofluorescence.

Storage: 2-8°C is recommended

2-8°C	17985-09	EMS Shield Mount	30 ml
2-8°C	17985-100	EMS Shield Mount	100 ml

► EMS Shield Mount with Anti Fading

EMS Shield Mount with antifading agent 1, 4-Diazobicyclo-(2,2,2-octane (DABCO™) is an aqueous non-permanent, low viscosity mounting medium for immunofluorescence. This unique formula prevents rapid photobleaching of FITC, Texas Red, AMCA, Cy2, Cy3, Cy5, Alexa fluoro 488, Alexa fluoro 594, Green fluorescent protein (GFP), tetramethyl rhodamine and Redox. The fluorescence is retained during storage at 4°C in the dark. This medium does not contain phenylenediamine, which destroys immunofluorescence of Cy dyes. Refractive Index: 1.382 +/- 0.002

Application: Immunofluorescence, confocal microscopy.

Reagent: Ready to use mounting medium for Immunofluorescence.

Storage: 2-8°C is recommended

2-8°C	17985-150	EMS Shield Mount with DABCO™	30 ml
2-8°C	17985-200	EMS Shield Mount with DABCO™	100 ml

► BiomedTM Substitutes (continued)

► Fluoro-Gel (A Direct Substitute for BioMedTM Gel-Mount)

Fluoro-Gel is a water based mounting medium designed for the permanent mounting of fluorescent stained tissues, which may either be damaged or soluble in organic solvents, such as xylene or toluene. This unique formula prevents rapid photo-bleaching of FITC, Texas Red, AMCA, Cy2, Cy3, Cy5, Alexa Fluoro 488, Alexa Fluoro 594, Green Fluorescent Protein (GFP), Tetramethylrhodamine, Redox, Phycoerythrin (RP-E), Phycocyanin (PC), and Allophycocyanin (APC). The fluorescence is retained during prolonged storage at 4°C in the dark.

Application: Immunofluorescence, confocal microscope.

For our original formula:

0-5°C	17985-10	Fluoro-Gel, (with Tris Buffer)	20 ml
0-5°C	17985-11	Fluoro-Gel, (with Tris Buffer)	100 ml

For a more stable pH:

0-5°C	17985-30	Fluoro-Gel, (with TES Buffer)	20 ml
0-5°C	17985-31	Fluoro-Gel, (with TES Buffer)	100 ml
0-5°C	17985-40	Fluoro-Gel, (with PIPE Buffer)	20 ml
0-5°C	17985-41	Fluoro-Gel, (with PIPE Buffer)	100 ml

► Fluoro-Gel II Mounting Medium

Fluoro-Gel II is similar to Fluoro-Gel, but Fluoro-Gel II contains DAPI (4, 6-diamino-2-phenylindole), which is a counter stain for DNA. This product is to be used in in situ hybridization techniques or other methods where fluorescence of DNA staining is required. DAPI excites at 360 nm and emits at 460 nm, producing blue fluorescence. RNA is also stained with DAPI.

Application: Immunofluorescence, confocal microscopy.

0-5°C	17985-50	Fluoro-Gel II	20 ml
0-5°C	17985-51	Fluoro-Gel II	100 ml

► Fluoro-Gel III Mounting Medium

Fluoro-Gel III Mounting Medium is similar to Fluoro-Gel, however, Fluoro-Gel III with the addition of PI (Propidium Iodide) which is a counterstain for DNA, makes this a unique mounting medium, which prevents rapid photobleaching of FITC, Texas Red, AMCA, Cy2, Cy3, Cy5, Alexa Fluoro 488, Alexa Fluoro 594, Green Fluorescent protein (GFP), Tetramethylrhodamine, Redox, Phycoerythrin (RP-E), Phycocyanin (PC), and Allophycocyanin (APC). The fluorescence is retained during prolonged storage at 4°C in the dark. This medium does not contain Phnylenediamine, which destroys immunofluorescence of Cy dyes, RP-E, PC, and APC. This product is to be used in in situ hybridization techniques or other method where fluorescence of DNA staining is required. PI excites at 535 nm, emits at 615 nm, producing a red fluorescence. RNA is also stained with PI.

Application: Immunofluorescence, confocal microscope

0-5°C	17985-60	Fluoro-Gel III	20 ml
0-5°C	17985-61	Fluoro-Gel III	100 ml



► Fluoro Gel with DABCOTM

Fluoro Gel with antifading agent 1, 4-Diazobicyclo-(2,2,2-octane (DABCOTM) is an aqueous mounting medium for preserving fluorescence of tissue and cell smears. This unique formula prevents rapid photobleaching of FITC, Texas Red, AMCA, Alexa fluoro 488, Alexa fluoro 594, Cy dyes, tetramethyl rhodamine, and Redox. The fluorescence is retained during prolonged storage at 4°C in the dark. Refractive Index: 1.366 +/- 0.002

Application: Immunofluorescence, confocal microscopy.

Reagent: Ready to use mounting medium with anti-fading agent

Storage: 2-8°C is recommended

2-8°C	17985-01	Fluoro Gel with DABCO	20 ml
2-8°C	17985-02	Fluoro Gel with DABCO	100 ml
2-8°C	17985-03	Fluoro Gel with DABCO	250 ml
2-8°C	17985-04	Fluoro Gel with DABCO	1000 ml

► Fluoro-Gel with Anti-Fading Mounting Medium

Fluoro-Gel Mounting Medium with a strong anti-fading agent 1,4-phenylenediamine is an aqueous mounting medium for preserving fluorescence of tissue and cell smears. This unique formula preserves rapid photobleaching of FITC, Texas Red, AMCA, Cy2, Cy3, Cy5, Alexa Fluoro 388, Alexa Fluoro 594 tetramethyl rhodamine, and Redox. The fluorescence is retained during prolong storage at 4°C in the dark. This medium contains Phnylenediamine and is not suitable for immunofluorescence of Cy dyes, Phycoerythrin (R-PR) phycocyanin (PC), and allophycocyanin (APC). Refractive index: 1.366 +/- 0.002

Application: Immuno-fluorescence, confocal microscopy.

Reagent: Prepared from TRIS buffer. Ready-to-use mounting medium with dark coffee color, this is normal, and does not interfere with immuno-fluorescence

Storage: 2 – 8°C is recommended. Protect from light. DO NOT FREEZE.

	Cat. #	Description	Qty
2-8°C	17983-20	Fluoro-Gel with Anti-Fading Agent	20 ml
2-8°C	17983-100	Fluoro-Gel with Anti-Fading Agent	100 ml

► In-Situ Mount (A Direct Substitute for BioMedTM Situ Mount)

In-Situ mounting medium is a unique mounting medium designed for permanent preservation of tissue sections and cell smear with alkaline phosphatase chromogens like NBT/BCIP and red stain.

Application: Mounting tissues and cell smears.

0-5°C	17988-30	In-Situ Mount	30 ml
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*The names BioMeda Gel Mount, Crystal Mount, Clarion, Situ Mount are all owned by BioMeda Corporation

► Mounting Medium for all Laser Scanning and Conventional Microscopes

A revolutionary new Mounting Medium which helps to control the effects of Refraction.

These Mountant Solutions:

- Have a refractive index of 1.52 to match the refractive index of your slides and coverslips
- Are simple to use – Just apply the solution to the specimen followed by a cover slip
- May be kept at room temperature – comes with dropper tip to aid in dispensing
- Are water miscible (aqueous glycerol based), and therefore the specimen does not need to be dehydrated prior to the addition of the mounting solution.
- Have a pH compatible with the specimens: CFM-1 has a pH of ~6.5, and CFM-2 has a pH of ~8.5
- Contain an antifadent to help reduce the bleaching of the fluorochromes (CFM-1 Plus Antifadent)
- May be used as a immersion oils in addition to being a mountant solution and since they are water-based, they facilitate cleaning the microscope optics.

► CFM-1 and CFM-1 Plus Antifadent

This glycerol-phosphate buffered saline based mountant solution has been specially formulated so as to have a refractive index of ~1.52 @ room temperature. The addition of antifadent retards the bleaching of fluorochromes. Its refractive index is similar to glass; therefore effects of refraction on image quality are minimized. The CFM-1 Plus antifadent will be particularly useful for high magnification work, where immersion oils are used to minimize distortion of the image due to the refraction of the viewing light and where bleaching of the fluorochrome occurs.

The solutions should also be very valuable for laser scanning microscopy where, three-dimensional imaging of specimens is carried out e.g. with confocal fluorescence microscopy where integrity of the image has to be maintained.

Both solutions are medium viscosity, and water-clear. CFM-1 Plus Antifadent have a pH of ~10
CFM-1 has a pH of ~6.5

► CFM-2 Mountant

This glycerol-tris-buffered based mountant solution has been specially formulated to have a refractive index of ~1.52 (at room temperature) i.e. a refractive index similar to glass so that the effects of refraction on image quality are minimized. This mountant solution may also be used as an immersion oil. The CFM solutions will be particularly



useful for high magnification work where immersion oils are used to minimize distortion of the image due to refraction of the viewing light. The solutions should also be particularly valuable for laser scanning microscopy where three-dimensional imaging of specimens is carried out e.g. with confocal microscopy.

The solution has a medium viscosity, and it is water-clear, and has a pH of ~8.5

RT	17980-10	CFM-1	10 ml
RT	17980-25	CFM-1	25 ml
RT	17981-10	CFM-1 Plus	10 ml
RT	17981-25	CFM-1 Plus	25 ml
RT	17982-10	CFM-2	10 ml
RT	17982-25	CFM-2	25 ml

► CITIFLUOR™ - Antifadent Mountant Solutions

A mounting medium for immunofluorescence, which overcomes the problems of fading.

This mounting media is designed to reduce the fading of the fluorescence of dyes used for labeling biological specimens.

In the technique of fluorescence microscopy, the fluorescence is stimulated by high intensity UV and/or visible light. Absorption of the light populates an excited state of the dye (usually a singlet state) and this leads to fluorescence. However, the excited state of the dye may undergo chemical reaction, which leads to destruction as evidenced by the fading of the fluorescence and consequent loss of the image. CitiFluor™ mounting media is designed to solve this problem.

Selection of the appropriate product:

There is no universal antifadent due to the fact that biological material is so varied in nature that the fluorescence fading of fluorochromic conjugates is a complex process.

The general anti-fadents are AF1, AF2, and AF3. The AF87 is a specialist immersion oil-based antifadent.

AF1 (Glycerol-phosphate buffered solution containing an additive for use with labeled tissue sections). Should be used if you normally examine specimens in glycol solution. If you normally use saline solution with your specimens. Refractive Index is 1.46.

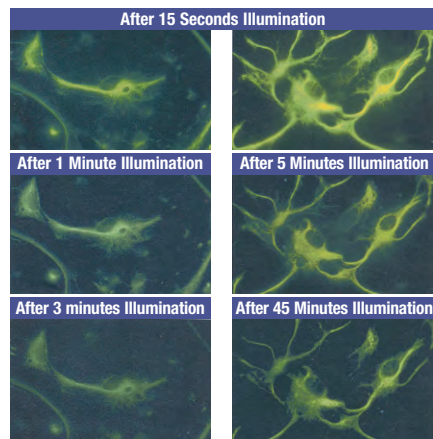
AF2 (Glycerol solution containing additives for use with labeled tissue sections) is simply a glycerol solution of the antifadent. Refractive Index is 1.47.

AF3 (Phosphate-buffered saline solution containing additives for examination of whole cell) is appropriate. Refractive Index is 1.34.

AF87, the antifadent, is contained in non-fluorescent immersion oil. It is designed for those requiring work at high magnification. It is useful for preventing the fading of such dyes as DAPI, which have the tendency to disperse in glycerol based mountant solutions.

CFPVOH is an aqueous solution of poly (vinyl alcohol) for use as a solid mountant. Apply a few drops of the solution to your sample, and allow drying to give a clear film. Refractive Index is 1.34–1.35.

AF100 is a solution of antifadents to be used with CFPVOH when fading of fluorescence in the poly(vinyl alcohol) is a problem. To prepare a CFPVOH solution containing AF100, add 0.1ml of Af100 to 0.9ml of CFPVOH. If more or less of the solid mountant solution is required, mix the reagent in the appropriate ratio. Once these solutions have been made up, they should be used within a period of days since the solution deteriorates on storage. Refractive Index is 1.34-1.35. All of these products have a long shelf life, a minimum of 2 years. The solution can be stored at room



temperature. With LD50's >2000mg/kg (in rat), this product exhibits no toxicological problems.

RT	17970-25	CitiFluor™ AF1	25 ml
RT	17970-100	CitiFluor™ AF1	100 ml
RT	17971-25	CitiFluor™ AF2	25 ml
RT	17971-100	CitiFluor™ AF2	100 ml
RT	17972-25	CitiFluor™ AF3	25 ml
RT	17972-100	CitiFluor™ AF3	100 ml
RT	17976-10	CitiFluor™ AF87	10 ml
RT	17976-25	CitiFluor™ AF87	25 ml
RT	17978-35	Set of CitiFluor™ 25 ml + 5 ml CFPVOH and AF100*	

* Only available when ordering with CFPVOH

► CitraMount® Mountant

This butyl acetate and acrylic resin mixture is the first mounting medium developed for coverslipping directly from d-limonene based clearants. Superior results are also achieved with xylene. CitraMount® medium is recommended for manual coverslipping only as it may cause damage to the valves of automated coverslippers.

- Clear seal with drying time is less than 24 hours
- Refractive index is 1.42 – Viscosity is 90 cPs

RT	18005-01	CitraMount® Mountant	100 ml
RT	18005-05	CitraMount® Mountant	500 ml

► CMCP Macroinvertebrate Mounting Medium

CMCP is a colorless, non resinous, water miscible mounting medium for permanent transparent mounts. This medium used like Canada Balsam, it can be used to mount almost any material, provided it is not stained, calciferous material, or thin tissue sections. This mounting media has the advantage of allowing live or preserved specimens to be mounted directly from water or alcohol.

Free living nematodes and live parasitic worms are among the organism suitable for mounting with CMCP. The CMCP mounting provide then with rapid relaxation, death, and clearing action.

RT	18003-01	CMCP-9 Low Viscosity Mountant	100 ml
RT	18003-05	CMCP-9 Low Viscosity Mountant	500 ml
RT	18004-02	CMCP-10 High Viscosity Mountant	250 ml
RT	18404-05	CMCP-10 High Viscosity Mountant	500 ml

Clearium® Mounting Media

Clear and coverslip your slide preparations in one easy step

This unique product eliminates the need for hazardous xylene or xylene substitutes as a clearing agent in histology and cytology laboratories. With Clearium, simply do away with the final step of clearing and coverslip directly from absolute isopropyl alcohol.



Cat No.	Description	Qty.
RT 13520-11	Clearium®, Pint	each
RT 13520-12	Clearium®, Pint	4/case
RT 13520-13	Clearium®, 4 oz. Dripper Bottle (12)	12/case

- Crystalbond; Wafer Mount
- See page 372-373, 437 >>>>**

TECHNICAL TIP

DEPEX (EMS Cat. #13514) is an Improved Mounting Medium

Most mounting media cause fading of histological preparations over time. A study was conducted to find the most suitable mounting media that would not fade. Depex as a Mounting Media appeared to have a conserving effect on the stain as compared to other available mounting media. The study was based on Araldite embedded semithin sections of rabbit cerebral cortex stained with Toluidine Blue and Pyronin G. The study also showed that the average optical density of sections prepared with DEPEX after one year was higher than the sections treated with other mounting techniques.

Cordula Schmolke (1993). Effects of Mounting Media on Fading of Toluidine Blue and Pyronin G Staining in Epoxy Sections. *Biotech. & Histochem.* 68/3, pg.132-136

► CytoSeal™ Mounting Medium

Premium quality; formulated from the highest quality advanced acrylic resin. It will not become brittle and crack, nor will it discolor or yellow with age. CytoSeal dries rapidly, allowing examination soon after application. It can be used with oil immersion objectives and in fluorescent procedures. Slides will not stick together and the medium will not "cold flow" to the edge of the slide during long term storage. CytoSeal can be dissolved in toluene or xylene. An antioxidant has been added to the formulation to prevent fading of slides. CytoSeal comes in a Controlled Drop Dispenser, with varying viscosities.



- CytoSeal 60, which has a viscosity of 60cps, is intended primarily for use with cover glass.
- CytoSeal 280, which has a viscosity of 280cps is intended for use where minimal spread of medium is required.

RT	18006	CytoSeal 60	4oz.
RT	18007	CytoSeal 60	16oz.
RT	18008	CytoSeal 280	4oz.

► DEPEX Mounting Media

A colorless, neutral, xylene miscible mountant which is suitable for preparations where Canada Balsam is usually used. R.I. 1.5222 @ 23°C.

RT	13514	DEPEX Mounting Media	100ml
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► DPX Mountant for Microscopy

A mixture of Distyrene, a plasticizer, and xylene. A colorless synthetic resin mounting media which replaces Xylene-Balsam. It preserves the stain and dries quickly. R.I. 1.5175 @ 23°C.

RT	13510	100ml
RT	13512	500ml

► Entellan® A rapid mounting media for microscopy

For long life preparations, without bubble formation at high ambient temperatures. It can be used for all dehydrated microscopic preparations. Cure time is 20 minutes at room temperature. It is colorless with an acid number less than 2.50 and a R.I. N_D²⁰ approx 1.49-1.5. (Contains xylene).

RT	14800	Entellan®	100ml
RT	14802	Entellan®	500ml

► Eukitt™; Mounting Medium

Eukitt is a mounting medium (contains 45% Acrylic Resin and 55% Xylenes), used in microscopy. It is an adhesive and specimen preservative that can be used manually and in automated cover-slipping equipment. Adhesive and sealant for use with glass, non plastic and other non-reactive materials. Spreads quickly and evenly without forming any air bubbles.



- Fast-drying (20 minutes)
- Refractive index close to glass (1.510)
- Chemically neutral
- Little sensitivity to water
- No reaction to staining
- Temperature limits: 42°C-17°C
- Passive to ultraviolet light
- Can be used in place of epoxy resins for mounting petrographic thin sections
- Used in fluorescence dyes in bones

RT	15320	Eukitt™	100ml
RT	15322	Eukitt™	500ml

► Fluoromount-G™ Slide Mounting Medium

A special mounting media for immunofluorescent staining procedures. It is a water soluble, non-fluorescing medium which is well suited for use when the staining procedure has an aqueous final step. It contains 10% polyvinyl alcohol in phosphate buffered glycerol with 0.1% sodium azide as a preservative. One bottle is sufficient to mount up to 500 slides. Refractive Index: 1.46



0-5°C	17984-25	Fluoromount-G	25 ml
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► DAPI-Fluoromount G™

DAPI-Fluoromount™ G is a water-soluble, instant blue nuclear probe fluorescing (455nm) compound for mounting fixed slides using a staining procedure having an aqueous final step. Mounting slides with DAPI Fluoromount™ G stains the cell nucleus and may reduce fluorochrome quenching during analysis of slides by fluorescence microscopy. This mounting medium also provides a semi permanent seal for long term storage of slide preparations.

0-5°C	17984-24	DAPI Fluoromount-G™	20 ml
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► Glycerin Jelly

For the mounting of hydrated sections.

RT	17998-10	Glycerin Jelly,	100ml
RT	17998-50	Glycerin Jelly,	500ml



► Histomount

A mixture of xylene - mixed isomers and non hazardous ingredients to offer a very good synthetic mountant. Once dried the refractive index is 1.58.

RT	17995-01	Histomount	100 ml
RT	17995-05	Histomount	450 ml

► Hydromount™

Ideal for frozen tissue sections

Hydromount™ is the traditional choice whenever a nonfluorescing aqueous medium is needed. Hydromount™ is water-based and is suitable for mounting specimens that have been processed in water. Hydromount™ is effective for frozen sections, amyloid, and immunofluorescent staining procedures. Should it become necessary, Hydromount™ may be removed by soaking the slides in warm saline.

RT	17966-01	Hydromount™	100ml
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Histomount™ and Hydromount™ are Trademarked names of National Diagnostics



MM 24® Mounting Media

Specially formulated for automatic glass coverslippers

MM 24 is a low viscosity mounting medium that is compatible with both aliphatic (eg Sub-X) and aromatic (eg xylene) clearing agents. It is specially formulated to achieve optimum results with automatic glass coverslippers, yet is also effective for manual slide preparation. Set up time before permanent filing is normally 24 hours with aromatic agents and 48 to 72 hours with aliphatics.



	Cat No.	Description	Qty.
RT	13520-21	MM 24® Mounting Media, Pint	each
RT	13520-22	MM 24® Mounting Media, Pint	4/case
RT	13520-23	MM 24® Mounting Media, 4 oz. Dripper Bottle (12)	12/case

► Mount Quick, Solvent/Water Base

Mounting media for cover glass. It comes in a convenient dispensing tube or bottle. Solvent based media which is soluble in xylene and has a 10 minute dry time. Its viscosity is 33 cps at 25°C.



RT	18000	Mount Quick-Solvent Base;	30cc
RT	18002	Mount Quick-Water Base;	30cc

► Omnimount™

- Optical clarity combined with exceptional durability
- Compatible with HistoClear II
- Higher flash point and lower toxicity than xylene based mountants

Specially developed to provide compatibility with National Diagnostic clearing agents, HistoClear II. Omnimount™ combined outstanding optical characteristics with low fluorescence and exceptional durability. In addition to being the ideal partner for HistoClear II, Omnimount is a truly universal mounting medium compatible with all common clearing agents: xylene, toluene, limonene, and petroleum derived products.

The Omnimount solvent has a higher flash point and a lower toxicity than xylene based mountants, so Omnimount™ provides both a safer work environment and reduce shipping costs.



RT	17997-01	Omnimount™	100 ml
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► Permout™* Mounting Medium

A toluene-based synthetic resin mounting medium. The right choice for both rapid mounting and long term storage of slides. Its low viscosity allows for a thinner mounting layer offering better optical quality and bubble-free preparations. It has a refractive index near that of a fixed protein which helps to keep images free of distortion. Ideal for mounting coverslips to slides with thick or thin specimens. Permout preserves most biological stains with little or no fading when the slides are stored in darkness. It contains an anti-oxidant to prevent the formation of annular rings and its high softening point (155°C/311°F) makes it suitable for microprojection.



RT	17986-01	Permout Mounting Medium	100ml
RT	17986-05	Permout Mounting Medium	500ml

*Ownership of Fisher Scientific

► Slide Coating Adhesive

See page 555 >>>>

► Cargille Meltmounts

- Instant thermal mountants that require "no-oven-time".
- 100% Usable; contains no solvents.
- Reversible, thermally, for particle retrieval or re-orientation
- Soluble in toluene for special techniques or clean-up.
- Fluid at 65°C, a temperature chosen because it makes permanent mount and protects the majority of specimens from thermal changes.
- PCB-Free.
- Direct replacement for old mountant mediums (Canada Balsam, Aroclor 5442, Naphrax...)



Cargille Meltmount™ (optical quality) is a series of mounting media which are specifically formulated for use in microscope slide mounting and in other optical coupling applications.

Melt Mount is also available in a Quick-Stick™ form which can be used to make permanent microscope slide mounts quickly. These Melt Mount sticks can be applied to a slide on a hotplate. As soon as the specimen and coverglass are positioned and the slide is cooled you have a permanent prepared slide that can be reversed by reheating, if you should wish to retrieve a particular particle. Each Quick-Stick™ weighs approximately ⅓ oz. (18g).

1. Meltmount™ 1.539

Has a refractive index (n_D @25°C) of 1.539 and an Abbe V dispersion of 45. Its optically similar to Canada Balsam and therefore ideal for mounting many biological specimens but without the long drying time of Canada Balsam.

RT	17994-10	Meltmount 1.539	1 oz.
RT	17994-11	Meltmount 1.539 Quick-Stick™	each

2. Meltmount™ for Chrysotile Asbestos

It has dispersion characteristics making it appropriate for mounting chrysotile asbestos.

RT	17994-20	Meltmount for Chrysotile	1 oz.
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3. Meltmount™ 1.582

It has a refractive index n_D @25°C) of 1.582 and an Abbe V dispersion of 33. Its optical clarity makes it the preferred choice for minimum visible absorption.

RT	17994-30	Meltmount 1.582	1 oz.
RT	17994-31	Meltmount 1.582 Quick-Stick™	each

4. Meltmount™ 1.605

It has a refractive index (n_D @25°C) of 1.605 and an Abbe V dispersion of 30, making it appropriate for mounting Asbestiform Tremolite, Anthophyllite, and Actinolite.

RT	17994-40	Meltmount 1.605	1 oz.
RT	17994-41	Meltmount 1.605 Quick-Stick™	each

5. Meltmount™ 1.662

It has a refractive index (n_D @25°C) of 1.662 and an Abbe V dispersion of 26, optically similar to Aroclor 5442 but is PCB-free.

RT	17994-50	Meltmount 1.662	1 oz.
RT	17994-51	Meltmount 1.662 Quick-Stick™	each

6. Meltmount™ 1.680

It has a refractive index (n_D @25°C) of 1.680 and an Abbe V dispersion of 25, making it appropriate for mounting Amosite and Crocidolite asbestos.

RT	17994-60	Meltmount 1.680	1 oz.
RT	17994-61	Meltmount 1.680 Quick-Stick™	each

7. Meltmount™ 1.704

It has a refractive index (n_D @25°C) of 1.704 and an Abbe V dispersion of 24, similar to Naphrax.

RT	17994-70	Meltmount 1.704	1 oz.
RT	17994-71	Meltmount 1.704 Quick-Stick™	each

► Liquid Coverglass; SHUR/Mount™

Shur/Mount is a liquid coverglass and mounting medium. Its low viscosity minimizes bubble formation under the coverglass. An antioxidant present in the medium prevents fading of the stain even over years of storage. A UV absorbent present in our Shur/Mount prevents the yellowing of the resin.



Available in three types:

- A toluene-based acrylic resin; rapid drying. It is used for mounting and preservation of microscope slide specimens, and is ideal for manual coverslipping. Refractive index: 1.49
- A xylene-based formula which is used for automatic cover slipping instruments. Refractive index: 1.48
- A unique water based mounting medium for Immuno procedures.

RT	17990-01	Shur/Mount - Toluene Based	4 oz.
RT	17990-12	Shur/Mount - Toluene Based	12x4 oz./cs
RT	17991-01	Shur/Mount - Xylene Based	16 oz.
RT	17991-06	Shur/Mount - Xylene Based	4x16 oz./cs
RT	17992-01	Shur/Mount - Water Based	20ml
RT	17992-04	Shur/Mount - Water Based	4x20ml

► Sub-X Mounting Medium

Sub-X Mounting Medium is a toluene based low viscosity quick-drying, permanent mountant formulated to be compatible with all xylene substitutes on the market. It may be used for all coverslip preparations that are cleared in xylene and or toluene. It may be used for manual as well as automated coverslipping. Sub-X contains an antioxidant to inhibit fading of stains.



RT	13519	Sub-X Mounting Medium	Pint
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► Tissue-Tack Adhesive

- Good for JB-4 and JB-4 Plus Sections.
- Improves permanent adhesion of sections to the glass slide during prolonged staining procedures and washes.
- Useful for immunofluorescent, immunoperoxidase and routine staining procedures.

RT	71301-01	Tissue-Tack Adhesive	100ml
RT	71301-05	Tissue-Tack Adhesive	500ml

► UV Mount Medium

- A mounting medium that is designed to match the refractive index of JB-4 embedded sections.
- Cures within 2 minutes when exposed to long wave UV light (365nm) when applied to moist sections.
- Sections are mounted after last staining water rinse.
- Slides must be coverslipped.

0-5C	17996	UV Mount Medium	100ml
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► Staining Apparatus:

► Five-Slide Gripper

- The 5-Slide Gripper accommodates 5 microscope slides in one staining procedure.
- It fits most coplin and round-open staining jars.
- It is made from a special material which is resistant to all chemicals and solvents which are used in staining.
- There is no need to remove slides for drying.
- It withstands drying temperatures up to 80°C



71410-06 Five-Slide Gripper 6/pk

► Glass Coplin Staining Jar, Screw Cap

5-Slide Unit. Holds 5 single 1"x3" slides vertically, or 10 slides back-to-back. Slides extend above the opening, allowing for the manipulation of them without the use of forceps.

A screw cap has a metal foil liner that withstands stains and organic solvents and it prevents evaporation. Overall measurement: 3 3/8"(H)x2 3/8"(W) base x 2 3/8"(dia) top.



70315 Complete Unit 4/cs

► Staining Jar With Glass Lid

An all glass jar which holds 5 to 10 standard slides (3" x 1"). They can be used as a chromatography jar with a choice of 2 ground glass lids. The lids are ground to the flange of the jar which deters evaporation. The jar with a taller lid (70316-04) accommodates larger slides: 4" x 1" (102mm x 25mm).



70316-02 Staining Jar w/Ground Lid 4/pk
70316-04 Staining Jar w/Tall Ground Lid 4/pk

► Glass Coplin Staining Jar, Screw Cap

5-Slide Unit. Holds 5 single 1" x 3" slides vertically, or 10 slides back-to-back. Slides stay within the jar so that it can be capped during staining. Complete with a screw cap and a metal foil liner. Overall measurement: 4 3/8"(H) x 2 3/4"(W) base x 2 3/8"(dia) top.

70317 Complete Unit 4/cs

► Staining Rack; Coverglass

Made from polished stainless steel:

- Securely holds thirty (30) 22mm or 24mm cover glass
- Spring-type detachable handle
- Welded stainless steel
- 4" (10.2cm) long.

72239-04 Large Coverglass Staining Rack each

► Coverglass Staining Jars (with Plastic Caps)

- For use with cover glass sizes 18 to 22mm.
- Accommodates eight cover glasses back-to-back.
- Caps have been tested to be resistant against most staining solutions

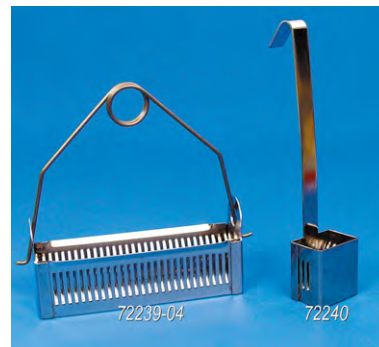


72242-21 Coverglass Staining Jars, Screw Cap each
72242-24 Coverglass Staining Jars, Screw Cap 4/pk

► Coverglass Staining Rack

Made from polished stainless steel. Specially designed to be used with coplin jars.

- Holds five of 22 x 24mm coverglasses.
- Comes with a handle, 5" (12.7cm) long.



72240 Coverglass Staining Rack each

► Wash-N-Dry™ Coverslip Rack

Holds 10 Coverslips

Fast & easy cleaning, surface-treating and drying. Holds all slipcover sizes including 18, 22 and 25mm.

Durable and Hassle Free

One piece polypropylene rack does not require assembly and is chemically and thermally resistant. Autoclavable!

Secure Innovative design includes a notch to secure coverslips with a rubber band or loop of monofilament.

Compatible Fits inside a 100ml beaker with space underneath for a small stir bar when submerged.

Economical Available at a fraction of the cost of PTFE products.

70366-16 Wash N'Dry Cover Slip Rack each



► Wash-N-Dry™ Slide Rack

Maximum Circulation

Offset design allows liquid and air to completely flow around the entire slide ensuring cleanliness and faster drying times.

"Hands Off Design"

Tailored to contact a minimal amount of slide surface area permitting solutions and air to affect entire slide.

Holds 12 Slides Securely

holds slides for convenient cleaning, treating, staining, and drying. Fits standard slide sizes including 25 mm and 1".

Laboratory Friendly Utilizes chemically and thermally resistant glass infused polypropylene. Autoclavable!

Create A System Use in conjunction with a 200ml tall form beaker to efficiently use solutions.

70366-17	Wash N'Dry Slide Rack	each
70366-18	200ml Tall Form Beaker	each



► Adjustable Cover-Glass Rack

Innovative design saves you time and headache when you are looking for a cover-glass holder!

This rack is machined from polypropylene and fabricated to accommodate a variety of cover-glasses in different sizes. With the ability to simply adjust the holder to fit your desired size and then securing it by tightening the reset screws with the hex key (hex key is included) all sizes of cover glasses are accommodated. Because the holder is made from non ferrous material, it is microwaveable. The rack accommodates 10 cover glasses, round, square or rectangular, adjusting from 5 mm to 60 mm. Removable handle. Rack comes with two set of holding rods. One set accommodate cover glasses from 5 to 25mm, and the other set for cover glasses from 5mm to 60mm.

Rack measures 1 1/2" W x 1 1/2" H (38 x 38 mm)

72243	Adjustable Coverglass Rack	each
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► Vertical Staining Jar w/Glass Lid

An all glass rectangular staining jar which accommodates 8 to 16 slides and comes with a glass lid. Its wide top eliminates the need for forceps in the handling of the slides. It accommodates slides up to 4"x1 1/2" (103mm x 39mm) in size.

70318-04	Vertical Staining Jar	4/pk
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► Slide Staining Jar, Square

Made from polypropylene, holds 10 slides, back-to-back.

Designed in a square shape and short body to conserve space and staining solution. When the cap is removed the slides can be handled without touching the solution. The screw cap has a locking recess to support the slides and both body and cap have a molded-in lug to enable them to be wired together for transit. The jars measure: 83mm(H)x33mm(W)x3mm(H)

When the cap is removed the slides can be handled without touching the solution. The screw cap has a locking recess to support the slides and both body and cap have a molded-in lug to enable them to be wired together for transit. The jars measure: 83mm(H)x33mm(W)x3mm(H)

71405-01	Square Slide Staining Jar	each
71405-04	Square Slide Staining Jar	4/bx



► High-Density Polyethylene Staining Jar

An unbreakable, high-density polyethylene Staining Jar with internal grooves and a shallow screw cap. The jar holds 5 single 1"x3" slides or 10 back-to-back slides vertically. Overall measurement: 4 1/2"(H) x 2 1/2"(dia)

70319	Complete Unit	4/cs
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► Rectangular Staining Dish

Heavy, clear, soda lime glass stain dish, accept glass slide measure 75 x 25mm or 3 x 1"

This dish comes with glass cover, holds 20 slides back-to-back horizontally. Inside dimensions: 3" x 2-5/16" x 1-3/16" deep.

70314-01	Rectangular Stain Dish	each
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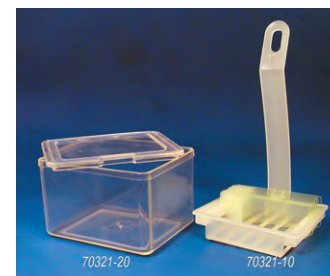


► Slide Staining Rack; Polypropylene

- Made from polypropylene; autoclavable.
- Accommodates up to 20 slides 3x1" (76x26mm).
- With a removable snap-on handle.

It measures: 2 3/4"x3 3/8"x1 1/8" (without handle) (70x86x21mm)

70321-10	Staining Rack, Polypropylene	each
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See page 576 for LockMailer Slide Jars >>>>

EasyDip™ Slide Staining System

The EasyDip™ Slide Staining System has two components: a square staining jar and a 12-position vertical slide staining rack. Jars can be loosely joined to each other laterally, therefore making sure they are kept in the same order when moved around on the lab counter. They also are available with five different colors to help better identify contents or applications.



EasyDip Slide Staining Jars - 71385-series

The Staining Jar being made from acetal plastic will not break like most glass jars do. It will resist attacks from most staining reagents including alcohol and xylenes but not phenols. The wide stable base offers greater stability while the inside is recessed, allowing for a smaller reagent volume of only 80ml. Ideal for frozen sections, small jobs and special processes. Dimensions: 64mm x 76mm x 92mm (2½ x 3 x 3¾).

The EasyDip™ Slide Staining Rack will hold up to 12 slides of 25x75mm or 26x76mm (3x1") with a thickness of 1.0 to 1.2mm. The lid completely covers the EasyDip™ Slide Staining Jar to minimize spill and evaporation. The handle is permanently attached to the rack for easy insertion or removal of the slide. The base of the rack is placed in the vertical position to ensure the slides are in place, and are rotated sideways for easy slide removal. Dimensions: 60 x 64 x 97mmH (2¼ x 2½ x 3¾")



Slide Staining Rack - 71386-DR

For your convenience, we offer EasyDip® Slide Staining Kit. Kit consists of one Staining Jar and one Staining Rack, color white.

Cat. #	Description	Qty
71385-W	EasyDip™ Slide Staining Jar, White	2/cs
71385-B	EasyDip™ Slide Staining Jar, Blue	2/cs
71385-G	EasyDip™ Slide Staining Jar, Green	2/cs
71385-P	EasyDip™ Slide Staining Jar, Pink	2/cs
71385-Y	EasyDip™ Slide Staining Jar, Yellow	2/cs
71386-DR	EasyDip™ Slide Staining Rack	2/cs
71388-01	EasyDip Slide Staining Kit (Jar+Rack), White	kit

EasyDip™ Stainless Steel Holder

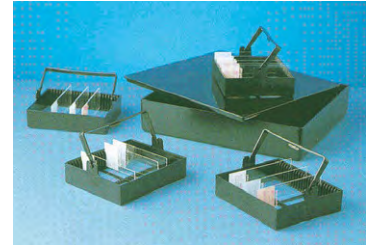
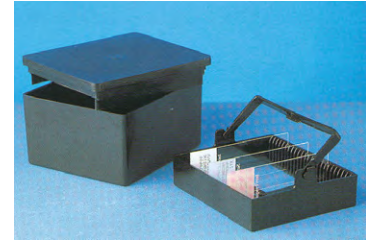
This holder is designed to six EasyDip™ staining jars together. Measures: 16 ¾" L x 4" W x 1 ½" H (425 x 102 x 38 mm)



Cat. #	Description	Vol.	Qty
71388-50	EasyDip Stainless Steel Holder	1	each

Slide Staining Dish And Storage Box

A universal slide rack and container for Autoradiography and all other staining techniques. It is molded from black Polyethylene-terephthalate (PET) plastic. This unbreakable plastic has many advantages over glass in cytological and histological laboratories. There are no metals to corrode. The rack and dish are easy to clean and are resistant to most laboratory chemicals.



■ **Slide Rack:** The slide rack has an open bottom for rapid draining when transferred. It holds 1"x3" (25mm x 76mm) slides in slots numbered 1 to 25.

71400 Slide Staining Rack each

■ **Staining Dish:** This unbreakable 3.7"(L) x 3.2"(W) x 1.9"(H) (94mm x 81mm x 49mm) staining dish has a light tight cover with a compartment for the drying agent and a perforated slide partition to support the drying agent. The partition has index numbers and a surface for writing. Included is a removable clip which is placed on the top edge of the dish permitting staining solution to drain back into the reservoir from the tilted rack. Staining takes place in complete darkness. The small size of the dish saves on staining liquids, developing fluids and intermediates since only 150ml is needed. Actual capacity is 250ml. The light tight lid is essential for evaporated baths. The dish is easy to clean and especially suited for the storage of enzymes. The cover will not jam in freezer storage.

71402 Staining Dish for One Rack each

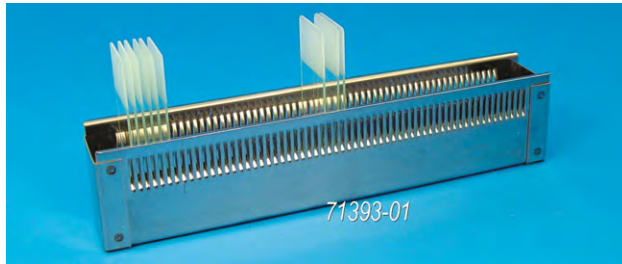
■ **Storage Box:** A black polystyrene storage box (not for staining) which can hold four of the slide racks. The box cover has a paper index marked off in four sections, each numbered from 1 to 25. The box measures 7½" x 6¾" x 1½" high (19 x 17 x 5cm).

71404 Storage Box only each

Slide Staining Dish

The dish is made from polymethylpentene "glass clear" for use with our staining rack (Cat# 70321-10) shown above. It comes with two lids; one lid should be used when the rack is not inserted. It measures: 3¾"x4x3¾" (81x101x86.5mm)

70321-20 Staining Dish each



► Vertical Slide Tray

A stainless steel tray with grooves that hold 76 x 26 mm (3" x 1") microscope slides vertically. Accommodates up to 60 slides.

Cat.#	Description	Pack
71393-01	Vertical Slide Tray	each



► Horizontal Slide Tray

A stainless steel tray with grooves to hold various microscope slides horizontally. Accommodates up to 60 slides.

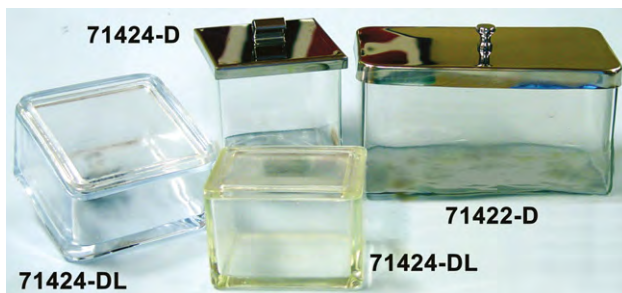
Cat.#	Description	Pack
71394-01	Horizontal Slide Tray	each

► Staining Dishes

A variety of inexpensive staining dishes made from molded glass with and without fitted glass and Stainless Steel lids.

The following sizes are available: (Outside Measurements)

120 x 120 x 50 mm	105 x 86 x 75 mm
100 x 100 x 100 mm	200 x 100 x 100 mm



Cat.#	Description	Pack
71423-DL	Staining Dish, Fitted Glass Lid, 120 x 120 x 50 mm	each
71424-DL	Staining Dish, Fitted Glass Lid, 105 x 86 x 75 mm	each
71424-D	Staining Dish only, 100 x 100 x 100 mm	each
71424-L	SS Lid for 71424-D	each
71422-D	Staining Dish Only, 200 x 100 x 100 mm	each
71422-L	SS Lid for 71422-D	each
71422-DL	Staining Dish and SS Lid, 200 x 100 x 100 mm	each

► Hellendahl Staining Dish

The Hellendahl type dish for the staining or use as a TLC developing chamber. Holds up to 8 individual 3" x 1" (76 x 26 mm) slides, or 16 slides back-to-back. These dishes are made from soda lime glass.

The approximate inside dimensions: 76 mm long x 25 mm wide x 75 mm deep.



Cat.#	Description	Pack
70313-01	Hellendahl Staining Dish	each

► Staining Dish; 20 Slide Unit

Ideal for immersing slides in several solutions. The removable glass slide rack has an open bottom which allows for rapid filling and draining. It holds back to back 20 slides-

3" x 1" (76 x 25mm), or 3" x 1½" (76 x 38mm) or 3" x 2" (76 x 51mm) in size. The staining dish measures: 107mm(L) x 87mm(W) x 70mm(H) Our complete set consists of 1x Staining dish, 1x Cover, 1x Slide Rack and Handle. The slide rack measures: 102mm (L) x 80mm (W) x 24mm (D).



Cat.#	Description	Pack
70312-20	20 Slide Unit Staining Dish	Set
70312-21	Dish only	each
70312-22	Cover only	each
70312-23	Dish and Cover only	each
70312-24	Slide Rack only	each
70312-25	Handle only	each

► 25 Slide Unit - Glass Staining Dish

A molded glass-staining dish with a fitted glass lid.

Volume: 240 ml. The outside measures 120mm x 120mm x 75mm (H) (4¾" x 4¾" x 3"H) and the inside

measures 4" x 4" x 2". The stainless steel rack has a swing handle for easy access and has grooves to take 76mm microscope slides, up to 40mm wide horizontally. Capacity: 25 slides. Complete set includes one staining dish with lid and one swing handle rack.



Cat.#	Description	Pack
71420-25	25-Slide Unit Staining Dish Complete Set	Set
71420-DL	240ml Staining Dish and Lid only	each
71420-SR	25 Slide Swing Handle Rack only	each

► Staining Dish for 30 Slide

These mix and match components offer greater flexibility in meeting your requirements. This staining dish accommodates 16, 20 and 30 slide racks (listed below). Slides range from 3x1" (75 x 25mm), 3" x 1½" (75 x 38mm), and 3 x 2" (75 x 38mm), and 3x2" (75 x50mm). The dish is made from soda-lime glass.

The inside dimensions: 135mm (L) x 102mm (W) x 69mm (H).
Outside dimensions: 146mm (L) x 113mm (W) x 83mm (H)
30-slide staining set consists of one Staining Dish, one Lid, one 30-slide stainless steel Rack.

Cat.#	Description	Pack
70312-30	30-Slide Staining Dish	Set
70312-31	30-Slide Staining Dish only	each
70312-32	Cover for 30-Slide Dish	each
70312-33	30-Slide Staining Dish and Cover	each



► 20/40 Slide Rack

This glass rack holds 20 single slides, or 40 slides back-to-back. This rack is made from soda-lime glass.

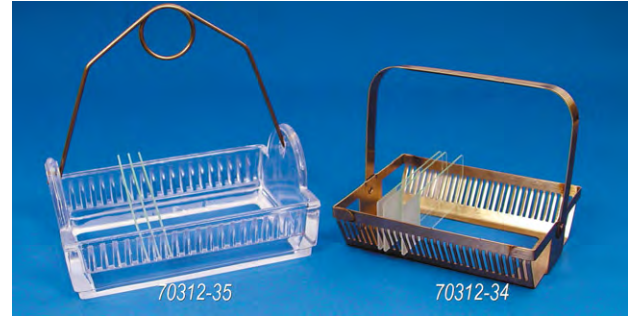


Cat.#	Description	Pack
70312-36	20/40-slide Glass Rack with Handle	each

► Staining Dish; 50 Slide Unit

A stainless steel, slotted rack, designed to hold 50 slides individually in a variety of sizes: 3"x1", 3"x1½", and 3"x2". The unit measures approximately 200x105x83mm overall. The rack is made from nontarnishable stainless steel and is resistant to most staining solutions. The handle is permanently attached allowing for closure of the dish and for easy insertion and removal of the slides. The inside of the staining dish measures: 186mm(L)x89mm(W)x68mm(H)
The complete set consists of 1x dish, 1x rack, and 1x cover.

70312-50	50 Slide Unit Staining Dish	Set
70312-51	Dish only	each
70312-52	Cover only	each
70312-53	Dish and Cover only	each
70312-54	Slide Rack only	each



► 30 - Slide Swing Handle Rack

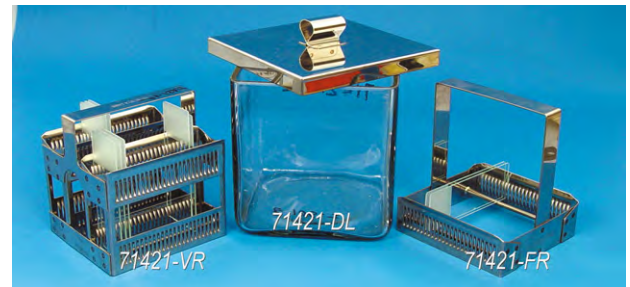
This 30 slide rack is made from non-tarnishing stainless steel and it is resistant to most staining solutions. The handle is permanently attached but it is swing-able to permitting for closure of the dish and easy insertion and removal of the slides.

► 16/32 Slide Rack

This glass rack holds up to 26 single slides, or 32 slides back-to-back. The rack is made from soda-lime. Rack measures: 4" x 3½" x 2"H

Cat.#	Description	Pack
70312-34	30-Slide Stainless Steel Rack	each
70312-35	16/32-slide Glass Rack with Handle	each

► Fixed Handle Rack and Vertical Slide Rack



Fixed Handle Rack: A stainless steel rack with a fixed handle for use with large slides. The rack is grooved to take 76mm microscope slides up to 50mm wide horizontally. The rack accommodates up to 24 slides

Vertical Slide Rack: A stainless steel rack with a fixed handle and grooves to take 76 x 26mm microscope slides vertically for maximum use of space and solution. The rack accommodates up to 48 slides (24 slides each row).

Cat.#	Description	Pack
71421-FR	Fixed Handle 24-Slide Rack only	each
71421-VR	Vertical 48-Slide Rack only	each

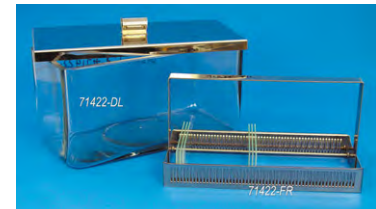
► Fixed Handle Rack and Vertical Slide Rack

Fixed Handle Rack

(#71422-FR): A stainless steel rack with fixed handle for use with larger slides. The rack is grooved to take 76mm microscope slides up to 50mm wide horizontally. The rack accommodates up to 55 slides.

Vertical Slide Rack (#71421-VR): A stainless steel rack with a fixed handle and grooves to take 76 x 26mm microscope slides vertically for maximum use of space and solutions.

Cat.#	Description	Pack
71422-FR	Fixed Handle 55 Slide Rack only	each
71421-VR	Vertical 48-Slide Rack only	each





► **Tissue-Tek® Slide Staining Set**

Sakura Finetek - Designed for staining histological and cytological specimens. With up to 12 solution wells, each deep enough for total immersions of 1x3" microscope slides. The set comes complete with a metal frame and a snap on locking cover that protects from spills. The set consists of 10 white polypropylene dishes, two green solvent resistant dishes, measures: 28"Lx9"W x 5½"H drain tray covers. Additional staining dishes and 24-slide holders with removable handles are sold separately. Staining dish (white or green) inside measures: 38mm x 90mm x 90mm H

Cat.#	Tissue-Tek	Description	Pack
62540-01	4451	Slide Staining Set	set
62541-01	4456	Staining Dish, Green	each
62541-12	4456	Staining Dish, Green	12/pk
62542-01	4457	Staining Dish, White	each
62542-12	4457	Staining Dish, White	12/pk
62543-06	4465	24-Slide Holder w/Handle	6/pk



► **Coverslip Staining Rack**

A stainless steel rack with grooves to take 22 x 22 mm coverslips vertically. It accommodates 25 coverslips at a time. The rack measures 3¾" x 1"(W) x 2"(H)

Cat.#	Description	Pack
72241-01	Staining Rack, Vertically	each

► **Disposable Slide Staining Tray Set**



Stain, Rinse and Dry on a Single Tray – Then Simply Throw Away!

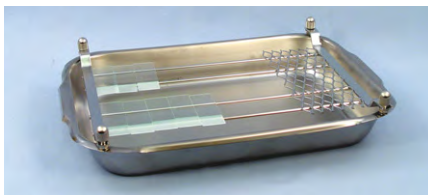
Stain, rinse, and dry your slides on a single working tray. Use the tray for a clean and fresh working surface area for staining. These trays are made from Polypropylene / polyethylene blend and is very durable

Stain, rinse, and dry your slides on a single working tray. Use the tray for a clean and fresh working surface area for staining. The deep well can hold liquid waste up to 38mL. Place eight slides comfortably onto the base. With its compact size, tray provides comfortable transport from work area to sink. Convenient pour spouts to easily dispose of unwanted liquid waste. Unique dark lid protects slides when used with fluorescents.

The Tray measures 305mm (l) x 127mm (h) x 29.5mm. The tray holds up to 8 slides maximum with a 38ml liquid capacity.

A complete set has 4 base trays and one lid. The dark lid protects the slides for light sensitive applications

Cat. #	Description	Qty.
71147	Disposable Slide Staining Tray Set	set



► **Slide Staining Tray and Rack**

The unit consists of four-bar racks which accommodates 22 slides (3x1"), and a slotted rack which accommodates 10 cover glasses. A stainless steel tray catches excess stain solution as it drains from the slides.

The unit measures: 12½"(L)x9½"(W)x2"(H) (32x24x5cm).

70323	Slide Staining Tray and Rack	set
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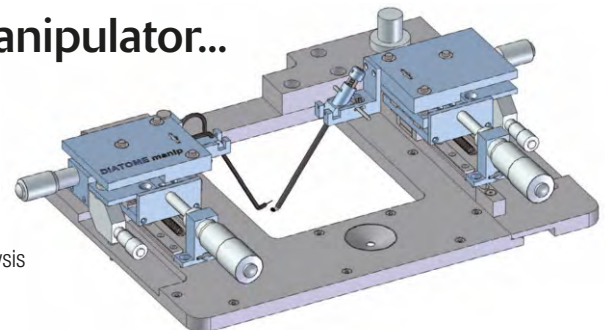
Check out our Newest and Most Revolutionary Products...

Introducing **DiATOME** manipulator...

For easily handling and mounting of section ribbons.

Applications

- Frozen hydrated biological samples (CEMOVIS)
- Room temperature sectioning of water sensitive samples
 - Dry resin sectioning of biological samples for chemical analysis
 - Dry sectioning of industrial samples such as polymers



A cryosection showing vacuole, mitochondria and filopodium of a cultured cell. C. Peitsch and I. lavocache, Inst. of Anatomy, Bern. Bar 100 nm

For more information, see page 710 >>>>

► Reagent Reservoirs Bio-Pure

Disposable – Sterile and Non-Sterile varieties

Unique – “Trough within a trough” maximizes reagent recovery.

Convenience – Pour-off spouts on all four corners.

Stable – A wide base provides stability and avoids spills.

Measurable – Graduated marks on inside wall.

Sterile – Sterilized by gamma irradiation.

Compatible – 25ml Reservoir with divider accommodates eight channel pipets on one side and one to four channel pipets on the other. The divider is also convenient for adding controls.

Options – Offered in bulk cases or individually wrapped (ideal for use in clean rooms).



100ml Sidecar Reservoir



25ml reservoirs with divider (left) and without (right)



Sidecar Reservoir* Features:

- “Two-in-One design” for precise reagent adding/mixing
- Ideal and efficient to use with small volume control and large volume test reagents
- “Sidecar” holds as little as 10ml of liquid or as much as 20ml

► Non-Sterile Cases of Reagent Reservoirs

Cat.#	Description	Qty.
70497-10	100ml Reservoir, Non Sterile	100/case*
70497-20	25ml Reservoir with divider, Non Sterile	100/case*
70497-30	25ml Reservoir, Non Sterile	100/case*
70497-35	50ml Reservoir, Non Sterile	100/case*
70497-40	100ml Sidecar Reservoir, Non Sterile	100/case*

Note: Each Case of 100 is packaged as 10 packs of 10 Reservoirs

* Patent Pending

► Sterile Cases of Reagent Reservoirs

Cat.#	Description	Qty.
70495-10	100ml, Sterile	100/case*
70495-20	25ml with divider, Sterile	100/case*
70495-30	25ml, Sterile	100/case*
70495-35	50ml Reservoir, Sterile	100/case*
70495-40	100ml Sidecar, Sterile	100/case*
70496-10	100ml, individually wrapped	50/case
70496-20	25ml with divider, individually wrapped	50/case
70496-30	25ml, individually wrapped	50/case
70496-35	50ml Reservoir, individually wrapped	50/case
70496-40	100ml Sidecar, individually wrapped	50/case

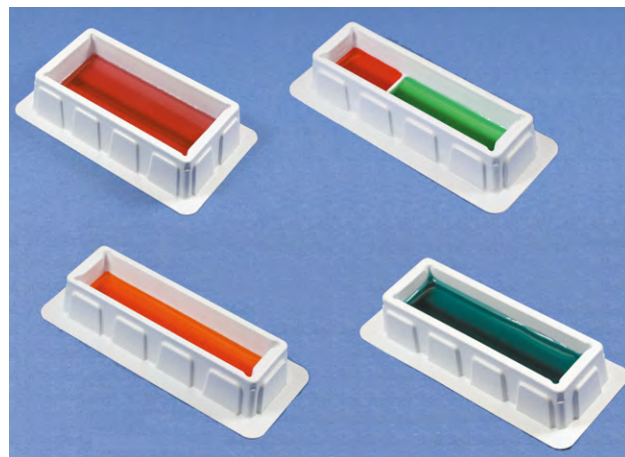
*Each Case of 100 is packaged as 10 packs of 10

► Sterile Biodegradable Reagent Reservoirs

A special additive helps the plastic bio-degrade by allowing bacteria and other organisms to breakdown the complex molecular chain. This speeds up the process to reduce the resin to its natural components within five years as opposed to 1,000 years or more.

Biodegradable - Using a special additive to PET, our reservoirs will safely degrade over time.

100% Eco-Friendly - Each case of Bio-Pure Reservoirs are packed in bio-degradable bags and recycled cardboard cases.



70497-45	Bio-Pure 100 ml Biodegradable Reservoir - Sterile	100/case*
70497-46	Bio-Pure 25ml w/divider Biodegradable Reservoir - Sterile	100/case*
70497-47	Bio-Pure 25ml Biodegradable Reservoir- Sterile	100/case*
70497-48	Bio-Pure 50ml Biodegradable Reservoir - Sterile	100/case*

*Each Case of 100 is packaged as 10 packs of 10

► Reagent Reservoir Cooler

Benchtop Cooling of Reagents

‘Keep Your Cool’ - Reagents are kept at ~5°C for approximately 3 hours

No Mess - No need for a cumbersome ice bath, the frozen gel is contained in a sealed molded cavity.

Extra Time - Extends safe working time for temperature sensitive reagents

Extend benchtop working time and keep reagents cool up to 3 hours.

Fitted - Each 100ml* Reservoir fits perfectly and snugly onto the Cooler ensuring uniform cooling

70497-50	100ml Reservoir Cooler	each
70497-51	50ml Reservoir Cooler	each
70497-52	25ml Reservoir Cooler	each



► WINLAB Slide Staining Racks and Carriers

STAINLESS STEEL AND PLASTIC SLIDE RACKS

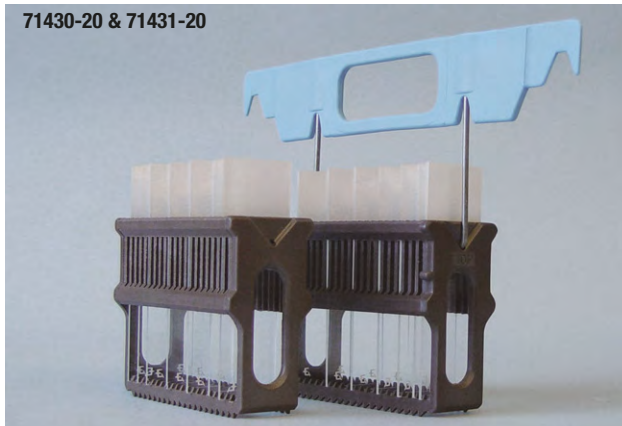
- They are very good chemically as well as thermally
- Has limited uses in microwave and solvents.
- When it comes to inserting the slide, easy to break the glass or tear the tape on abrupt edges.

WINLAB SLIDE RACKS

- WINLAB Racks made from Poly-ceramic that maintains its structural integrity to 200°C in any solvent while being microwaved.
- WINLAB Racks last a lot longer than any other materials.
- Save time and money.

ADVANTAGES OF WINLAB SLIDE RACKS:

- Made from Poly-ceramic with more than 40 years of product development and state of the art molding technology.
- **Microwave Safety** – in a distortion-free rack
- **Chemical Resistant** – to all solvents below 200°C
- **Designed** – for histology and cytology staining and coverslipping
- **Quality Control** – Every rack is tested for performance criteria and dimensional accuracy, ensuring consistency, which makes WINLAB a name you can trust
- WINLAB Racks fit the Tissue-Tek Tape Machines
- **Easy Slide Insertion** - V-Grooves slots



1. WINLAB 30-Slide Racks

WINLAB 30-Slide Racks available with two models: LS-30 and LSM-30

The LS-30 – is held rigid by the carrier the same way as the Sakura / Bayer models, preferred for Leica stainers. Handle positions: 1 x Vertical, 2 x 45 degrees, and 2 x 90 degrees.

The LSM-30 version swivels by carrier as does the Medite stainless Steel racks and has the advantage of fitting Leica, VBS, Bayer, Sakura, Medite, coverstaining machines and Sakura tape coverslipper. Handle position: Swivel 45 degrees

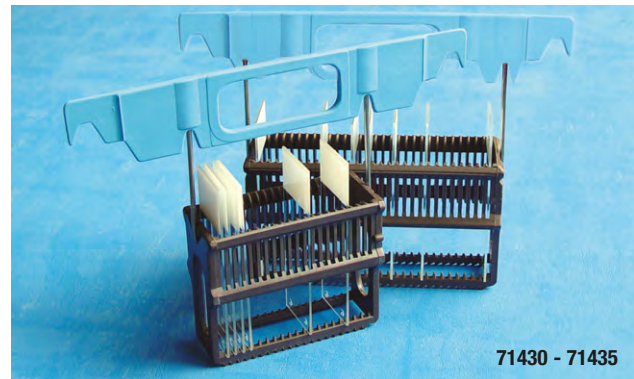
WINLAB 30-Slide Racks measure: 4½" L x 2½" H x 1⅝" W (115 x 65 x 35 mm)

2. WINLAB 20-Slide Racks

WINLAB 20-Slide Racks available in two models: LS-20 and LSM-20 (LSM-20 is fit Medite stainers)

WINLAB 20-Slide Rack is fitted to a Sakura Staining Dish, either Green or White and also fits most other staining dishes.

Racks measure 3" L x 2 ½ " H x 1" W (77x64x25mm)



3. WINLAB 30-Slide Rack Carriers

Steel wire hooks molded to the polypropylene handle to form Slide Rack Hanger. The Slide Rack Hanger is very easy to attach or detach from the WINLAB Slide Racks.

30 Slide Rack Carriers fit all Models LS-30 and LSM-30 above.



4. WINLAB 20-Slide Rack Carriers

Same construction as 30-Slide Rack Carrier but they fit all LS-20 and LSM-20 Slide Racks



5. WINLAB 30-Slide Rack Carrier for InstrumeC/Dako Slide Racks

6. WINLAB 20-Slide Rack Carriers for InstrumeC/Dako Slide Racks

7. WINLAB Slide Racks Wire Handles

Steel wire is bended to form a handle. Use these Handles for manual staining and the Medite stainer.

Model **W3-5** fits all WINLAB 30-Slide Racks

Model **W3-6** fits all WINLAB 20-Slide Racks

8. WINLAB Plastic Handles

Model **SR-20** for all 20 Slide Racks

Model **SR-30** for all 30 Slide Racks

These handles are economical as well as microwave safe and solvent resistant. They may be used for all manual staining to avoid unwanted chemical and heat contact.

Ordering:

Cat. #	Description	Qty
71430-30	WINLAB 30-Slide Rack, Model LS-30	each
71431-30	WINLAB 30-Slide Rack, Model LSM-30	each
71430-20	WINLAB 20-Slide Rack, Model LS-20	each
71431-20	WINLAB 20-Slide Rack, Model LSM-20	each
71433-B	30-Slide Rack Carrier, Blue	each
71435-B	20-Slide Rack Carrier, Blue	each
71433-Dako	30-Slide Rack Carrier, Blue, for InstrumeC/Dako Slide Racks	each
71435-Dako	20-Slide Rack Carrier, Blue, for InstrumeC/Dako Slide Racks	each
71437-30	Wire Handle for 30-Slide Rack	each
71437-20	Wire Handle for 20-Slide Rack	each
71437-40	SR-20 Plastic Handle for the 20-Slide Unit	each
71437-50	SR-30 Plastic Handle for the 30-Slide Unit	each



► StainTray™ - Slide Staining System

An ideal device for immunohistochemistry slide staining. The

StainTray™ has a black base, made from tough ABS plastic, withstanding a wide range of chemicals (except chlorinated hydrocarbons). It will accept up to 20 slides on four plastic rails covered with a polymer strip to perfectly hold the slides even if the tray is held at an angle. When humidity is needed, the wells between the rails will hold the water securely without splashing. Rails are raised not only to avoid water touching the slides but also make the slides more easily retrievable. The base will also hold excess stain solution that drips from the slides. Four rubber feet add to the base for stability. Units are stackable to save space.

Two covers are available:

- A clear cover, allowing for visual examination. Made from PETG with temperature a range of -20°C to 60°C
- A black cover for fluorescent work. Made from ABS with a temperature range of -80°C to 80°C.

Dimensions with the cover:

20-Slide unit: 38 x 24 x 4.5 cm H (15 x 9½ x 1¾" H)

10 Slide unit: 24 x 24 x 4.5 cm H (9½ x 9½ x 1")

This tray is not only suitable for routine staining requiring a humid chamber but is also ideal for hematology, cytology and microscopy laboratories

Ordering:

EMS #	Description	Qty
71396-C	10-Slide StainTray™ with Clear Lid	1
71396-B	10-Slide StainTray™ with Black Lid	1
71398-C	Clear Lid only for 10-Slide StainTray	1
71398-B	Black Lid only for 10-Slide StainTray	1
71397-C	20-Slide StainTray™ with Clear Lid	1
71397-B	20-Slide StainTray™ with Black Lid	1
71399-C	Clear Lid only for 20-Slide StainTray	1
71399-B	Black Lid only for 20-Slide StainTray	1

Dip Miser; Staining Cup See Specimen Prep, page 247 >>>>

For more Staining Molds and Supplies, See Grid Section, pages 145-149 >>>>

► Glass Slide Processing Holder

The holder is designed to hold securely five 1x3" microscope slides. It comes with a handle for easy manipulation. Up to 50 slides (10 holders) can be processed at one time in one staining vessel from start to finish without interruption. The slide holder has two sides - one being black and the other white. This allows for easy grouping and identification of the slides. The holder is ideal for both frozen and paraffin sections.



The Slide Holder can be used to:

1. Fix frozen sections in acetone.
2. Deparaffinize and rehydrate paraffin sections.
3. Isolate sections on the slide with our PAP Pen (#71310).
4. Immunostain, incubate and wash.
5. Counter stain.
6. Mounting with medium.

The holder measures: 6¼" x 3½" (159mm x 89mm) excluding the handle.

71524-01	Glass Slide Processing Holder	each
71524-10	Glass Slide Processing Holder	10/pk

► Immuno Stain Moisture Chamber



This low-cost, high precision moisture chamber for ten slides is another innovative product from Evergreen.

Each moisture chamber is divided into ten individual compartments with approximately half-inch empty space between the compartments. When the chamber lid is closed, eight barrier dividers are placed into the empty spaces between the microscope slide compartments completely isolating all compartments. This is a very desirable feature when doing immuno staining.

The microscope slides are placed on four pedestal posts and four corner posts each 0.460 inch (11.5 mm) high thus raising the surface of the slides approximately half-inch off the floor to keep the slides away from the water below and to make the slides easily retrievable (either by hand or by forcep).

The chamber is fabricated out of heavy-duty polystyrene with an air-tight design to keep moisture in. The chambers are designed to be stackable in order to save counter and/or refrigerator space.

Available in clear, black and amber.

62010-35	Immuno Stain Moisture Chamber Clear	each
62010-36	Immuno Stain Moisture Chamber, Amber	each
62010-37	Immuno Stain Moisture Chamber, Black	each

► General Supplies for Histology

► Glasgow Washout Brushes

Four rows of white bristles locked in a wooden handle for the cleaning of the bench-top, around microtomes and microscopes etc. The overall length is 10".



Cat.#	Description	Pack
65580-01	Glasgow Washout Brush, Hard	each
65580-03	Glasgow Washout Brush, Medium	each
65580-05	Glasgow Washout Brush, Soft	each
65580-06	Glasgow Washout Brush, Very Soft	each

► Scratch Brushes with Metal Ferrules

These pen shaped handles are available in four different types. They are offered with metal ferrules for improved durability. Used for fine deburring, polishing, as well as rust removal and the cleaning and removal of deposited wax.

The overall length is 4 1/4" long, and the brush is 1/8" wide. Refills are available and are packaged 12/box.



Cat.#	Complete Brush	Pack	Brush Material	Cat.# for Refill	Pack
65582-01	each	each	Steel Ferrules Brush	65582-R1	12/pk
65582-03	each	each	Nylon Ferrules Brush	65582-R3	12/pk
65582-05	each	each	Fiberglass Brush	65582-R5	12/pk
65582-07	each	each	Brass Brush	65582-R7	12/pk



► Wood Handle Metal Brushes

A four-row brush made in Germany from 0.10mm crimped steel or brass wire set in a wooden handle. Excellent for use as a cleaning brush or for surface texturing on soft metals. The overall length is 8 3/4"

Catalog #	Description	Qty
65585-S	Steel Bristle Brush	each
65585-B	Brass Bristle Brush	each

► Camel Hair Brushes

Useful for dusting and cleaning embedding center, balances, and sensitive instruments. Camel hair is mounted on wooden handle with metal ferrule. Available with three styles:

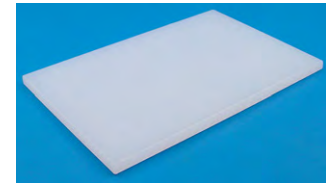
- Round, camel hair portion has full body and slightly pointed tip. Brush size 3/4" diameter x 1 1/2" long. Overall length is 9".
- Paint brush style 1, camel hair portion is 1" long x 1" wide. Overall 6" long.
- Paint brush style 2, camel hair portion is 1 1/4" long x 2" wide. Overall 8 3/4" long.



Cat. #	Description	Pack
65575-01	Camel Hair Round Brush	each
65576-01	Camel Hair Paint Brush, Style 1	each
65577-01	Camel Hair Paint Brush, Style 2	each

► Cutting Board; Polypropylene

This cutting board is autoclavable, unbreakable, non-absorbent, and easy to clean. It is a useful item in any laboratory. Measurements: 300mm(L) x 210mm(W) x 9mm(H).



63308	Cutting Board	each
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► Cork Sheets

Resin bonded cork sheets for specimen preparation.



Cat.#	Desc.	Pack
63303-28	Sheets, 305 x 305 x 1.6 mm	6/pk

► Cork Boards

All resin bonded cork dissecting boards.

Cat.#	Description	Pack
63304-01	Cork Board, 305 x 305 x 20mm	each
63304-03	Cork Board, 450 x 450 x 20mm	each
63304-02	Cork Board, 450 x 305 x 20mm	each

► Cork Discs

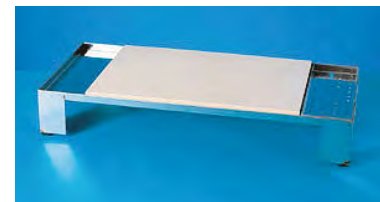
These discs are 20mm diameter and are 3mm thick. Perfect to be used with a cryostat



Cat.#	Description	Qty/pk
63305	Cork Discs	100/pk

► Post Mortem Board Table

Low profile made from stainless steel post mortem table, which includes #63302-77 mortem boards. This board is rested at a slight gradient to



aid drainage away from the operator. The table has rubber feet to prevent movement and a removable perforated tray is provided for specimen fluid drainage, as well as storage area for dissecting instruments. The overall table measures 668 x 313 x 108 mm (26 1/8" x 12 1/2" x 3 7/8"). The board size is: 454 x 307 x 18mm (17 3/4" x 12 1/8" x 1 1/16"). Tray size: 307 x 105 x 18mm (12 1/8" x 4 1/8" x 1 1/16").

Cat.#	Description	Qty
63301	Post Mortem Board Table	each

► DissecTable™ Set

The first and only reversible dissecting table for the laboratory

► The DissecTable™ Board Base

Made from high impact polystyrene

To make dissecting more comfortable, this heavy duty base is used to elevate the DissecTable™ Board to the right height. The bases are stackable and will not move sideways during the dissecting work. The base will also retain excess fluid if necessary.



Dimensions: 481 mm x 656 mm x 91 mm (19¼" x 26¼" x 3½")

► The DissecTable™ Board

Made from high-density polyethylene

A new and unique approach makes this dissecting board more convenient than any other board found on the market today. It is no longer necessary to buy different sizes as this board offers a large surface on one side and two smaller ones on the other side.



Made from heavy-duty thick polyethylene, it will last for years to come without changing shape, bending or swelling. In order to contain fluids, a drain groove is carved all around the edge of the DissecTable™

On one side, you will find a large cutting area including dimensional scales in inches and centimeters, along with a 60 x 80 mm grid made of 48 x 10 mm squares. Six dimensional circles are also printed from 1/8 to 5/8 in. and 4 to 14 mm in diameter.

Flip it over and the other size, others two cutting boards half the size with the same dimensional features printed on each one of them. All corners have rubber feet giving more stability to the working surface.

Dimensions: 575 mm x 400 mm x 12.5mm (23" x 16" x ½")

► The DissecTable™ Set

The set consists of DissecTable™ Board Base and DissecTable™ Cutting Board

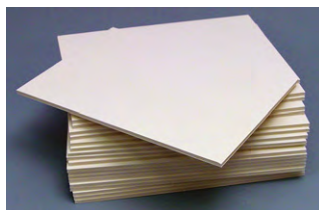


Ordering:

Cat.#	Description	Qty
63309-DT	DissecTable Board Base	each
63309-DB	DissecTable™ Board	each
63309-O1	DissecTable™ Set	each

► Disposable Dissecting Board

Manufactured from white, water resistant cardboard and sponge sandwich. The board measures: 297 x 420 x 5mm (10" x 16" x 3")

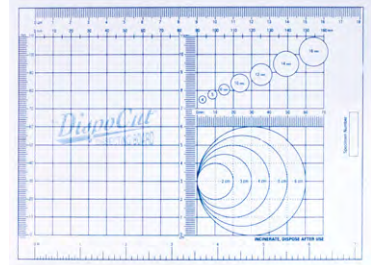


Cat.#	Description	Qty
63306	Disposable Dissecting Board	10/pk

► The EMS DispoCut™ Dissecting Board

The DispoCut™

Disposable Dissecting Board is strong yet inexpensive enough to throw away. It is especially developed to provide a clean, safer and more efficient way of handling infectious tissue specimens for the pathologist. It can be used on both sides, a great money saving feature. Printed with helpful imperial and metric dimensional scales in inches, centimeters and millimeters. Available in three sizes to accommodate small biopsies to large gross anatomy procedures.



DispoCut™ is extrusion made using a copolymer resin in order to increase impact and high and low temperature performance. Copolymer resins are also used because they retain the ability to be flexed an unlimited number of times without breaking. Chemically, DispoCut is inert. At regular temperatures most oils, solvents and water have no effect, allowing it to perform under adverse weather conditions or as a product component exposed to harsh chemicals.

Each surface has many conveniently located rulers including seven dimensional circles from 4 to 16 mm in diameter and five larger ones from 2 to 6 cm in diameter. Surface will not dull knives. Perfect for use with dissecting pins. All sizes of DispoCut™ Disposable Dissecting Boards are ideal for pathology labs, medical schools, classroom dissections, forensic labs, medical research labs, pharmaceutical labs, surgery and more.

Temperature performance range: -17 °F to 160 °F, Melting point: 162 °C, 324 °F

Sterilization: DispoCut™ may be wiped down with alcohol with no effect on the material. There are many types of autoclaves on the market. DispoCut™ is being autoclaved (in excess of 3 years) in many situations. There are some extreme settings which will be damaging and we suggest a trial to determine performance in your equipment. Ethylene oxide gas sterilization has no effect of any kind on DispoCut™ and may be repeated any number of times.

63308-20	DispoCut™ 6 x 8 in. (152 x 203 mm)	24/pk
63308-30	DispoCut™ 9 x 12 in. (229 x 305 mm)	24/pk
63308-40	DispoCut™ 12 x 19 in. (305 x 483 mm)	12/pk

► Dissecting Boards

Made from ½" thick high-density poly-ethylene. A white background with X,Y scales in centimeters offers a quick orientation and sizing of the specimens. It is chemical and stain resistant and comes with a spill control border and rubber feet to prevent spillage and sliding. To secure the specimen to the board, styrene-capped pins are available (optional). Boards are available in two sizes.



Measurements: Board B 13"(L)x11"(W)x½"(H)(33x28x1.6cm)
Board C 23"(L)x16"(W)x½"(H)(58.4x40.6x1.6cm)

63307-20	Dissecting Board B	each
63307-30	Dissecting Board C	each
63307-50	Dissecting Pins	100/bx

► Dissecting Pan and Mat

This dissecting pan is made from aluminum, which is rust free and easy to clean. It comes with a removable reusable vinyl pad, which accepts dissecting as well as push-pins to hold down your specimen during dissecting. The pad measures 13 1/8" x 9 3/8" x 2 1/4" thick



63313 Dissecting Pan & Vinyl Mat each

► Instrument Trays With Cover

Natural polypropylene. Steam autoclavable at 250°F (121°C) Smooth with rounded corners. They are easily cleaned and sterilized. The cover protects the instruments from contamination.



Inside bottom dimensions:

- Tray 1: 4"x7"x2 1/2" deep (102x178x54mm)
- Tray 2: 4 3/4"x9"x3 3/4" deep (121x229x83mm)
- Tray 3: 6"x11"x5" deep (152x279x127mm)

63312-01	Instrument Tray 1	each
63312-02	Instrument Tray 2	each
63312-03	Instrument Tray 3	each

► Tray, Dispensing

These trays, which are 1/4" thick, are fabricated from either low or high density polyethylene. They come complete with a polyethylene dispensing valve which is located as close to the bottom as possible on the corner. The tray is suitable for specimen preparation procedures.



Cat.#	Inside Dimensions	Material	Pack
63007-01	12"x16"x3" Deep	LDPE	each
63007-02	16"x20"x4" Deep	LDPE	each
63007-03	18"x22"x4" Deep	LDPE	each
63007-04	22"x26"x4" Deep	HDPE	each

► Instrument Trays

Blue polyethylene.

- These deep trays keep fluids from splashing.
- Has a smooth surface and rounded internal corners for easy cleaning.
- It is lightweight and noiseless as compared to heavy metal trays.



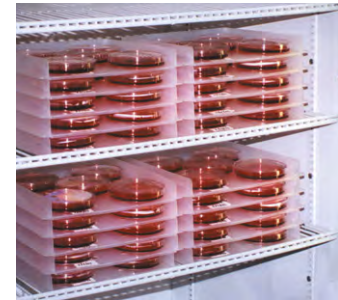
Available in 2 sizes:
 ■ Size 1 measures: 20"x12"x6" deep
 ■ Size 2 measures: 21 1/2"x15 1/2"x6" deep

63310-02	Instrument Tray 1, 6" Deep	each
63310-06	Instrument Tray 2, 6" Deep	each

► Petri Dish Incubation Trays

For the organization of all of your Petri dishes. Increases your incubator capacity.

These trays are stackable and can be autoclaved. They are designed to hold five 10 cm diameter or fifteen 6 cm diameter Petri dishes. Each tray comes with two large label areas for critical sample identification by either using a marker or a label.



Features:

- Increase incubator capacity
- Transport and store Petri dishes with ease while maintaining even CO₂ circulation
- Easy sample grouping and identification
- Autoclavable

Made from polypropylene, the tray measures 9 1/2" x 9 1/2" x 1 1/2" high (251 x 237 x 35 mm).

Cat.#	Description	Pack
71395-03	Petri Dish Incubation Tray	3/pk.

► Tissue-Tek® Microtome Waste Collection Tray

Sakura Finetek - This unique tray assists in the collection of all of the waste trimmings from paraffin blocks, therefore this system helps eliminate slippery hazards caused by paraffin shavings on the floor or the work area. The set includes a durable plastic tray, bag holder and 25 disposable waste collection bags.



Cat.#	Tissue-Tek	Description	Pack
63318-01	4657	Waste Collection Set	set
63318-25	658	Waste Collection Bag	250/cs

► Tissue-Tek® Cold Plate

Sakura Finetek - This cold plate is made from a polystyrene top and base molded together for a tight seal, with an additional Styrofoam insulator at the base to prolong cooling and prevents moisture accumulation. The plate freezes in about 4 hours in a freezer and the surface remains cold for up to 3 hours. The plate is ideal in chilling and preparing paraffin blocks for sectioning at the microtome or for other laboratory procedures. Not for use with organic solvents such as toluene, xylene, acetone. It holds up to 24 cassettes or embedding rings. Measures 11"(L)x5 1/2"(W)x1"(H). Packed 6 cold plates and 1 insulator base per package; 4 packages per case.



Cat.#	Tissue-Tek	Description	Pack
62536-01	4650	Cold Plate	1 pack
62536-04	4650	Cold Plate	4 Packs/cs

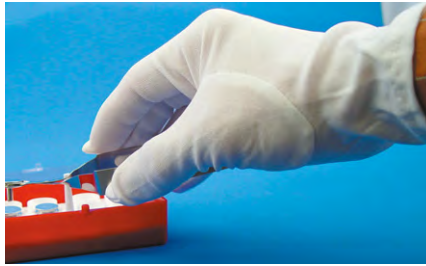
► Cotton Gloves



These well tailored, high quality gloves are made from 100% cotton. They offer softness and comfort. A perfect choice for handling photographs.

Cat. #	Size	Qty.
71118-01	Small	6prs/pk
71118-03	Medium	6prs/pk
71118-05	Large	6prs/pk

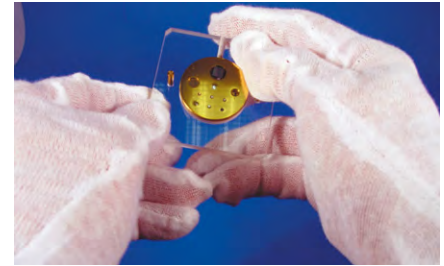
► Gloves; Lint Free, Clean-room



Finest quality, stretch nylon, one size fits all.

Cat. #	Size	Qty.
71090	Mens	6 pair/pk
71092	Womens	6 pair/pk

► Lightweight Cotton Inspector Gloves



These gloves are un-hemmed and lint-free. They are tailored cotton gloves which are ideal for inspection jobs. These gloves are available in one-size fits all for either men or women.

Cat. #	Size	Qty.
71119-01	Women	12/pk
71119-05	Men	12/pk

► Gloves; Latex Exam Gloves With Aloe Vera and Vitamin E

Made from 100% natural latex with the addition of Aloe Vera and Vitamin E, offering the softness, tactile sensitivity and skin protection. Economical ambidextrous style, beaded cuff, and are chemically resistant to acids, alcohols, ketones and alkalis. Packed in a convenient dispenser box, 100/box. Non-sterile. Available either with powdered (biologically cornstarch dusting, ~ 2mg/glove) or powder-free gloves.

Product specification		
Mean Tensile Strength:		
Before aging	24Mpa	
After aging	20Mpa	
Elongation:		
Before aging	750% min.	
After aging	700% min.	
Thickness		
Finger	0.15mm ± 0.01mm	
Palm	0.14mm ± 0.01mm	
Cuff	0.11mm ± 0.01mm	



Latex Conform®

Cat. #	Size	Qty.
Light Powdered Latex Gloves		
71110-01	Small	100/bx
71110-20	Small	10bxs/cs
71111-01	Medium	100/bx
71111-20	Medium	10bxs/cs
71112-01	Large	100/bx
71112-20	Large	10bxs/cs

Cat. #	Size	Qty.
Powder-Free Latex Gloves		
71114-01	Small	100/bx
71114-20	Small	10bxs/cs
71115-01	Medium	100/bx
71115-20	Medium	10bxs/cs
71116-01	Large	100/bx
71116-20	Large	10bxs/cs

Cat. #	Size	Qty.
Powder-Free Latex Gloves with Aloe-Vera and Vitamin E		
71114-50	Small	100/bx
71114-51	Small	10bxs/cs
71115-50	Medium	100/bx
71115-51	Medium	10bxs/cs
71116-50	Large	100/bx
71116-51	Large	10bxs/cs



Latex Powder Free

► Nitrile Exam Textured Gloves

Powder-Free Green Gloves with Aloe Vera

Made from 100% synthetic nitrile, contains no latex. It is an extremely tough glove yet gentle on the hand. It offers superior textile strength and they are puncture resistant when compared to other similar thickness of latex or vinyl gloves. There are no natural rubber protein allergens as is present in natural latex rubber gloves. With the addition of Aloe Vera, the powder-free gloves will provide the user with superior comfort, excellent flexibility and dexterity. Textured gloves provide a positive grip on wet and or dry surfaces. The nitrile compound provides a broad range of hand protection against accidental chemical splashes.

Product specification

Type:	Nitrile exam gloves – non-sterile - Textured	
Color:	Blue (w/o Aloe Vera), Green (with Aloe Vera)	
Mean Tensile Strength:		
Before aging	24Mpa	
After aging	20Mpa	
Elongation:		
Before aging	740% min.	
After aging	730% min.	
Thickness		
Finger	0.21mm ± 0.03mm	
Palm	0.14mm ± 0.03mm	
Cuff	0.11mm ± 0.03mm	

Cat. #	Size	Qty.
Powder-Free Nitrile Gloves		
71106-20	Small	100/bx
71106-21	Small	10bxs/cs
71106-30	Medium	100/bx
71106-31	Medium	10bxs/cs
71106-40	Large	100/bx
71106-41	Large	10bxs/cs
71106-50	X-Large	100/bx
71106-51	X-Large	10bxs/cs

Cat. #	Size	Qty.
Powder-Free Nitrile Gloves with Aloe-Vera		
71107-20	Small	100/bx
71107-21	Small	10bxs/cs
71107-30	Medium	100/bx
71107-31	Medium	10bxs/cs
71107-40	Large	100/bx
71107-41	Large	10bxs/cs
71107-50	X-Large	10bxs/cs
71107-51	X-Large	100/bx



► Vinyl Exam White Gloves

Made from synthetic polyvinyl chloride, powder-free, ambidextrous, medical grade non-sterile gloves, Seamless, chemical resistant and excellent sensitivity, these vinyl gloves offer a unique balance of softness flexibility and strength.



Product specification	
Type:	Vinyl exam gloves – non-sterile – Ring Roll Bead Cuffs
Color:	White
Mean Tensile Strength:	9Mpa
Elongation:	740% min.
Thickness	Finger 0.10mm ± 0.01mm Palm 0.10mm ± 0.01mm
Overall Length, mm:	235 (Small & Medium), 245 (Large & x-Large)

Cat. #	Size	Qty.
71108-10	Small	100/bx
71108-12	Small	10bxs /cs
71108-20	Medium	100/bx
71108-22	Medium	10bxs/cs
71108-30	Large	100/bx
71108-32	Large	10bxs/cs
71108-40	X-Large	100/bx
71108-42	X-Large	10bxs/cs

► Cut-Resistant Gloves; Safeknit™

The comfortable choice when choosing a high performance cut resistant glove. Safeknit is a blend of abrasion-resistant Spectra® fiber and other synthetics. The mix of these fibers form a rugged cut resistant barrier that offers the histologist sensitivity for manipulation but with extreme comfort and productivity.



NOTE: These gloves are neither puncture proof nor water resistant. They should not be used to protect against intentional cutting. Avoid use near moving blades. For applications which are related to fluids where a water resistant glove is required, we recommend either double gloving or using Nitrile Gloves, (Cat # 71106-71109 or 71068.)

71066-06	Medium Duty Safeknit™ Glove	Size 6	each
71066-07	Medium Duty Safeknit™ Glove	Size 7	each
71066-08	Medium Duty Safeknit™ Glove	Size 8	each
71066-09	Medium Duty Safeknit™ Glove	Size 9	each
71066-10	Medium Duty Safeknit™ Glove	Size 10	each
71066-11	Medium Duty Safeknit™ Glove	Size 11	each

► Finger Cots; Latex– Powder Free

Inexpensive, expandable finger cots. Seamless. Protective dexterity without covering the entire hand. Powderless, non-rolled. 3/8mil (0.0030"), 2 3/4" (40mm)L.



71130	Latex Finger Cots Small	1 gross/pk
71131	Latex Finger Cots Medium	1 gross/pk
71132	Latex Finger Cots Large	1 gross/pk

SAFETY TIP

The standard latex surgical gloves do not offer adequate skin protection when handling glutaraldehyde. Nitrile or Neoprene gloves provide the protection that is needed. However, dexterity is inhibited with these gloves. Therefore, double-gloving with latex gloves is recommended for delicate work.

Raewyn Eager, Dept. of Zoology, Auckland University. EM News. Newsletter of the New Zealand Society for Electron Microscopy. No. 24, Dec. 1992

SAFETY TIP

In the past several years there has been documentation in the medical literature of numerous cases of latex allergy in medical and other laboratory personnel. Many people are experiencing itchy hands, shortness of breath or other signs of allergic reactions when they use latex gloves in their laboratory work. Some people are changing to powder free gloves with some relief; however, other people get relief only after changing to another type of glove.

E. Ann Ellis, Ellis EM Consulting Service, 1316 SW 61st Terrace, Gainesville, FL. 32607

For Skin Protection, see Dermaplus Safety Section page 1106 >>>>

For our complete line of Protective Gloves and Supplies, See pages 948-949 >>>>

► Gloves Dispenser

- Easy to mount with keyholes, tape
- Accepts most brands of gloves
- Available either top loading or side loading
- Color white and clear front



EMS #	Description, (L x W x H)	
64365-01	Single Gloves Dispenser, 11.5" x 4.75" x 5.25"	each
64365-02	Double Gloves Dispenser, 11.50" x 4.75" x 10.25"	each
64365-03	Triple Gloves Dispenser, 11.5" x 4.75" x 15.25"	each

Marking Pens, See Specimen Preparation, pages 310-311 >>>>

Fro-Marker - A pen for use with frozen sections See Specimen Preparation, page 309 >>>>

Para-Marker - A pen for use with paraffin sections See Specimen Preparation, page 309 >>>>

► Tissue Marking Dyes



A specialized dye for marking tissue biopsies and pathology specimens.

- For use with frozen or fixed tissues.
- Permanently mark the margins of excised surgical specimens for exact orientation.
- Specially formulated binding pigment that evenly coats the tissue without penetrating the tissue surface.
- The marking dyes do not interfere with diagnostic interpretation due to the fact colors are not similar to standard histopathology dyes.
- Fast drying, easy-to-use, and ideal for work with frozen sectioning.
- Dyes are available individually (8oz/bottle) or as a set of a 2oz per bottle with the following colors: blue, black, red, yellow, green, purple and orange. The set also comes with 50 applicator sticks and a wooden storage case.

Cat.#	Description	Pack
63020-01	Tissue Marking Dye Set	7 x 2 oz
63020-BK	Black Marking Dye Refill	8 oz
63020-BL	Blue Marking Dye Refill	8 oz
63020-YL	Yellow Marking Dye Refill	8 oz
63020-RD	Red Marking Dye Refill	8 oz
63020-GR	Green Marking Dye Refill	8 oz
63020-OR	Orange Marking Dye Refill	8 oz
63020-PUR	Purple Marking Dye Refill	8 oz

► Wet Surface Pen



This unusual pen will write clearly on wet surfaces, such as marking slots on wet Southern, Northern, and Western blots. Use it for marking alignment dots on blotting filters placed over agar plates containing bacterial colonies or phage plaques. Mark lanes on wet plots prior to cutting the filter into strips to be incubated separately with different antisera or probes. It can be used to correct or write on wet labels that were kept in a water bath, in liquid nitrogen or in a freezer at 0 degrees. The Wet Surface Pen is extremely useful for marking filters during processing under water-based buffers. The pen can, of course, also be used to write on dry paper as a standard ball pen.

72128 Wet Surface Pen, Black each

► Manomark™ Pen

Writes on all plastic, glass, metal, wool, paper and cloth, including PTFE, fluoropolymer resins. With its precision seal valve the pens life is preserved and as well it allows for a smooth flow of ink even if it's left uncapped. Once dry, the solvent base ink is temperature resistant from 0°C to 155°C (32°F – 310°F) > Markings are insoluble in water or hydrocarbons, resist many solvents, and are easily removed with alcohol.



72127-AS	Manomark Pen Assorted (4 black, 2 red, 2 green, 2 blue, 2 orange)	12/pk
72127-B1	Manomark, Black only	each
72127-B12	Manomark, Black only	12/pk

► Solvent-Resistant Pens & Teeny Writers

Solvent Resistant Pens feature an ultra-permanent ink.

- Resistant to xylene, alcohol, acetone and formalin
- Ideal for histology and cytology
- Markings will not run on embedding cassettes or frosted/painted slides and labware, even after repeated washes and solution treatments
- Remove markings with acetic acid, an ethanol/xylene mixture or paraffin. Testing advised before use

Teeny Writers are perfect general use lab markers.

- The Twin-Tip Teeny Writer has a fine tip and an ultra fine tip
- The original Teeny Writer has an extra fine tip
- Both are ideal for writing on Tough-Tags and Tough-Spots
- Use for labeling samples stored at room temperature and not exposed to chemicals and/or caustic agents

The Twin-Tip Too laboratory marking pen provides a new option for all writing needs. It is the best of both worlds. It is resistant to most mild laboratory chemicals and gives the flexibility of a twin tip pen for fine tip writing on small tubes and labels. Keep it close by utilizing the included handy pocket clip.

Testing is recommended.

Cat. #	Description	Color	Tip (Millimeters)	Qty.
62053-B	Solvent Resistant	Black	Extra Fine (0.6)	each
62053-R	Solvent Resistant	Red	Extra Fine (0.6)	each
62054-B	Twin-Tip	Black	Fine/Ultra Fine (0.7/0.3)	each
62052-B	Teeny Writer	Black	Extra Fine (0.4)	each



Twin-Tip
Teeny Writer

► Securline II Marker

Fine tip, ultra permanent ink that resists solvents such as xylene, alcohol, acetone and formalin.

Ideal for histology and cytology labs.



Cat.#	Description	Qty
72107-B1	Securline II Marker, Black	each
72107-B10	Securline II Marker, Black	10/bx
72107-R1	Securline II Marker, Red	each
72107-R10	Securline II Marker, Red	10/bx

► WRITE-ON™ Marker Pens

These pens are made from specially formulated ink and are to be used on anterior surfaces as well as sides of histology cassettes. The ink will dry almost instantly and withstands temperatures up to 195°C and is resistant to solvents.

72106-01	Write-On™ Marker Pen, Red	each
72106-10	Write-On™ Marker Pen, Red	10/pk

► Marker Pen; Markal Sharpie

Smear resistant, water-resistant, fast-drying no. 15 fine line. Usable on glass, porcelain, metals, and plastics.

72110	Black Felt Tip	each
72120	Black Felt Tip	box/12
72130	Red Felt Tip	each
72140	Red Felt Tip	box/12

► Slide Markers - SHUR/Mark™

A perfect marker designed to mark glass slides and cassettes with priming action; comes with a replaceable felt tip.

- Quick drying; will not smudge or smear.
- Chemically resistant; especially to alcohol, xylene and many other solvents.
- Consistent ink flow with effortless writing.
- Replaceable priming tip, which eliminates clogged and/or worn out tips.

TO USE: Simply depress the tip until the tip is saturated with ink.

72100-01	Shur/Mark Black	each
72100-12	Shur/Mark Black	12/pk
72102-01	Shur/Mark Red	each
72102-12	Shur/Mark Red	12/pk
72104-12	Shur/Mark Replacement Tips	12/pk

► Slide Markers - Histo-Mark Pen

The Histo-Mark pen is designed to work like a pen. It is a fine-line marker that can be used on any surface. The Histo-Mark pen is solvent resistant, especially to alcohol, acetone, xylene, xylene substitute and toluene. Marking quality remains consistent throughout the life of the ink barrel.

72155-01	Histo-Mark Pen	each
72155-12	Histo-Mark Pen	12/bx

► High Opacity – Paint Markers

Constructed aluminum barrel, actuating ball and hard felt tips, these markers permanently cover nearly any surface. Weatherproof. Resistant to alcohol and acetone. Contain xylene.

Markers are available in black, red and white with bullet tips. Except model 130, it writes like a pen with white ink for marking on dark surfaces, including carbon tabs, which is used in SEM specimen mounting purpose.

Cat. #	Description	Pack
72167-R1	Small Marker, Red	each
72167-R2	Large Marker, Red	each
72168-W1	Pen-like Marker, White	each
72168-W2	Large Marker, White	each
72168-B1	Small Marker, Black	each
72169-B2	Large Marker, Black	each

► StatMark Pen

Permanent ink in an ultrafine tip is ideal for labeling microscope slides and cassettes. StatMark Pens are made of rigid nylon that allow for precise hand marking on glass slides as well as on most tissue embedding cassettes. This quick drying ink is highly resistant to aqueous based stains, alcohols, xylene and xylene substitutes. StatMark Pens do not dry out easily and last twice as long as many of the leading 'laboratory' pens.

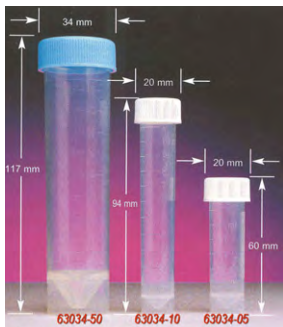
Cat. #	Description	Pack
72109-01	StatMark Pen	each
72109-12	StatMark Pen	12/box



For our complete line of Light Boxes, See Photography section, pages 742-743



► Transport/Sample Collection Vials and Tubes



► 1. Transport Vials

Transport Vials - ideal for sample collection and storage. Made from virgin polypropylene, they are available in three sizes, and come either sterile or non-sterile. Graduations provide convenient and accurate references. 5 ml and 10 ml sizes are supplied with white screw cap; 50 ml are supplied with blue cap that has a molded-in sealing ring for a leak-proof fit.

- Conical tubes with freestanding skirts
- Tubes are autoclavable
- Write-on area on side

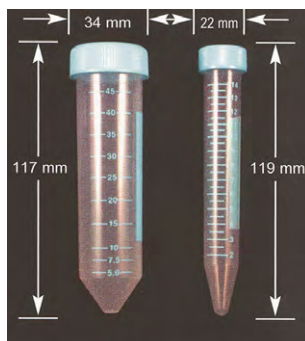
Cat.#	Description	Pack
63034-05	5 ml Transport Vials with white caps, Non-sterile	4x250/pk
63035-05	5 ml Transport Vials with white caps, sterile	20x25/pk
63034-10	10 ml Transport Vials with white caps, Non-sterile	4x250/pk
63035-10	10 ml Transport Vials with white caps, sterile	20x25/pk
63034-50	50 ml Transport Vials with blue caps, Non-sterile	500/pk
63035-50	50 ml Transport Vials with blue caps, sterile	20x25/pk

► Large, Screw Cap Centrifuge Tubes

Premium quality general purpose centrifuge tubes with printed graduations

SUPERIOR CLARITY & DURABILITY

- 50ml: Made from premium polypropylene copolymer for excellent chemical resistance; withstands temperature extremes of -40°C to 125°C ; high centrifugation of 6000RCF with exceptional clarity.
- 15ml: Available in poly-styrene or polypropylene. Polystyrene offers glass-like clarity and can withstand 1800RCF. Polypropylene has excellent chemical resistance and can withstand 6400 RCF.

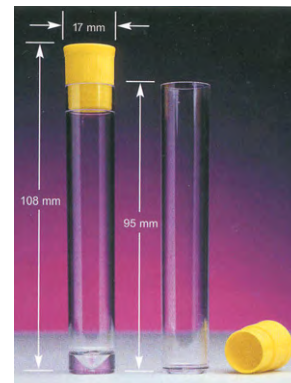


These tubes are available in bulk, bag pack, or in expanded styrene foam trays. As well they are available non-sterile or sterile

Cat.#	Volume	Material	Sterile	Pack
64763-01	15ml	Polystyrene	Sterile	Tray 50
64764-01	15ml	Polypropylene	Sterile	Tray 50
64763-02	15ml	Polystyrene	Sterile	Bag 25
64764-02	15ml	Polypropylene	Sterile	Bag 25
64763-10	15ml	Polystyrene	Non Sterile	Bag 500
64764-20	15ml	Polypropylene	Non Sterile	Bag 500
64760-01	50ml	Co-Polymer	Sterile	Tray 25
64760-10	50ml	Co-Polymer	Sterile	Bag 25
64760-20	50ml	Co-Polymer	Sterile	20 bags/25/pk
64761-01	50ml	Co-Polymer	Non Sterile	Tray 25
64762-01	50ml	Co-Polymer	Non Sterile	Bag 25
64762-20	50ml	Co-Polymer	Non Sterile	Bag 500

► 2. Transport Tubes

Transport Tubes—Ideal for rapid sample collection when a plug cap is needed. Made from virgin polypropylene (PP) or polystyrene (PS). They also work well in Olympus automated testing equipment. Tube volume is 12 ml. Plug caps are available in yellow color and you can choose from hollow top (HT) or hollow bottom (HB)



Cat.#	Description	Pack
63036-PS	12 ml PS Conical Bottom w/skirt Tube, no cap	1000/pk
63036-PP	12 ml PP Conical Bottom w/skirt Tube, no cap	1000/pk
63037-PS	12 ml PS Flat Bottom Tube, no cap	1000/pk
63037-PP	12 ml PP Conical Bottom Tube, no cap	1000/pk
63040-HT	Hollow Top Plug Cap, yellow	1000/pk
63040-HB	Hollow Bottom Plug Cap, yellow	1000/pk

► EZFlip™ Conical Centrifuge Tubes (Patented*)

- Leak-proof – Hinged, flip-cap design.
- One handed opening and closing.
- Good chemical resistance – low protein binding.
- 15 ml and 50 ml – Sterile.
- Freezer/Refrigerator capability.
- Clarified polypropylene – good visibility of contents.
- Easily maintain aseptic conditions.
- Compatible with all major centrifuges and rotors.



EzFlip™ Conical Centrifuge tubes offers a safer alternative to screw cap tubes. A patented closure system improves ergonomics and versatility. An improved tube and cap design increases mechanical strength to withstand aggressive centrifugal forces. The 15 ml tube's maximum relative centrifugal force (RCF) is 8,500 x g, and the 50ml tube's maximum RCF is 9,500 x g.

Tubes are graduated and feature a writing area. All EZFlip™ tubes are available in rack or bag of 50, case of 500.

Ordering:

Cat.#	NUNC #	Description	Size, mm Dia x L	Qty/ Pack	Qty/ Case
63030-25	362695	PP, 15 ml EZFlip™ Conical Centrifuge Tube, Rack	17 x 120	50	-----
63030-5C	362695	PP, 15 ml EZFlip™ Conical Centrifuge Tube, Rack	17 x 120	-----	500
63031-25	362697	PP, 50 ml EZFlip™ Conical Centrifuge Tube, Rack	30 x 115	25	-----
63031-5C	362697	PP, 50 ml EZFlip™ Conical Centrifuge Tube, Rack	17 x 120	-----	500

► The B.O.P.[®] Kit* (Biopsy Organizer Plates)

Introducing the World's First Single Specimen Container for Multiple Endoscopic Biopsies

Simply stated, a BOP kit is a secure plate of specialized, easy to open and reseal biopsy specimen containers in an anatomical map format.

► The BOP Kit:

The BOP Starter Kit includes 1 case of 12 BOP Kits and 2 of the B.O.P Kit Table Top Light Box; one for use in the GI/Endoscopy specimen collection area, and the other for use in the laboratory for enhanced visualization in specimen retrieval.

► The BOP Kit Table Top Light Box

Provides bright, even light for illuminating specimen containers and enhancing visualization for specimen retrieval via the 8" x 10" illumination area. Runs on "D" cell batteries or an AC Adapter (sold separately).

► The BOP Kit Light Box

An Essential Accessory for both GI/Endo Department and the Receiving Lab

► The BOP Kit Slim Light Pad:

This light box is ultra thin, only 1/2" (14mm) thick. This new technology provides bright, even 5400K light for illuminating specimen containers and easily finding even small specimen material with the clear plastic 8" x 10" illumination panel. 12 VAC adapter provided.

* Product of 3GEN SCIENTIFIC – Designed by a pathologist



What Can A B.O.P Kit Do For My GI Department?

- Streamlines and Simplifies submission of multiple biopsy specimens
- Reduces the risk of misidentification of specimens
- Saves time, effort and money
- Reduces storage space
- Maintains all patient's specimens in a single container

Cat.#	Description	Qty.
63920-01	BOP Starter Kit, 12 kit/cs with 2 Light Boxes	each
63921-01	BOP Kit for Lower GI, 12 Kit/case	each
63920-50	BOP Table Top Light Box	each
63920-60	Slim Light Pad for BOP Kit w/Adapter	each

► Peel n' Seal

Pre-Cut, Breathable and Non-Breathable Sealing Membranes for Flasks

Breathable - A breathable option is available for cell culture applications

Non-Breathable - A non-breathable option is available for general sealing applications

Sterile - All membranes have been gamma irradiated to remove cyto-toxins and other contaminants

Protects - Liquid-tight membranes keep solutions safe from outside contamination during storage

Proven - Non-breathable Peel-n-Seal is made from our Titer-Tops material and breathable Peel-n-Seal is made from our Breathe-Easier material; both are trusted and proven throughout the life science industry

Temperature Ranges

Breathable: -20°C to 80°C/Non-Breathable: -40°C to 100°C

Peel-n-Seal Utilizes: Breathe-Easier and Titer-Tops

Cat. No.	Description	Flask Size	Qty
Breathe-Easier			
77578-10	Breathable Peel-n-Seal, 1.50" (38.1mm) dia.	250ml	50/pack
77578-20	Breathable Peel-n-Seal, 1.63" (41.4mm) dia.	500ml	50/pack
77578-30	Breathable Peel-n-Seal, 2.13" (54.1mm) dia.	1,000ml	50/pack
Titer-Tops			
77578-40	Non-Breathable Peel-n-Seal, 1.50" (38.1mm) dia.	250ml	50/pack
77578-50	Non-Breathable Peel-n-Seal, 1.63" (41.4mm) dia.	500ml	50/pack
77578-60	Non-Breathable Peel-n-Seal, 2.13" (54.1mm) dia.	1,000ml	50/pack



► Thumbs-Up Microtubes

Made of autoclaveable polypropylene

- Opens with flip of thumb!
- Easy retrieval from rotors
- Special reaction vessels in lid
- Color option for easy identification
- RNase and DNase free
- Temperature range: -196°C to 130°C
- RFC rating of 17,00 x g



Cat. #	Description	Qty
72370-0	0.5 ml Thumbs-Up Microtubes, Clear	1,000/pk
72370-1	0.5 ml Thumbs-Up Microtubes, Blue	1,000/pk
72370-2	0.5 ml Thumbs-Up Microtubes, Green	1,000/pk
72370-3	0.5 ml Thumbs-Up Microtubes, Pink	1,000/pk
72370-4	0.5 ml Thumbs-Up Microtubes, Purple	1,000/pk
72370-5	0.5 ml Thumbs-Up Microtubes, Yellow	1,000/pk
72371-0	1.5 ml Thumbs-Up Microtubes, Clear	500/pk
72371-1	1.5 ml Thumbs-Up Microtubes, Blue	500/pk
72371-2	1.5 ml Thumbs-Up Microtubes, Green	500/pk
72371-3	1.5 ml Thumbs-Up Microtubes, Pink	500/pk
72371-4	1.5 ml Thumbs-Up Microtubes, Purple	500/pk
72371-5	1.5 ml Thumbs-Up Microtubes, Yellow	500/pk

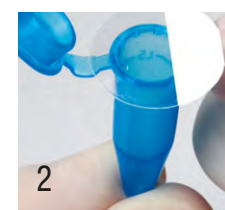
► Breathable Tube Membranes

- Micro-permeable Membranes for Microtubes
- Ideal for cell growth and freeze drying
- Permits consistent gas exchange
- Easy microtube cap closure
- Will not bind in centrifuge rotors
- Easy-to-use finger tab for quick liner removal
- Pre-cut to fit a variety of popular tube sizes
- Sterile and free of cytotoxins

Cat.#	Description	Qty.
70537-10	Breathe-EASY	100/pk.
70537-20	Breathe-EASIER	100/pk.



1 Remove the paper liner and adhere the membrane to the tube opening.



2 Remove the top protective layer to expose the breathable membrane

► Hinged Lid Containers PE

These hinged lid containers are ideal for use just about anywhere. They feature a secure snap closure with hinged lid that eliminates lost caps. Containers offer air and moisture resistance to contents. Manufactured from flexible FD approvable polyethylene resin.

Cat.#	Capacity	Diameter	Height	Qty
64238-01	¼oz (7.4ml)	1½" (38mm)	½"(12.7mm)	100/pk
64238-05	½oz (14.8ml)	1½" (38mm)	1" (25.4mm)	100/pk
64238-10	1oz Flat	1½" (38mm)	1½" (38mm)	100/pk
64238-12	1oz (29.57ml)	2" (50.8mm)	1" (25.4mm)	100/pk
64238-15	2oz (59.14ml)	2" (50.8mm)	1½" (38mm)	50/pk
64238-20	4oz (118.3ml)	2" (50.8mm)	3¼" (83mm)	50/pk



► Polystyrene Containers – Sterile

These containers are made from polystyrene and they are clear and rigid.

- **Sterile:** All containers are manufactured aseptically within a state of the art clean room.
- **Various Labels:** Labeling options include unlabeled printed or plain.
- **Various Closures:** The 30 universal uniquely relies on special seal technology. Other sizes employ liners or crab claw closures to facilitate sample containment.
- Some sizes are available with spoons.



Polystyrene Containers #	Capacity ml	Label	Type	Spoon	Cap Material	Height mm	Diameter mm	Case Quantity
64240-01	60	Plain	Universal	No	PE	61.1	44.6	300
64240-02	30	No	Universal	No	PP	93.1	30.1	400
64240-03	30	Printed	Universal	No	PP	93.1	30.1	400
64240-04	30	Plain	Universal	No	PP	93.1	30.1	400
64240-05	30	No	Universal	Yes	PP	93.1	30.1	400
64240-06	30	Plain	Universal	Yes	PP	93.1	30.1	400
64240-07	7	No	Bijou	No	PE	50.2	22.5	700
64240-08	7	Plain	Bijou	No	PE	50.2	22.5	700
64240-09	150	Plain	Plain	No	Metal	107.5	54.9	120
64240-10	100	Plain	Plain	No	PE	76.4	50.5	200
64240-11	30	Printed	Universal	Yes	PE	93.1	30.1	400
64240-12	60	No	Plain	No	PE	61.1	44.6	300
64240-13	60	Printed	Plain	No	PE	61.1	44.6	300

► Histology Containers

- **Designed for the storage and transport of histology specimens in fixatives.**
- **Made from durable polypropylene (except 8L size, which is made of polyethylene)**
- **Leak-proof self-seal caps**

All of the containers (except the 5ml size) have graduated markings on three sides. 2L to 8L sizes are supplied with snap-top lids and carrying handles, and has no graduations.

Cat.#	Visibility	Inside Height x Top I.D.	Size	Pack
64233-10	Semi-Clear	2" x ½" (50 x 13mm)	5ml	500/pk
64233-11	Semi-Clear	1½" x 1¼" (40 x 28mm)	20ml	200/pk
64233-12	Semi-Clear	1½" x 1½" (40 x 42mm)	40ml	200/pk
64233-14	Semi-Clear	2¼" x 1¾" (55 x 42mm)	60ml	100/pk
64233-16	Semi-Clear	2¾" x 1¾" (75 x 42mm)	90ml	400/pk
64233-17	Semi-Clear	3" x 1⅞" (75 x 48mm)	120ml	300/pk
64233-18	Opaque	2¼" x 3½" (55 x 88mm)	250ml	100/pk
64233-20	Opaque	4" x 3½" (110 x 88mm)	500ml	100/pk
64233-22	Opaque	5¼" x 4¼" (135 x 110mm)	1000ml	100/pk
64233-24	White	4¾" x 7¾" (120 x 184mm)	2000ml	20/pk
64233-26	White	7½" x 8⅞" (190 x 126mm)	5000ml	10/pk
64233-28	White	9¾" x 9" (245 x 230mm)	8000ml	10/pk



► Discups™; Disposable Paper Beakers

With environmental awareness in mind these disposable paper beakers create less waste and are as economical as plastic.



Discups and Lids

- Graduated in English and Metric units (½ oz. or 10cc increments).
- Very economical.
- Constructed from unwaxed, plain finished paper.

60954-10	Discups™, 120cc	100/pk
60954-20	Polystyrene Lids	100/pk

► 4 Oz. Specimen Container



This 4 oz. specimen container provides a “full-turn” screw thread cap, which offers an excellent “leak-proof” seal that meets the NCCLS Specimen Handling Guidelines for primary containers. These versatile, graduated, polypropylene containers with polyethylene caps can be used for almost any liquid or solid specimen for either storage or transport purposes. They come with color coded caps: Green for individually wrapped sterile caps; White for non-sterile ones.

64231-20	4 oz. Specimen Containers, Non-Sterile	20/bag
64231-50	4 oz. Specimen Containers, Non-Sterile	500/cs

► Antibody Saver Tray

- Minimize the use of expensive antibodies when incubating filters in the Western Blot process



- Trays are available for popular midi and mini and multiple lane filters
- Each tray is molded of polypropylene and includes an attached lid to protect from spillage.
- Trays are stackable, reclosable and reusable.
- Single lane trays are linked together for easier handling but can be separated.

70480-10	Single Lane Trays, 1.6 x 11.5cm (5.8 x 4½")	5/pk
70481-10	Small Square Trays, 90 x 90cm (3½" x 3½")	5/pk
70481-20	Large Square Tray, 165 x 165 cm (6½" x 6½")	5/pk

► Tri-Seal™* Specimen Containers

Introducing the World's First Patented, Leakproof, Airtight, Touch-Top Specimen Containers for the Pathology Lab

- Triple Seal Design – Vials are “closed in the mold” during manufacturing
- Permanent Hinge – Allows for one-hand opening and closing
- Patented Leakproof Touch-Top Construction ideal for the Pathology lab
- Molded from 100% high-density, translucent polypropylene
- Available in a variety of sizes from 13 ml to 300 ml
- Locking latch option for optimum security **
- No more loose threaded screw caps to deal with – just press down the triple-seal lid to securely close and seal

* Tri-Seal Containers are the product of 3GEN SCIENTIFIC

** Included in indicated products only



► The 4 Most Popular Styles for Pathology:

(These containers come with Locking Latch, except 15ml size)

Cat.#	Description, (Overall Diameter x High)	Qty.
64234-15	Tri-Seal Container 15 ml, 1/8" x 2 1/2"	500/pk.
64234-15B	Tri-Seal Container 15 ml Bulk	2000/pk.
64234-90L	Tri-Seal Container 90 ml, 2 1/8" x 2 1/2"	400/pk.
64234-120L	Tri-Seal Container 120 ml, 2 5/8" x 2 1/2"	250/pk.
64234-240L	Tri-Seal Container 240 ml, 3" x 3"	140/pk.



► The Other Tri-Seal Touch-Top Containers:

Cat.#	Description, (Overall Diameter x High)	Qty.
64235-13	Tri-Seal Container 13 ml Tall, 15 x 95 mm	500/pk.
64235-50T	Tri-Seal Container 50 ml Tall, 28 x 84 mm	600/pk.
64235-50TL	Tri-Seal Container 50 ml Tall, 28 x 84 mm (with Locking Latch)	600/pk.
64235-75T	Tri-Seal Container 75 ml Tall, 33 x 93 mm	400/pk.
64235-90	Tri-Seal Container 90 ml Tall, 50 x 50 mm	400/pk.
64235-120	Tri-Seal Container 120 ml Tall, 63 x 50 mm	250/pk.
64235-120T	Tri-Seal Container 120 ml Tall, 43 x 90 mm	25/pk.
64235-120TL	Tri-Seal Container 120 ml Tall, 43 x 90 mm (with Locking Latch)	250/pk.
64235-240	Tri-Seal Container 240 ml Tall, 75 x 75 mm	150/pk.
64235-300TL	Tri-Seal Container 300 ml Tall, 30 x 80 mm (with Locking Latch)	100/pk.
64235-45TE	Tri-Seal Container 45 ml Tall, 30 x 80 mm Tamper Evident Transport Container)	700/pk.



Independently tested to perform with a 0% leak rate under requirements detailed in:

United Nations Model Regulations
Packing Instruction 620/650

U.S. Department of
Transportation's Title 49 Code of
Federal Regulations, §173.196

International Civil Aviation
Organization (ICAO) Packaging
Instruction 620/650

International Air Transport
Association (IATA) Packaging
Instruction 620/650

International Safe Transit
Association (ISTA) Random
Vibration Under Low Pressure
Test

► EMS Click-Leak-Proof Container

WE'VE ADDED A CLICK AND REMOVED THE LEAK.

Our new EMSClick container was designed to eliminate leakage that occurs during specimen transport. The container produces an audible "clicking" sound when the leak-proof seal has been properly engaged, assuring accurate closure and specimen integrity during transport.

Say Goodbye to Messy Clean-Ups and Unnecessary Exposure

- 100% virgin medical grade plastic (HDPE) provides consistent vial to vial performance
- Audible proof of closure confirms engagement of leak-proof seal
- Cap designed to enhance seal during positive and negative pressure differentials
- Rounded knurls on cap offer an easy gripping surface for users
- Vial "ears" prevent cap from backing off during rough transport

The Vials are 20 ml in capacity and they measure 3.04 CM in Diameter and are 4.43 cm in height.

Cat. No	Description	Qty.
64233-08	EMSClick Container, 20 ml	100/Pack
64233-09	EMSClick Container	800/Case

► SecurTainer™ I Tamper Evident Specimen Containers



Container made of polypropylene - Closure made of polyethylene
This shatter resistant, especially designed for collection, transport and specimen storage.

- Unique integrated leak resistant seal
- High clarity to allow specimen to be viewed without opening
- The magenta lids are ribbed for easy opening
- Container are stackable with straight side format.
- SecurTainer™ I is a unique tamper evident to ensure no alter allow. (SecurTainer™ can be used without using the tamper evident locking mechanism)
- For color coding purpose, use CapInsert (Cat. #68106-series)

Both containers and caps are manufactured without the use of plasticizers or mold release agents. All material used are free from latex. All containers are 95kpa compliant. Non sterile, container and caps are packaged separately in bag of 100.

EMS #	Description	Qty
64236-02	SecurTainer I, Size 20ml	500/pk
64236-04	SecurTainer I, Size 40 ml	500/pk
64236-06	SecurTainer I, Size 60 ml	500/pk
64236-09	SecurTainer I, Size 90 ml	400/pk
64236-12	SecurTainer I, Size 120 ml	300/pk

► SecurTainer™ II Tamper Evident Specimen Containers



This model uses a different tamper evident concept compared to the SecurTainer I above. No locking tab to push up is necessary when the tamper evident is used. Simply screw the cap on the container and the tamper evident sealing ring is automatically locking in place. When unscrewed, the ring is detached from the cap. All other features are the same as SecurTainer I.

EMS #	Description	Qty
64237-02	SecurTainer I, Size 20ml	500/pk
64237-04	SecurTainer I, Size 40 ml	500/pk
64237-06	SecurTainer I, Size 60 ml	500/pk
64237-09	SecurTainer I, Size 90 ml	400/pk
64237-12	SecurTainer I, Size 120 ml	300/pk

CapInsert: available with colors:

EMS #	CapInsert™ Color	Qty
61806-B	CapInsert, Color Blue	100/pk
61806-L	CapInsert, Color Lilac	100/pk
61806-R	CapInsert, Color Red	100/pk
61806-Y	CapInsert, Color Yellow	100/pk
61806-W	CapInsert, Color White	100/pk
61806-AS	CapInsert, Assorted Colors	100/pk

► FlexTainer™ Containers

Made from polypropylene

This is a space-saving expandable accordion-style jug with flattens down for easy transport and storage.

Great ideal for storing and carrying numerous types of fluids, it is suitable for any laboratory. Made of high strength polyethylene, it features comfortable carry grip and screw-on cap with

on/off spout. It is available in many sizes up to 8 liters. Come with individually wrapped.

Cat. #	Description	Qty
64228-13	Flex-Tainer™, 3 L	12/pk
64228-43	Flex-Tainer™, 3 L	48/pk
64228-15	Flex-Tainer™, 5 L	12/pk
64228-45	Flex-Tainer™, 5 L	48/pk
64228-18	Flex-Tainer™, 8 L	12/pk
64228-48	Flex-Tainer™, 8 L	36/pk



► Petri Dishes –Sterile Petri Dishes

Made from polystyrene

Our Petri Dishes are available in a variety of shapes and sizes for use in routine procedures and with automated equipment. Economical, optical clarity, dishes are precision-molded from biomedical grade polystyrene so cultures are clearly visible without distortion. Dishes are packaged 20 each in sturdy polyethylene sleeves. These dishes are not recommended for tissue culture application, due to non treated by "corona effect".



Cat. #	Model	Description (actual Dimension)	Vol	Qty
70678-10	D210-7	Dish 90x20mm – Commonly referred to as a 100x20mm dish. For unimpaired observation of specimen growth with raised straight ridge around top for stable stacking	500 ml	100/pk
70678-20	D210-7WL	Dish 90x20mm – Commonly referred to as a 100x20mm dish. This dish has three venting ribs into the underside of the lid to prevent condensation build-up	100 ml	500/pk
70678-30	D210-8	Dish 90x25mm – Commonly referred to as a 100x25mm dish. Accommodates deeper fills for longer culture periods. Used for fungal cultures, plant propagation. This dish has three venting ribs into the underside of the lid to prevent condensation build-up	125 ml	500/pk
70678-40	D210-8R	Dish 90x25mm – Commonly referred to as a 100x25mm dish. Similar to D210-8 but with no-vented lid having a raised straight ridge around top for stable stacking.	125 ml	500/pk
70678-50	D210-13	Dish 55x13mm – Commonly referred to as a 60x15mm dish. For use whenever a small quantity of culture is desirable. For unimpaired observation of specimen growth with raised straight ridge around top for stable stacking. Dish has three venting ribs on the edge of the dish to prevent condensation build-up.	28 ml	500/pk
70678-60	D210-14	Dish 50x8mm – Commonly referred to as a 60x9mm dish. Box type dish, for classroom studies, culturing of mycobacteria aerosol testing, membrane filter and immunodiffusion techniques. Tight lid prevents sample dehydration.	12 ml	500/pk
70678-70	D210-15	Dish 35x10mm – Commonly referred to as a 35x10mm dish. Selected for small quantities culture media. For unimpaired observation of specimen growth with raised straight ridge around top for stable stacking. This dish has three venting ribs into the underside of the lid to prevent condensation build-up.	9 ml	500/pk

► Square Petri Dish

Made from polystyrene – Radiation sterile

This dish commonly referred to as a 100 x 15 mm dish. Free from optical distortion and sterile, these dishes are ideal for phase typing, susceptibility testing, plate counts, and probe assays.



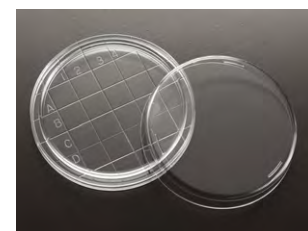
The square Petri dish with grid is consists of 36 of 13 x 13 mm squares, each 13 mm grid is marked numerically in one direction and alphabetically in the other. This dish has four venting ribs into the underside of the lid to prevent condensation build-up.

Cat. #	Description	Qty
70691	Square Petri Dish with Grid, 10/sleeve	100/pk
70691-CS	Square Petri Dish with Grid, 500/cs	500/pk
70690	Square Petri Dish, Plain, 20/sleeve	100/pk
70690-CS	Square Petri Dish, Plain, 500/cs	500/pk

► Contact Plate

Made from polystyrene

These dishes are free from optical distortion. The dish has 16 of 10 x 10 mm square grids, which is marked numerically in one direction and alphabetically in the other. The model 70692-20 is designed with a convex bottom to save on culture medium. Dishes are packaged 20 per sleeve and are radiation sterile.



Cat. #	Description	Vol.	Qty
70692-10	Contact Plate, 60x15mm	20 ml	500/pk
70692-20	Contact Plate, convex bottom, 60x15mm	15 ml	500/pk

► Bacterial Cell Spreader

Made from high impact polystyrene

No flame sterilization needed. Designed for easy spreading of cells onto the surface of an agar plate. Supplied sterile in individually packs. Total length of handle: 176 mm, width of spreader: 36mm. Color green



Cat. #	Description	Qty
62452	Bacterial Cell Spreader	100/pk

► Histology Cassettes

All the histology cassettes listed below are specially made to be used either manually or in any leading automatic cassette labeling instruments.

► Tissue Processing/Embedding Cassettes

Made from Acetyl Polymer, which is a special high density polymer that keeps specimens safely submerged in solution. These cassettes are totally resistant to most histological solvents and their slots offer maximum flow through for good fluid exchange and proper drainage. The lids either come attached to the cassette or are packaged separately. The lids can be opened and closed as often as necessary and they always relock securely without danger of specimen loss. Large labeling areas are located on three sides of the cassette for your convenience. Each slot measures: 1x5m, total 128 slots per cassette. Available in 11 different non-cytotoxic, non-metallic colors. Anterior writing area is at 45° angle to make the cassette universal.



1. Label cassette on front or sides.



2. Press on back tab to open cover.



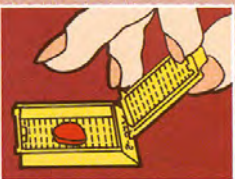
3. Insert sample.



4. Press down on lid to lock it in place.



5. To open, lift tab while pressing down on the center of lid with thumb.



6. Remove the cover by pivoting it forward.

► 1. Slotted Cassettes With Lids

A. Lids are packed separately

Ordering: Each case contains 2 dispenser boxes of 500 cassettes and 1 dispenser box of 1000 lids.

Cat.#	Color	Qty/Cs
70070-W	White	2x500/cs
70070-P	Pink	2x500/cs
70070-G	Green	2x500/cs
70070-Y	Yellow	2x500/cs
70070-B	Blue	2x500/cs
70070-Pe	Peach	2x500/cs
70070-T	Tan	2x500/cs
70070-Gr	Gray	2x500/cs
70070-L	Lilac	2x500/cs
70070-O	Orange	2x500/cs
70070-A	Aqua	2x500/cs



B. Lids are placed on cassettes

Ordering: Each case contains 3 dispenser boxes of 500 cassettes with lids already locked in place.



Cat.#	Color	Qty/Cs
70071-W	White	3x500/cs
70071-P	Pink	3x500/cs
70071-G	Green	3x500/cs
70071-Y	Yellow	3x500/cs
70071-B	Blue	3x500/cs
70071-Pe	Peach	3x500/cs

Cat.#	Color	Qty/Cs
70071-T	Tan	3x500/cs
70071-Gr	Gray	3x500/cs
70071-L	Lilac	3x500/cs
70071-O	Orange	3x500/cs
70071-A	Aqua	3x500/cs

► Compartment - Micro Processing/Embedding Cassettes – 6-Compartment

Made from Acetal Polymer. These biopsy cassettes can hold up to six tissue specimens, each one placed in its own compartment, numbered from 1 to 6 and measuring $\frac{1}{4}'' \times \frac{1}{16}'' \times \frac{3}{16}''$ D (7x12x5mm). Cover and base have over 3000 0.26mm square openings. Cassettes keep specimen safely submerged in solvent and are totally resistant to the most histological solvents.

The efficient flow-through slots maximize fluid exchange and insure proper drainage. The one-piece integral lid eliminates the need for separate steel lids. Large labeling areas are located on three sides of the cassette. The anterior writing area is at a 45° angle, making the cassette, to some degree, able to be used with certain types of cassette labeling instruments. Each case contains 4 dispenser boxes of 250 cassettes with covers assembled.



Cat.#	Color	Qty/Cs
70078-W	White	2x250/pk
70078-P	Pink	2x250/pk
70078-G	Green	2x250/pk
70078-Y	Yellow	2x250/pk
70078-B	Blue	2x250/pk
70078-Pe	Peach	2x250/pk

Cat.#	Color	Qty/Cs
70078-T	Tan	2x250/pk
70078-Gr	Gray	2x250/pk
70078-L	Lilac	2x250/pk
70078-O	Orange	2x250/pk
70078-A	Aqua	2x250/pk

► Biopsy Processing/Embedding Cassettes

► Square Mesh Cassettes With Lids

Similar to slotted cassettes listed above but designed to hold biopsy specimens during the embedding process, as well as in a storage file.

A. Lids are packed separately

Each case contains 2 dispenser boxes of 500 cassettes and 1 dispenser box of 1000 covers.

Cat.#	Color	Qty/Cs
70072-W	White	2x500/cs
70072-P	Pink	2x500/cs
70072-G	Green	2x500/cs
70072-Y	Yellow	2x500/cs
70072-B	Blue	2x500/cs
70072-Pe	Peach	2x500/cs
70072-T	Tan	2x500/cs
70072-Gr	Gray	2x500/cs
70072-L	Lilac	2x500/cs
70072-O	Orange	2x500/cs
70072-A	Aqua	2x500/cs



B. Lids are placed on cassettes

Each case contains 3 dispenser boxes of 500 cassettes. The lids are already locked in place.

Cat.#	Color	Qty/Cs
70073-W	White	3x500/cs
70073-P	Pink	3x500/cs
70073-G	Green	3x500/cs
70073-Y	Yellow	3x500/cs
70073-B	Blue	3x500/cs
70073-Pe	Peach	3x500/cs
70073-T	Tan	3x500/cs
70073-Gr	Gray	3x500/cs
70073-L	Lilac	3x500/cs
70073-O	Orange	3x500/cs
70073-A	Aqua	3x500/cs



► Process/Embedding Cassettes (Without Lids)

Made from Acetal copolymer – Disposable plastic tissue cassettes are suitable for holding and identifying tissue samples in processing, embedding, and sectioning procedures. The cassettes fit securely in microtome chuck adapters. They are molded from a high-density polymer that is totally resistant to histological solvents. These cassettes are designed to accept standard metal lids (#70025-10) and will also fit either the standard stainless steel base molds or the disposable plastic ones. Only Clear one is made of polypropylene. All other are made of Acetal Polymer. Stainless Steel Lids order separately. Each case contains 3 dispenser boxes of 500 cassettes.



Cat.#	Color	Qty/Cs	Cat.#	Color	Qty/Cs
70025-W	White	500/pk	70025-T	Tan	500/pk
70025-C	Clear	500/pk	70025-Gr	Gray	500/pk
70025-P	Pink	500/pk	70025-L	Lilac	500/pk
70025-G	Green	500/pk	70025-O	Orange	500/pk
70025-Y	Yellow	500/pk	70025-A	Aqua	500/pk
70025-B	Blue	500/pk	Stainless Steel Covers:		
70025-Pe	Peach	500/pk	70025-10	–	25/pk

► Micromesh™ - Single Compartment

Biopsy Processing/Embedding Cassettes with Lid Made from acetyl polymer

This new version of Micromesh™ offers 1676 square openings (0.38 mm) allowing for a greatly improved fluid exchange without having to use the biopsy pads. Large anterior and posterior slots in both cassette and cover ensure that the Micromesh™ biopsy cassettes will sink rapidly (far better than cloth mesh cassettes). A large square compartment measuring 27 mm is perfect even for needle biopsies. The cover does not protrude above the cassette, a great space saving feature allowing more cassettes to be stacked in automatic labeling machines and tissue processors.



- These patented cassettes keep specimens safely submerged in liquid
- Totally resistant to the most histological chemicals and solvents.
- The Micromesh™ ensures efficient fluid exchange and drainage.
- One-piece integral lid eliminates the need for separate steel lid.
- Lid is locked securely, no danger of specimen loss.
- Anterior writing area at a 45° angle – these cassettes are ideal for automated cassettes printers.
- Available in non-cytotoxic, non-metallic colors.

Each case contains four dispenser boxes of 250 cassettes with covers.

Cat.#	Color	Qty	Cat.#	Color	Qty
70074-W	White	1000/pk	70074-GR	Gray	1000/pk
70074-P	Pink	1000/pk	70074-L	Lilac	1000/pk
70074-G	Green	1000/pk	70074-O	Orange	1000/pk
70074-Y	Yellow	1000/pk	70074-A	Aqua	1000/pk
70074-B	Blue	1000/pk	70074-FP	Fluo-Pink	1000/pk
70074-PE	Peach	1000/pk	70074-FG	Fluo-Green	1000/pk
70074-T	Tan	1000/pk	70074-FY	Fluo-Yellow	1000/pk

► MicroMesh™ - Four-Compartment

Biopsy Processing/Embedding Cassettes with Lid

This model is similar to the one above – single compartment – but cassettes have four square compartments each measuring 13 mm. Cover and base have about 1676 square openings maximizing fluid exchange and ensuring proper drainage.



Each case contains four dispenser boxes of 250 cassettes with covers.

Cat.#	Color	Qty	Cat.#	Color	Qty
70075-W	White	1000/pk	70075-GR	Gray	1000/pk
70075-P	Pink	1000/pk	70075-L	Lilac	1000/pk
70075-G	Green	1000/pk	70075-O	Orange	1000/pk
70075-Y	Yellow	1000/pk	70075-A	Aqua	1000/pk
70075-B	Blue	1000/pk	70075-FP	Fluo-Pink	1000/pk
70075-PE	Peach	1000/pk	70075-FG	Fluo-Green	1000/pk
70075-T	Tan	1000/pk	70075-FY	Fluo-Yellow	1000/pk



IP ActivFlo Biopsy I

► IP ActivFlo™ Biopsy Cassettes

Patented "Fluidic Flow" pore design maximizes reagent exchange.

IP ActivFlo Biopsy Cassettes feature innovative V-shaped 0.67 mm pores that pull fluid in and force air out.

Sloped walls create a basket for small tissue management. The one-piece cassettes with 'frangible lids' have been designed for the Leica IPC Cassette Printer, with <1% printing error rate.

■ Available in loose and taped packaging for easy printer loading.

■ Choose from eleven colors in quantities of 500 loose or 1000 taped.

Specifications, Loose:

CE approved
Weight5 Kg
Dimensions:
(L x W x H)12" x 7" x 10"
Packaged as 500/case

Specifications, Taped:

CE approved. For IPC Printers
Weight4.5 Kg
Dimensions:
(L x W x H)17" x 11" x 7"
Packaged as 1000/case



IP ActivFlo Biopsy III



IP ActivFlo Biopsy II

► IP ActivFlo Biopsy I Cassettes

Cat No.	Description	Qty.
700076-10	IP ActivFlo Biopsy I, White	500/pk
700076-11	IP ActivFlo Biopsy I, Taped White	1000/pk
700076-12	IP ActivFlo Biopsy I, Blue	500/pk
700076-13	IP ActivFlo Biopsy I, Taped Blue	1000/pk
700076-14	IP ActivFlo Biopsy I, Aqua	500/pk
700076-15	IP ActivFlo Biopsy I, Taped Aqua	1000/pk
700076-16	IP ActivFlo Biopsy I, Green	500/pk
700076-17	IP ActivFlo Biopsy I, Taped Green	1000/pk
700076-18	IP ActivFlo Biopsy I, Lilac	500/pk
700076-19	IP ActivFlo Biopsy I, Taped Lilac	1000/pk
700076-20	IP ActivFlo Biopsy I, Pink	500/pk
700076-21	IP ActivFlo Biopsy I, Taped Pink	1000/pk

Cat No.	Description	Qty.
700076-22	IP ActivFlo Biopsy I, Orange	500/pk
700076-23	IP ActivFlo Biopsy I, Taped Orange	1000/pk
700076-24	IP ActivFlo Biopsy I, Gold	500/pk
700076-25	IP ActivFlo Biopsy I, Taped Gold	1000/pk
700076-26	IP ActivFlo Biopsy I, Yellow	500/pk
700076-27	IP ActivFlo Biopsy I, Taped Yellow	1000/pk
700076-28	IP ActivFlo Biopsy I, Tan	500/pk
700076-29	IP ActivFlo Biopsy I, Taped Tan	1000/pk
700076-30	IP ActivFlo Biopsy I, Gray	500/pk
700076-31	IP ActivFlo Biopsy I, Taped Gray	1000/pk

► IP ActivFlo Biopsy II Cassettes

Cat No.	Description	Qty.
70076-61	IP ActivFlo Biopsy II, White	500/pk
70076-62	IP ActivFlo Biopsy II, Taped White	1000/pk
70076-63	IP ActivFlo Biopsy II, Blue	500/pk
70076-64	IP ActivFlo Biopsy II, Taped Blue	1000/pk
70076-65	IP ActivFlo Biopsy II, Aqua	500/pk
70076-66	IP ActivFlo Biopsy II, Taped Aqua	1000/pk
70076-67	IP ActivFlo Biopsy II, Green	500/pk
70076-68	IP ActivFlo Biopsy II, Taped Green	1000/pk
70076-69	IP ActivFlo Biopsy II, Lilac	500/pk
70076-70	IP ActivFlo Biopsy II, Taped Lilac	1000/pk
70076-71	IP ActivFlo Biopsy II, Pink	500/pk
70076-72	IP ActivFlo Biopsy II, Taped Pink	1000/pk

Cat No.	Description	Qty.
70076-73	IP ActivFlo Biopsy II, Orange	500/pk
70076-74	IP ActivFlo Biopsy II, Taped Orange	1000/pk
70076-75	IP ActivFlo Biopsy II, Gold	500/pk
70076-76	IP ActivFlo Biopsy II, Taped Gold	1000/pk
70076-77	IP ActivFlo Biopsy II, Yellow	500/pk
70076-78	IP ActivFlo Biopsy II, Taped Yellow	1000/pk
70076-79	IP ActivFlo Biopsy II, Tan	500/pk
70076-80	IP ActivFlo Biopsy II, Taped Tan	1000/pk
70076-81	IP ActivFlo Biopsy II, Gray	500/pk
70076-82	IP ActivFlo Biopsy II, Taped Gray	1000/pk

► IP ActivFlo Biopsy III Cassettes

Cat No.	Description	Qty.
70076-83	IP ActivFlo Biopsy III, White	500/pk
70076-84	IP ActivFlo Biopsy III, Taped White	1000/pk
70076-85	IP ActivFlo Biopsy III, Blue	500/pk
70076-86	IP ActivFlo Biopsy III, Taped Blue	1000/pk
70076-87	IP ActivFlo Biopsy III, Aqua	500/pk
70076-88	IP ActivFlo Biopsy III, Taped Aqua	1000/pk
70076-89	IP ActivFlo Biopsy III, Green	500/pk
70076-90	IP ActivFlo Biopsy III, Taped Green	1000/pk
70076-91	IP ActivFlo Biopsy III, Lilac	500/pk
70076-92	IP ActivFlo Biopsy III, Taped Lilac	1000/pk
70076-93	IP ActivFlo Biopsy III, Pink	500/pk
70076-94	IP ActivFlo Biopsy III, Taped Pink	1000/pk

Cat No.	Description	Qty.
70076-95	IP ActivFlo Biopsy III, Orange	500/pk
70076-96	IP ActivFlo Biopsy III, Taped Orange	1000/pk
70076-97	IP ActivFlo Biopsy III, Gold	500/pk
70076-98	IP ActivFlo Biopsy III, Taped Gold	1000/pk
70076-99	IP ActivFlo Biopsy III, Yellow	500/pk
70076-100	IP ActivFlo Biopsy III, Taped Yellow	1000/pk
70076-101	IP ActivFlo Biopsy III, Tan	500/pk
70076-102	IP ActivFlo Biopsy III, Taped Tan	1000/pk
70076-103	IP ActivFlo Biopsy III, Gray	500/pk
70076-104	IP ActivFlo Biopsy III, Taped Gray	1000/pk

► IP Biopsy VI, Two Piece Cassettes

IP Biopsy VI cassettes are two-piece biopsy cassettes with 0.67 mm pores, 45 degree writing surface and a secure latch closure. Taped cassettes have been designed for the Leica IPC Cassette Printer and offer <1% printing error rate.



■ Available in loose and taped packaging for easy printer loading.

■ Choose from nine colors in quantities of 500 loose or 1000 taped.

Specifications, Loose:

CE approved
Weight: 5 Kg
Dimensions: 12" x 7" x 10" (L x W x H)
Packaged as 500/case

Specifications, Taped:

CE approved. For IPC Printers
Weight: 4.5 Kg
Dimensions: 17" x 11" x 7" (L x W x H)
Packaged as 1000/case

Cat No.	Description	Qty.
70076-110	Jet Biopsy VI, White	500/pk
70076-111	IP Biopsy VI, Taped White	1000/pk
70076-112	Jet Biopsy VI, Blue	500/pk
70076-113	IP Biopsy VI, Taped Blue	1000/pk
70076-114	Jet Biopsy VI, Aqua	500/pk
70076-115	IP Biopsy VI, Taped Aqua	1000/pk
70076-116	Jet Biopsy VI, Green	500/pk
70076-117	IP Biopsy VI, Taped Green	1000/pk
70076-118	Jet Biopsy VI, Lilac	500/pk
70076-119	IP Biopsy VI, Taped Lilac	1000/pk
70076-120	Jet Biopsy VI, Pink	500/pk
70076-121	IP Biopsy VI, Taped Pink	1000/pk
70076-122	Jet Biopsy VI, Orange	500/pk
70076-123	IP Biopsy VI, Taped Orange	1000/pk
70076-124	Jet Biopsy VI, Gold	500/pk
70076-125	IP Biopsy VI, Taped Gold	1000/pk
70076-126	Jet Biopsy VI, Yellow	500/pk
70076-127	IP Biopsy VI, Taped Yellow	1000/pk

► Activflo Mini Biopsy Cassette

Ideal for needle biopsies and small tissues

Activflo Mini Cassettes are one third the size of standard cassettes, and feature sloped walls, creating a basket for small tissue management. The smaller size allows double the number of blocks to be stored, reducing specimen storage space.

- Excellent solution for microwave and rapid tissue processors
- Available in eleven colors.



Specifications:

CE approved
NOT FOR IPC
Weight: 5 Kg
Dimensions: 12" x 7" x 10" (L x W x H)
Packaged as 500/case

Cat No.	Description	Qty.
70076-128	ActivFlo Mini Biopsy-White	500/pk
70076-129	ActivFlo Mini Biopsy-Blue	500/pk
70076-130	ActivFlo Mini Biopsy-Aqua	500/pk
70076-131	ActivFlo Mini Biopsy-Green	500/pk
70076-132	ActivFlo Mini Biopsy-Lilac	500/pk
70076-133	ActivFlo Mini Biopsy-Pink	500/pk
70076-134	ActivFlo Mini Biopsy-Orange	500/pk
70076-135	ActivFlo Mini Biopsy-Gold	500/pk
70076-136	ActivFlo Mini Biopsy-Yellow	500/pk
70076-137	ActivFlo Mini Biopsy-Tan	500/pk
70076-138	ActivFlo Mini Biopsy-Gray	500/pk

► Supamega Tissue Processing Cassettes:



■ Ideal for prostate, brain, breast tissue and eyes

■ Extremely useful for research and toxicology laboratories

■ Measures: - Inside: 64mm x 48mm x 13mm - Outside: 75mm x 52mm x 18mm

Cat.#	Color	Qty
70065-W	White	100/pk.
70065-G	Green	100/pk.
70065-B	Blue	100/pk.
70065-P	Pink	100/pk.
70065-Y	Yellow	100/pk.

► SupaMega Stainless Steel Base Molds

The SupaMega range of stainless steel base molds have extra deep side walls, allowing wax to be decanted into the cassettes during embedding without the risk of the usual leakage of wax. The smaller faced mold also saves wax on medium sized blocks too large to fit into standard cassettes, negating the use of full size molds.



Cat.#	Description	Qty
62354-36	SupaMega SS Base Mold, 36 x 36 x 10mm	5/pk.
62354-60	SupaMega SS Base Mold, 60 x 45 x 15mm	5/pk.

► Strip Disposable Base

Disposable base molds are manufactured from high impact polystyrene, offering a low cost alternative to stainless steel.

These molds are available in a choice of sizes and depths. The molds have a smooth interior finish and rounded corners for ease of removal. There are five molds per strip and they are packed 100 strips to a case.



■ Wide range of sizes to suit your needs

■ Disposable – no cleaning required

■ International standard sizes

■ Convenient with 5 mold per strip

Cat.#	Description	Size	Qty.
62351-07	Strip Disposable Mold	7 x 7 x 5 mm	100/pk.
62351-15	Strip Disposable Mold	15 x 15 x 5 mm	100/pk.
62351-24	Strip Disposable Mold	24 x 24 x 5 mm	100/pk.
62351-30	Strip Disposable Mold	30 x 24 x 5 mm	100/pk.
62351-37	Strip Disposable Mold	37 x 24 x 7 mm	100/pk.
62351-33	Strip Disposable Mold	33 x 25 x 13 mm	100/pk.
62351-39	Strip Disposable Mold	39 x 25 x 13 mm	100/pk.

► Easy-Load Cassettes for Automated Labeling Instruments

Made from acetal copolymer – This newly patented cassette, allows you to load the Micro-Writer® and Shur/Mark® Cassette Labeling Instruments in one simple operation. Each convenient stack contains 50 unique cassettes. No more manual insertion one-by-one. Save time and money.

Two types of cassettes are offered in order to suit your needs: Slotted tissue cassettes and meshed biopsy cassettes.

The anterior printing area is a 45° angle which suits most cassette labeling instruments. Lids are available as one-piece disposable plastic. It can be opened and closed as often as necessary and it always relocks securely without danger of specimen loss. Cassettes are packaged in stacks of 50. Each case contains 2 boxes of 20 stacks. Order cassette bases and cover separately.

► Slotted Cassettes - Tissue Cassettes

Base Cat.#	Cover Cat.#	Color	Qty/Pk
70060-W	70061-W	White	2000/pk
70060-P	70061-P	Pink	2000/pk
70060-G	70061-G	Green	2000/pk
70060-Y	70061-Y	Yellow	2000/pk
70060-B	70061-B	Blue	2000/pk
70060-Pe	70061-Pe	Peach	2000/pk
70060-T	70061-T	Tan	2000/pk
70060-Gr	70061-Gr	Gray	2000/pk
70060-L	70061-L	Lilac	2000/pk
70060-O	70061-O	Orange	2000/pk
70060-A	70061-A	Aqua	2000/pk

► Mesh Cassettes - Biopsy Cassettes

Base Cat.#	Cover Cat.#	Color	Qty/Pk
70062-W	70063-W	White	2000/pk
70062-P	70063-P	Pink	2000/pk
70062-G	70063-G	Green	2000/pk
70062-Y	70063-Y	Yellow	2000/pk
70062-B	70063-B	Blue	2000/pk
70062-Pe	70063-Pe	Peach	2000/pk
70062-T	70063-T	Tan	2000/pk
70062-Gr	70063-Gr	Gray	2000/pk
70062-L	70063-L	Lilac	2000/pk
70062-O	70063-O	Orange	2000/pk
70062-A	70063-A	Aqua	2000/pk

► Macro-Cassette

Processing/Embedding Cassettes (with lids)

Made from Acetal-Polymer. Comes complete with a one piece integral lid. It is specially designed

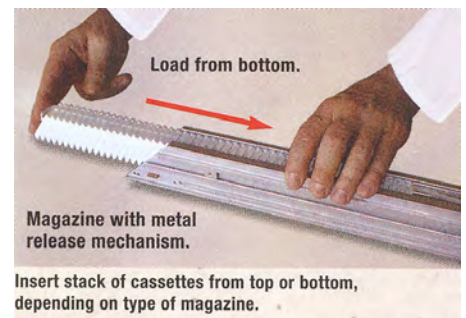
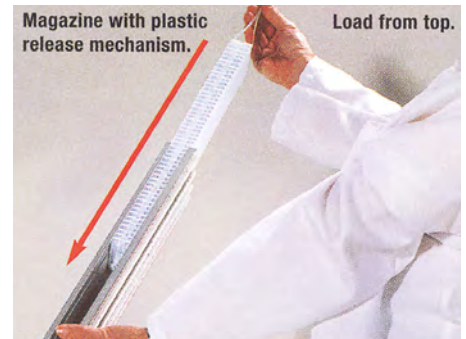
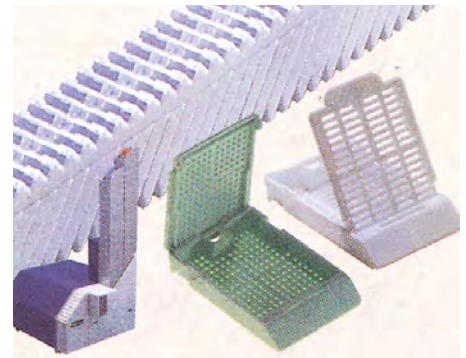
to hold large specimens during the embedding process, as well as in a storage cabinet. Inside measurements: 29mm(L)x25mm(W)x11mm(D).

Cat.#	Description	Qty/Pk
70077-W	Macro-Cassettes Cassettes, White	250/pk

► Disposable Deep Base Mold for Macro-Cassette

Made from PVC with excellent thermal exchange. Specially designed for the Macro-Cassette above. It has a smooth interior finish and rounded corners to facilitate its removal. Will resist temperatures from -80°C to 60°C. Not to be used with xylene or acetone. Measures: 37 x 24 x 10mm, and 5ml volume.

Cat.#	Description	Qty
62353	Disposable Base Mold for Macro-Cassettes	500/pk



➤ 1. Uni-Cassettes® System by Tissue Tek; Sakura Finetek

Tissue-Tek® Uni-Cassette® System is now easier to use in every way. It is made from a solvent and decalcifying solution resistant plastic and comes with a snap-latch hinge-lock disposable lid. The cassettes have three textured writing surfaces. Biopsy/Uni-Cassette® cassettes are the same Uni-Cassette® but feature 1mm pores instead of slots, which eliminates the warping of most small specimens and reduce the risk of specimen loss.



Features:

- Smooth, single action, fracture-back hinge - Fractures when being closed, then breaks easily and smoothly without rough edges for greater protection.
- Raised Spacer nubs - Placed at the center and the corners. Helps maintain the space between the cassettes for better exchange of processing reagents.
- Wider, thicker finger tab - Eliminates sharp edges; reduces strain on operator's finger. It simplifies opening of the lid.
- Improved front latch - Provides secure closure while making it easier to open.
- New smooth edge, sure-locking lid - The closure guides make it easier to close the lid. Secures sample throughout entire processing cycle.
- Oversize front writing surface - For large print and/or more information. Angled to make the cassette easier to hold and label.

Cat.#	Tissue-Tek	Description	Pack
Tissue-Tek® Uni-Cassette®			
62500-W	4170-02	White	1500/cs
62500-A	4120-02	Aqua	500/cs
62500-B	4157-02	Blue	500/cs
62500-G	4119-02	Gold	500/cs
62500-GR	4156-02	Green	500/cs
62500-P	4155-02	Pink	500/cs
62500-O	4117-02	Orange	500/cs
62500-Y	4154-02	Yellow	500/cs
62500-L	4118-02	Lilac	500/cs
62500-T	4153-02	Tan	500/cs
62500-R	4135-02	Red	500/cs
Tissue-Tek® Biopsy/Uni-Cassette®			
62501-W	4086	White	500/cs
62501-B	4087	Blue	500/cs
62501-G	4174	Green	500/cs
62501-O	4090	Orange	500/cs
62501-R	4045	Red	500/cs
62501-Y	4088	Yellow	500/cs

➤ 2. Mesh Biopsy Cassette System

The perfect cassette for the smallest specimens. This Mesh Biopsy Cassette System is now the easier, ideal way for processing the smallest of biopsy specimens. Using our Mesh Biopsy Cassettes, you avoid reagent carryover in the tissue processor and you eliminate the structural artifacts usually caused by sponge and tea bag abrasion. They also allow direct specimen filtration into the cassette and facilitate embedding.



Additional features:

- Large venting slots improve flow-through.
- Mesh screen with a blue tint for safe specimen containment and easy visualization.
- Tongue-and-groove seal surrounds entire specimen.
- Rounded inner walls for easier removal.

Cat.#	Description	Pack
62502-W	Mesh Cassette, White	500/cs
62502-B	Mesh Cassette, Blue	500/cs
62502-G	Mesh Cassette, Green	500/cs
62502-P	Mesh Cassette, Pink	500/cs
62502-R	Mesh Cassette, Red	500/cs
62502-Y	Mesh Cassette, Yellow	500/cs

➤ 3. Tissue-Tek® II Stainless Steel Base Molds-for Uni-Cassettes and Process/Embedding Systems

These base molds are to be used with Tissue-Tek® embedding cassettes and Tissue-Tek® Uni-Cassette® cassettes. These molds are made from polished stainless steel, offer optimal thermal conductivity, as well as easy paraffin block removal. All corners are precisely rounded for optimal paraffin ribboning.



Cat.#	Tissue-Tek	Description	Pack
62510-07	4161	SS Base Mold, 7x7x5 mm	12/pk
62510-15	4162	SS Base Mold, 15x15x5mm	12/pk
62510-24	4163	SS Base Mold, 24x24x5mm	12/pk
62510-30	4164	SS Base Mold, 30x24x5mm	12/pk
62510-37	4165	SS Base Mold, 37x24x5mm	12/pk

➤ 4. Tissue-Tek® Mega-Cassette® System

Mega-Cassette® cassettes have been designed to accommodate a large variety of samples, including bone, eye, teeth etc. They are made from white plastic with a snap latch, hinged-lock, disposable lid. These cassettes have three large writing surfaces and are resistant to solvent and decalcifying solutions. Measures 30mm(L)x24mm(W)x11mm(D). A stainless steel, reusable base mold is available. Measures 31mm(L)x23mm(W)x13.5mm(D)



Cat.#	Tissue-Tek	Description	Pack
62512-30	4173	Mega-Cassette®	750/pk
62512-31	4166	Mega Base Mold	6/pk

► Precision Cryo-Embedding System

This section offers you a simple system of stainless steel well bars, chucks and freezing blocks, kept cold in cryostat, allow you to perform a variety of precision embedding techniques addressing the most difficult embedding tasks with ease and minimum time needed.

SPEED

- 20 to 60 seconds to freeze (depending on the well size)
- Multiple samples handled quickly
- No monitoring necessary (for placement of heat extractor)

PRECISION

- Precise flat or on edge embedding
- Predictable orientation
- Liquid samples easily embedded
- No crush artifact caused by heat extractor weight

REDUCED TISSUE WASTAGE

- Less trimming the result of flat plane of embedding
- Minute samples embedding in the same plane.

EASY AND COMFORTABLE

- Less cryostat adjustments
- Comfortably performed on a shelf just inside most cryostats
- Easy to used – and safe time

► 1. Embedding Wells



61710-18



61712-34



61713-50



61715-24

Cat #	Description	Qty
61710-18	Embedding Bar, 4-Well of 18 x 18mm	each
61710-24	Embedding Bar, 4 well of 24 x 24 mm	each
61710-30	Embedding Bar, 3 well of 30 x 30 mm	each
61712-34	Embedding Bar, 2 wells of 30 & 24 mm	each
61713-50	Embedding Bar, 2 well of 50 x 30 mm; completely fills a standard glass slide	each
61714-20	Embedding Bar, 20 x 20 mm, 9mm Deep Wells; Ideal for research applications, such as re-embedding snap frozen blocks and embedding fresh blocks and embedding fresh whole small animal organs.	each
61715-24	Embedding Bar, 2 Deep Well of 24 x 24 mm x 6mm deep and two 24 x 24 mm x 9 mm deep. Ideal for research applications such as re-embedding snap frozen blocks and embedding fresh whole small animal organs. Using refrigerated embedding medium will maximize speed and prevent thawing of snap frozen tissues.	each
61716-10	Embedding Bar, Four 10 mm square wells. Two wells are 4.0 mm deep and 2 wells are 6.0 mm deep. Designed for small specimens when multiple sections need to be placed on a single slide. This well freezes in 10 seconds at -24°C. Useful in both clinical and research applications	each

► 2. Stainless Steel Chucks

These stainless steel chucks are designed to be used cold for rapid freezing, and to maximize the gripping power required to hold the embedded tissue block. The stem of the chuck provides the focal point for a sharp tap resulting in an easily release of the block from the well. These chucks fit many of the major brand cryostat and can be used in most cryostats with use of an adapter. These Chuck Adapters have stem measures 20mm L x 9mm diameter, and fit Leica and most Microm cryostats. We also offer adapters to use these chuck for other cryostats.



Cat #	Description	Qty
61720-28	Small Chuck – Made of stainless steel, 28 mm square with gridded surface	each
61720-36	Large Chuck – Made of stainless steel, 36 mm square with gridded surface	each
61721-36	Large Chuck – Stainless steel, 36 x 28 mm rectangular with gridded surface	each
61721-55	Extra Large Chuck – Stainless steel 55 x 36 mm rectangular shape with gridded surface	each

► 3. Stainless Steel Over Chucks Freezing Blocks

These stainless steel rectangular blocks are a useful tool for a number of tasks. They serve as a heat extractor, designed to fit over the stem of the chuck. The flat surfaces can also be used as an extra heat extractor when using conventional cryostat embedding technique. The freezing block also served as a dislodging tool. A light tap of the chuck stem cleaves the plane of adhesion holding of the formed block to the well. These blocks also serve as a convenient hand held flat freezing surface useful in gently cooling the tissue without the use of sprays and in plastering technique.



Cat #	Description	Qty
61725-01	Over-Chuck Freezing Block	each

► 4. Chucks Bin

A sturdy stainless steel bin to store over-chuck freezing block while staying cold in cryostat. Removable cover for easy access the contents.



Cat #	Description	Qty
61725-50	Chuck Storage Bin	each

► 5. Dispensing Slides

These thin transparent polyvinyl slides serve as a surface to precisely orient the tissue into the desired position and as a means to accurately transfer tissue to the embedding well floor. Tissue is applied face down to the end of the dispensing slide where it can be visualized from below and manipulated into position. The face that is visible will be laid onto the well floor and will ultimately be the embedded surface to be sectioned.

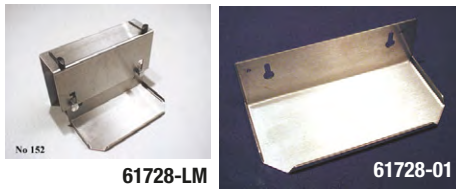


Cat #	Description	Qty
61727-08	Dispensing Slide	8/pk

► Precision Cryo-embedding System (continued)

► 6. Embedding Shelf

This removable shelf can be installed below the opening of the cryostat in the most convenient and location available. The shelves can be made in various sizes to accommodate most instruments.



Also available two more models of 3 pieces shelf size 4 x 8" for temporary or permanently installation. One for Leica or Micron cryostats, and one for Shandon Cryostat

Cat #	Description	Qty
61728-01	Embedding Shelf, size 4 x 8"	each
61728-LM	Embedding Shelf for Leica/Micron	each
61728-Sh	Embedding Shelf for Shandon	each

► 7. Well Bar Storage Platform

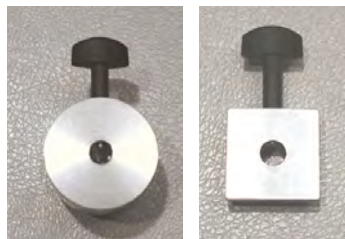
This stainless steel plate to fit to the Laica cryostat for storing Well Bar inside the cryostat

Cat #	Description	Qty
61730-01	Well Bar Storage Platform	each



► 8. Chuck Adapter

This Chuck Adapter machined to fit Shandon and Ames / Tissue-Tek cryostats.

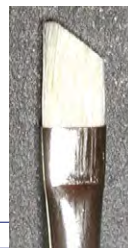


Cat #	Description	Qty
61731-01	Chuck Adapter for Shandon	each
61732-01	Chuck Adapter for Ames/Tissue-Tek	each

► 9. Frozen Section Brushes

Flat white boar bristle brushes which are cut into an angle. These stiff bristles will prevent the frozen section from curling through the brush. We offer a set of four brushes: two #1 with 3/8" angle cut and #2 with 1/4" angle cut.

Cat #	Description	Qty
61735-01	Frozen Section Brush	4/set



► Well Bar Sets

We offer these Well Bar Sets to make your ordering easier and to offer you a complete set for facilitate your work:

Cat #	Description	Qty
61700-01	Well Bars Set 101	set
<i>Includes: Three sizes well bars (61710-18, 61710-24, 61710-30); Six small chucks (6 x 61720-28); Four large chucks (4 x 61720-36); Four Over-Chuck Freezing Blocks (4 x 61725-01); One Chuck Bin (1 x 61725-50); 16 Dispensing Slide (61727-08); Cutting Board/Freezing Girdle (61733-01); 1 Elevated Freezing Block (61734-01); 1 Angle Embedding Forceps (78359-124); and accessories</i>		
61701-01	Well Bars Set 102	set

This set is dedicated for Ames / Tissue-Tek Cryostats.

Includes: Two sizes well bars (61710-18, 61710-24); Six small chucks (6 x 61720-28); Four large chucks, 36x28mm (4 x 61721-36); One Chuck Adapter (61732-01); Four Over-Chuck Freezing Blocks (4 x 61725-01); One Chuck Bin (1 x 61725-50); 16 Dispensing Slides (61727-08); Cutting Board/Freezing Girdle (61733-01); 1 Elevated Freezing Block (61734-01); 1 Angle Embedding Forceps (78359-124); and accessories

Cat #	Description	Qty
61704-01	Small Embedding Well Bar Set	set
<i>Includes: One 18 mm Well Bars (61710-18); Four Small Chucks (61720-28); Two Over Chuck Freezing Blocks (61725-01); Dispensing Slides (61727-08); Accessories included.</i>		

Cat #	Description	Qty
61704-02	Medium Embedding Well Bar Set	set
<i>Includes: One 24 mm Well Bar (61710-24); Four Small Chucks (61720-28); Two Over Chuck Freezing Blocks (61725-01); Dispensing Slides (61727-08); Accessories included.</i>		

Cat #	Description	Qty
61704-03	Large Embedding Well Bar Set	set
<i>Includes: One 30 mm Well Bars (61710-30); Four Small Chucks (61720-36); Two Over Chuck Freezing Blocks (61725-01); Dispensing Slides (61727-08); Accessories included.</i>		

Cat #	Description	Qty
61704-04	24/30 mm Well Bar Set	set
<i>Includes: One Well Bar with two wells 24 mm and two wells 30mm (61712-34); Two Large Chucks (61720-36); Two Small Chucks (61720-28); Two Over Chuck Freezing Blocks (61725-01); 8 Dispensing Slides (61727-08)</i>		

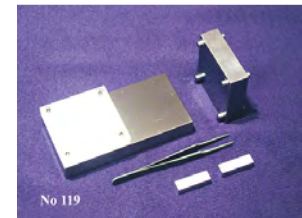
Cat #	Description	Qty
61704-05	50/30 Well Bar Set	set
<i>Includes: One Well Bar 50 x 30 mm (61713-50); Two Large Chucks (61720-36) Two Small Chucks 55 x 36 mm (61721-55)</i>		

Cat #	Description	Qty
61704-06	20 x 20 mm Deep Well Bar Set	set
<i>One 20 x 20 mm Deep Well Bar (61714-20); Two Small Chucks (61720-28); Two Over Chuck Freezing Blocks (61725-01); 8 Dispensing Slides (61727-08)</i>		

► Freezing Griddle/ Elevated Freezing Block Set

Includes:

Cutting board / Freezing griddle — The steel "freezing griddle" serves as a freezing surface on which to prepare frozen blocks when used in conjunction with the elevated freezing block. The small attached cutting board serves as a cold surface to cut the frozen block while maintaining the freezing temperature. This simple piece of apparatus is kept cold in the cryostat and is removed to the work bench only during the process of cutting the frozen block. As sections are cut, they are kept cold on the freezing griddle.



Elevated Freezing Block — This steel block is kept cold in the cryostat and is used in conjunction with the freezing griddle. The two broad sides of the block are equipped with feet measuring 3.0 mm on one side and 4.5 mm on the other. The feet create a space between the two steel bars in which the frozen blocks are prepared. Additional elevating bars are supplied to further elevate the block when preparing very thick portion of tissue.

Epoxy Coated Forceps

Putty knife and extra elevating bars

Cat #	Description	Qty
61706-01	Freezing Griddle/ Elevated Freezing Block Set	each

► CytoSep™ Family

The Simport CytoSep™ Family is a series of Cytology Funnel sample chambers specially designed to concentrate cells into thin layer preparation. These Cytology Funnels are disposable and manufactured to use with numerous major models, such as Shandon Cytospin™ 4 Cytocentrifuge, the Sakura Cyto-Tek™ Cytocentrifuge, the Hettich Cyto-System. They are safer than reusable sample chambers and lower your risk of contamination to pathologic samples. These disposable CytoSep™ Cytology Funnels are time saver compared to cleaning and sterilizing reusable sample chambers. The CytoSep™ Cytology Funnels are recommended for the following applications:

- Bronchial alveolar lavage washes
- Cerebrospinal fluids
- Exudates and transudates
- Fine needle aspirates, and other aspirates
- Gastric washes – Oral cavity washes
- Pericardial fluids - Peritoneal fluids
- Pleural fluids – Synovial fluids
- Sputum
- Urine

► CytoSep™ for the Shandon Cytospin® 4 Cytocentrifuge

A. Simport Single CytoSep™ Cytology Funnels

Fully compatible with the Shandon CytoSpin® Centrifuge, the Simport CytoSep™ Cytology Funnels can be used to deposit a thin layer of cells in a clearly defined area of a microscope slide. The filter card absorbs any excess fluid. These Cytology Funnels have the filter cards pre-attached for consistent, reliable results. No alignment necessary. All disposable funnels are packaged with closure caps to seal in specimen for added protection. All components are also available separately.

- For sample volumes of up to 0.5 ml, use the Single CytoSep™ Cytology Funnel with a White Filter Card & Cap. It provides a cell deposition area of 6 mm (28 mm squares) and allows one sample to be run simultaneously on a single slide. It is not necessary to use a different stainless steel slide clip.
- For sample volumes of up to 0.4 ml, such as spinal Fluids, use the Single CytoSep™ Cytology Funnel with Brown Filter Card & Cap. It allows for a slower absorption of fluids. All the individual components are also available separately.



EMS #	Description	Qty	EMS #	Description	Qty
62750-10	Single Funnel with White Filter & Cap	50	62750-35	Funnel Cap only	50
62750-20	Single Funnel with Brown Filter & Cap	50	62750-40	White Filter Paper for Single Funnel	200
62750-30	Single Funnel only	500	62750-45	Brown Filter Paper for Single Funnel	200

B. CytoSep™ for the Shandon Cytospin® 4 Cytocentrifuge

Simport Double CytoSep™ Cytology Funnels

This double CytoSep™ Cytology Funnel with disposable sample chamber allows for two samples to be run simultaneously on a single slide and is ideal for immunohistochemistry work. The Double CytoSep™ Cytology Funnels provides a cell deposition area of 6 mm (28mm squared) for sample volumes of up to 0.5 ml. The filter card come pre attached. Cap is included. No need to use a different stainless steel slide clip. Components are also available separately.

EMS #	Description	Qty
62751-10	Double Funnel with White Filter & Cap	50
62751-30	Double Funnel only	500
62750-35	Funnel Cap only	50
62751-40	White Filter Paper for Double Funnel	200



C. CytoSep™ for the Shandon Cytospin® 4 Cytocentrifuge

Simport ALL PLASTIC Single CytoSep™ Cytology Funnels

These are so easy to use, and improve turn-around time while giving more diagnostic information. Being totally disposable, they eliminate time consuming decontamination and cleaning. They are safe to use and reduce the risk of exposure to pathologic samples. They also decrease the possibility of cross-contamination.

This series of CytoSep™ Funnels is single-use. The disposable sample chambers do not need metal clips and are designed to meet any processing equipment. They are capable producing high quality thin-layer slide preparation while improving laboratory efficiency.

The disposable Sample Chambers with white Filter Cards are used for sample volumes up to 0.5 ml, the ones with the Brown Filter Cards are for sample volumes up to 0.4 ml. The cell deposition area is 6 mm diameter (28 mm squared). Filter Cards are pre-attached> Excellent for scanty specimens such as CSF. All components are also available separately.

EMS #	Description	Qty	EMS #	Description	Qty
62752-10	Single Funnel with White Filter & Cap	40	62752-32	Funnel Base only	50
62752-20	Single Funnel with Brown Filter & Cap	40	62750-35	Funnel Cap only	50
62752-30	Single Funnel only	50	62750-40	White Filter Paper for Single Funnel	200
			62750-45	Brown Filter Paper for Single Funnel	200



► CytoSep™ Family (continued)

D. CytoSep™ for the Shandon Cytospin® 4 Cyto centrifuge Simpport ALL PLASTIC Double CytoSep™ Cytology Funnels

This double CytoSep™ Cytology Funnel with disposable sample chamber allows for two samples to be run simultaneously on a single slide and is ideal for immunohistochemistry work. The Double CytoSep™ Cytology Funnels provides a cell deposition area of 6 mm (28mm squared) for sample volumes of up to 0.5 ml. The filter card come pre attached. Cap is included. No need to use a different stainless steel slide clip. Components are also available separately.

EMS #	Description	Qty
62753-10	Double Funnel with White Filter & Cap	40
62753-30	Double Funnel only	50
62752-32	Funnel Base only	50
62750-35	Funnel Cap only	50
62751-40	White Filter Paper for Double Funnel	200



E. CytoSep™ for the Shandon Cytospin® 4 Cyto centrifuge Simpport MEGA Double CytoSep™ Cytology Funnels

This ALL PLASTIC CytoSep™ MEGA Funnel provides an easy, efficient and cost effective method of producing high quality thin-layer slide preparations. It eliminates the needs for stainless steel clips. It is ideally for preparation of large volume samples.

The larger funnel is quick and easy to remove. The large rectangular cell deposition area of 22 x 14.75 mm (325 mm squared) provides for up to 12 times the sample volume (6 ml) of the single Cyto™ Cytology Funnel. Strategically placed baffles inhibit cell setting which results in uniform cell deposition and excellent quality slide preparations. This MEGA funnels and cap minimize user exposure to pathogens while reducing the risk of specimen cross contamination. Can prepared both air dried and fixed preparations.

EMS #	Description	Qty
62754-10	Single Funnel with Cap	40



► CytoSep™ for the Sakura Cyto-Tek® Cyto centrifuge



All components are available separately. The Simpport CytoSep™ Cytology Funnel offers the 1 ml fluid chamber component including 1 ml fluid chamber, 1 ml base holder, 1 ml chamber cap, and the appropriate filter paper

EMS #	Description	Qty
62755-25	Fluid Chamber only, 1 ml	50
62755-32	Base Holder only	50
62755-35	Cap only	50
62755-40	White Filter Card only	200

► CytoSep™ for the Hettich Cyto-System

The Simpport CytoSep™ Funnel Chambers for the Hettich Cyto-System optimize lab throughput with multiple funnel options in 2, 3 or 4 funnels per slide. These funnels are perfect for every application such as CSF, Viral infections, Bronchial secretions and come in four sizes from 1 ml to 8 ml. The 1 ml chamber is for small-volume samples of low cell contents. Both 2 and 4 ml chambers are suggested for cell-rich samples, e.g. pleura, ascites and bronchial washing while the 8 ml chamber is perfect for large volume samples such as urine.

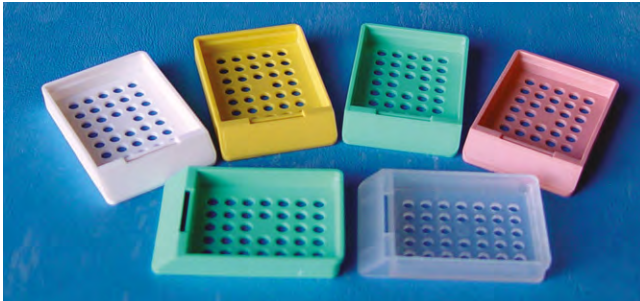


EMS #	Description	Qty
62756-30	One-Funnel Chamber, 1ml	10
62756-31	One-Funnel Chamber, 2 ml	10
62756-32	One Funnel Chamber, 4 ml	10
62756-33	One Funnel Chamber, 8 ml	10
62756-40	Filter for 1, 2 and 4 ml Chambers	200
62756-41	Filter for the 8 ml Chamber	200

► Processing Embedding Cassettes Systems by Tissue Tek®; Sakura Finetek

► 1. Tissue-Tek® Process/Embedding Cassette

Made from chemical resistant plastic. These cassettes have an angled, texture writing surface, ensuring positive identification throughout processing, embedding, sectioning and storage. Stainless steel cover is available separately.



Cat.#	Tissue-Tek	Description	Pack
62520-C	4191	Clear	1500/cs
62520-W	4187	White	1500/cs
62520-A	4129	Aqua	1500/cs
62520-B	4184	Blue	1500/cs
62520-G	4128	Gold	1500/cs
62520-GR	4183	Green	1500/cs
62520-O	4126	Orange	1500/cs
62520-P	4182	Pink	1500/cs
62520-Y	4179	Yellow	1500/cs
62520-25	4194	SS Cassette Cover	25/pk

► 2. Tissue-Tek® Embedding Rings

Made from polystyrene and reinforced with the dual bar center support to prevent warping, these rings have a cross-hatch surface design that provide excellent paraffin bonding for clamping and sectioning.



Cat.#	Tissue-Tek	Description	Pack
62525-W	4151	White	1000/pk
62525-B	4116	Blue	1000/pk
62525-G	4115	Green	1000/pk
62525-P	4114	Pink	1000/pk
62525-Y	4113	Yellow	1000/pk

Tissue-Tek® Filing Cabinet System, See page 609 >>>>

► 3. Tissue-Tek® Base Molds for Embedding Rings

Made from high quality stainless steel for optimal thermal conductivity, and they have a well polished surface for easy paraffin block removal. All of the corners are rounded for good paraffin ribboning. These Base Molds are for all applications in specimen embedding with Tissue-Tek® Embedding Rings shown above.



Cat.#	Tissue-Tek	Description	Pack
62527-16	4121	Base Mold 16x16x6 mm	12/pk
62527-22	4122	Base Mold 22x22x6 mm	12/pk
62527-32	4123	Base Mold 32x25x6 mm	12/pk
62527-38	4124	Base Mold 38x25x6 mm	12/pk
62528-22	4131	Base Mold 22x22x12 mm	12/pk
62528-32	4132	Base Mold 32x25x12 mm	12/pk
62528-38	4133	Base Mold 38x25x12 mm	12/pk

► Tissue-Tek® Embedding Supplies by Tissue Tek; Sakura Finetek

1. Tissue-Tek® Mold Release, Concentrate

Use this solution to coat base molds to ensure complete separation of embedding paraffin from the mold. The working solution is prepared by adding 5ml of Concentrate to 95 ml of ethyl alcohol or isopropyl alcohol. Molds are dipped in solution and dried prior to use.



2. Tissue-Tek® Marking Pencil

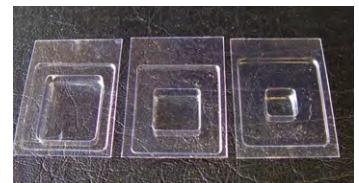
These pencils are made from soft lead, which is ideal for marking plastic cassettes.

Cat.#	Tissue-Tek	Description	Pack
62530-01	4141	Mold Release	4 oz
62530-12	4141	Mold Release	12/cs
62531-01	4160	Marking Pencil	12/pk
62531-06	4160	Marking Pencil	6pk/cs

► Tissue-Tek® Cryomold®; Sakura Finetek

These disposable plastic Cryomolds produce a uniformly shaped flat surface specimen block with tissue freezing medium (O.C.T.) for frozen sectioning, Standard Cryomold fits directly into Cryobar® freezing wells of the Tissue-Tek® II microtome/cryostat.

Use a Cryomold® adapter to adapt smaller biopsy and intermediate Cryomold® molds to freezing wells on the Cryobar® unit.

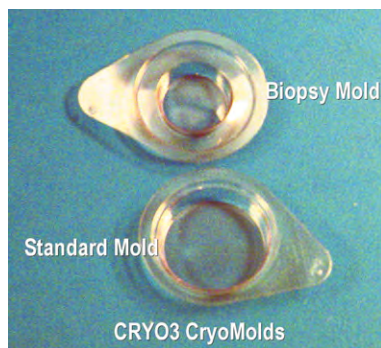


Cat.#	Tissue-Tek	Description	Pack
62534-25	4557	Standard, 25x20x5mm	100/pk
62534-10	4565	Biopsy, 10x10x5mm	100/pk
62534-15	4566	Intermediate 15x15x5mm	100/pk
62535-15	4568	Intermediate Cryomold Adapter	12/pk

► Accessories for Tissue-Tek® CRYO₃® Microtome/Cryostat Cryo 2000™

1. Cryomold® Specimen Holders

Plastic Cryomold®, round shapes with a tab for easy handling. Available in standard and biopsy configurations. The standard mold measures 22mm (D) x 5mm deep. The Biopsy mold measures 15mm (D) x 5mm deep.



2. Round Object Holders

Machined from solid aluminum with an embossed surface for holding frozen embedding blocks. Measures: 26mm top diameter (without 'O' ring), 28.55mm diameter with 'O' ring, 23mm body diameter, 16mm height



Cat.#	Tissue-Tek	Description	Qty/cs
62532-01	4728	CRYO3 CryoMold, Standard	100/cs
62532-12	4728	CRYO3 CryoMold, Standard	1200/cs
62533-01	4730	CRYO3 Cryomold, Biopsy	100/cs
62533-12	4730	CRYO3 Cryomold, Biopsy	1200/cs
62537-01	4726	Round Object Holder, 25mm	each
62537-06	4726	Round Object Holder, 25mm	6/cs

► Tissue-Tek® Microtome Lubrication Kit

This kit contains special low temperature blended lubricants and grease for the routine maintenance of all of the Tissue-Tek microtomes. Tissue-Tek® II and Tissue-Tek® brand Cryo 2000™.



Cat.#	Tissue-Tek	Description	Pack
62556-01	4556	Tissue-Tek™ Lubricating Kit	each

► Autopsy Cassettes

Made from stainless steel. It is fully perforated allowing for free movement of fluids. It comes with a snap-cap which provides positive enclosure.



Cat.#	Description	Measure (mm)	
62310-12	SS Autopsy Cassettes	50(L)x25(W)x12(D)	each

► Embedding Rings

Molded from the highest quality plastic, our Embedding Rings fit most base molds.



For added convenience, there are four colors from which to choose (Blue, Pink, Green, Yellow). The large writing surface further eases identification and handling.

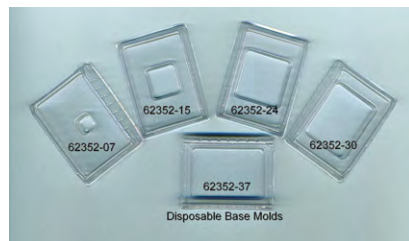
The Base measures 1 7/8" x 1 1/8" (42 x 28mm)

The Ring measures 1" x 1" (25 x 25mm)

62350-W	Embedding Ring, White	250/bx
62350-B	Embedding Ring, Blue	250/bx
62350-P	Embedding Ring, Pink	250/bx
62350-G	Embedding Ring, Green	250/bx
62350-Y	Embedding Ring, Yellow	250/bx

► Disposable Base Mold

Our Disposable Base Mold is designed to fit all existing cassettes. Because our base molds are disposable you save time on cleaning and storing and they offer you less exposure to hazardous chemicals.



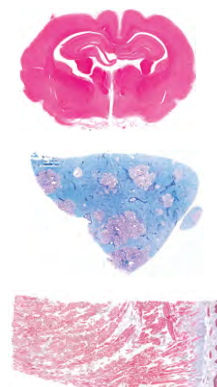
Cat.#	Description	Measure (mm)	Pack
62352-07	Disposable Base Mold	7x7x5mm	500/pk
62352-15	Disposable Base Mold	15x15x5mm	500/pk
62352-24	Disposable Base Mold	24x24x5mm	500/pk
62352-30	Disposable Base Mold	30x24x5mm	500/pk
62352-37	Disposable Base Mold	37x24x5mm	500/pk

PathScan Enabler IV

Low Cost Digital Histology Slide Scanner

The PathScan Enabler IV, is designed to allow scanning of an entire whole mounted histology sample attached to standard 1 x 3 inch cover slipped glass slide. The PathScan Enabler IV solves low power, large field of view, high resolution imaging problems.

For more information, see page 606. >>>>



► Paraffin Tissue Microarrays

Paraffin tissue microarrays (TMAs) are becoming more common in the laboratories. Current techniques including organizing, punching, and inserting tissues is time consuming and involving costly equipment.

This Arraymold is the simple tool but great answer for this current technique for laboratories to perform TMAs with less time consuming, excellent results.

With this Arraymold, you can process up to 150 specimens onto one single slide with very little time consuming, minimal technical training.

DVD instruction accompanies each kit, with a step by step guide to performing the entire TMAs process.

Arraymold features include:

- Allow pathologist or researcher to view many different samples on the same single slide
- Helpful in finding IHC markers for control or quality assurance from hundreds of samples
- Staining markers will be more consistent when hundreds of samples are on one slide
- Used less costly antibody
- Arraymold kit is small enough to be stored in a drawer
- Rubber arraymold can be reused many times without losing its flexibility.

► Arraymold Kit A, (60 cores)

This mold generates 2 mm diameter sample core, 60 cores per mold. Kit consists of:

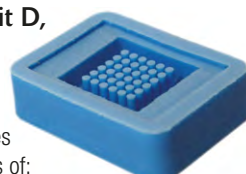


- 10 Disposable 2 mm sterile dermal needle
- 2 Stylets (used to remove sample from needle)
- 1 Brass Plate (for setting cryoarray punches)
- 1 2 mm reusable rubber Arraymold (60 cores)
- 1 DVD instruction (NTSC) for showing how to use the mold.

69130-10 Arraymold Kit A, 60 Cores each

► Arraymold Kit D, (36 cores)

This mold generates 2 mm diameter sample core, 36 cores per mold. Kit consists of:

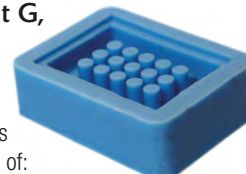


- 10 Disposable 2 mm sterile dermal needle
- 2 Stylets (used to remove sample from needle)
- 1 Brass Plate (for setting cryoarray punches)
- 1 2 mm reusable rubber Arraymold (36 cores)
- 1 DVD instruction (NTSC) for showing how to use the mold.

69130-15 Arraymold Kit D, 36 Cores each

► Arraymold Kit G, (24 cores)

This mold generates 3.5 mm diameter sample core, 24 cores per mold. Kit consists of:

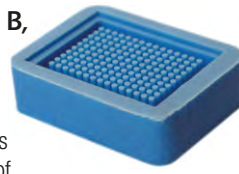


- 10 Disposable 3.5 mm sterile dermal needle
- 2 Stylets (used to remove sample from needle)
- 1 Brass Plate (for setting cryoarray punches)
- 1 4 mm reusable rubber Arraymold (24 cores)
- 1 DVD instruction (NTSC) for showing how to use the mold.

69130-55 Arraymold Kit G, 24 Cores each

► Arraymold Kit B, (150 cores)

This mold generates 1.5 mm diameter sample core, 150 cores per mold. Kit consists of:

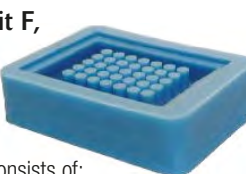


- 10 Disposable 2 mm sterile dermal needle
- 2 Stylets (used to remove sample from needle)
- 1 Brass Plate (for setting cryoarray punches)
- 1 1.5 mm reusable rubber Arraymold (150 cores)
- 1 DVD instruction (NTSC) for showing how to use the mold.

69130-20 Arraymold Kit B, 150 Cores each

► Arraymold Kit F, (35 cores)

This mold generates 3 mm diameter sample core, 35 cores per mold. Kit consists of:



- 10 Disposable 3 mm sterile dermal needle
- 2 Stylets (used to remove sample from needle)
- 1 Brass Plate (for setting cryoarray punches)
- 1 4 mm reusable rubber Arraymold (35 cores)
- 1 DVD instruction (NTSC) for showing how to use the mold.

69130-45 Arraymold Kit F, 35 Cores each

► Arraymold Kit C, (15 cores)

This mold generates 4 mm diameter sample core, 15 cores per mold. Kit consists of:



- 10 Disposable 4 mm sterile dermal needle
- 2 Stylets (used to remove sample from needle)
- 1 Brass Plate (for setting cryoarray punches)
- 1 4 mm reusable rubber Arraymold (15 cores)
- 1 DVD instruction (NTSC) for showing how to use the mold.

69130-40 Arraymold Kit C, 15 Cores each

► Arraymold Kit E, (72 cores)

This mold generates 1.5 mm diameter sample core, 72 cores per mold. Kit consists of:



- 10 Disposable 1.5 mm sterile dermal needle
- 2 Stylets (used to remove sample from needle)
- 1 Brass Plate (for setting cryoarray punches)
- 1 1.5 mm reusable rubber Arraymold (72 cores)
- 1 DVD instruction (NTSC) for showing how to use the mold.

69130-25 Arraymold Kit E, 72 Cores each

► Arraymold Package Kit

To save money, you can order Arraymold Package Kit. This package includes two or three Arraymold kits listed above.

- Arraymold Kit 1: Including Arraymold Kit A and Arraymold Kit B
- Arraymold Kit 2: Including Arraymold Kit A and Arraymold Kit C
- Arraymold Kit 3: Including Arraymold Kit B and Arraymold Kit C
- Arraymold Kit 4: Including all three Arraymold Kit A, B, and C

69131-01 Arraymold Package Kit 1 (A +B) each

69131-02 Arraymold Package Kit 2 (A +C) each

69131-03 Arraymold Package Kit 3 (B +C) each

69131-04 Arraymold Package Kit 4 (A +B+C)each

► Spare Accessories for the ArrayMold

69130-56 Punch Needle 1.5mm	50/pk
69130-57 Punch Needle 2.0mm	50/pk
69130-58 Punch Needle 3.0mm	50/pk
69130-59 Punch Needle 3.5mm	50/pk
69130-62 Punch Needle 4.0mm	50/pk
69130-63 Styler 1.5mm	each
69130-64 Styler 2.0mm	each
69130-65 Styler 3.0mm	each
69130-66 Styler 3.5mm	each
69130-67 Styler 4.0mm	each

► Micro Baskets



Made from stainless steel and has a positive clip-on cover. It is ideal for processing micro specimens. It can be used as a holder for paraffin sections while removing paraffin wax. Available in medium and fine mesh. It measures: 20mm (dia.)x 5mm(deep).

62312-10	Micro Baskets, Medium Mesh	each
62312-16	Micro Baskets, Medium Mesh	6/pk
62312-20	Micro Baskets, Fine Mesh	each
62312-26	Micro Baskets, Fine Mesh	6/pk

► Expandable Capsules

Made from stainless steel and comes with a positive snap cap. They are expandable. When closed its dimensions are 40mm (dia.) x 7mm (deep) and can be expanded to 11mm deep. Perforated top and bottom.



62314-01	Expandable Capsule	each
62314-06	Expandable Capsule	6/pk

► Stainless Steel Tissue Capsules

Features:

- A secure positive snap-on cover.
- Perforated on the top and bottom for easy fluid circulation.
- Can be partitioned for up to 4 sections.

The separator is not included. They measure: 37mm(I.D.)x6mm(deep) (1 $\frac{1}{16}$ "x $\frac{3}{16}$ ")

62320-01	SS Tissue Capsule	each
62320-06	SS Tissue Capsule	6/pk
62320-20	Tissue Capsule Separator	2/pk



► Plastic Tissue Capsules



- Molded from polyethylene; resistant to all processing chemicals, including Zenker's fixative.
- A three-compartment divider which is removable for specimens up to 35mm.
- A weighted end floats the capsule in a upright position to conserve space.
- Perforated on the top and bottom for better circulation of the fluid.
- Snap-on hinged cover.

They measure: 35mm(I.D.)x35mm(I.D.)x10mm(deep) (1 $\frac{3}{8}$ "x $\frac{3}{8}$ ")

62322-12	Plastic Tissue Capsules	12/pk
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► Tissue Processing Capsules



These one piece plastic capsules are hinged and perfectly aligned, offering convenience and ease of use. Both the top and the bottom of the capsule have an open mesh offering maximum fluid flow during processing. A frosted marking surface assures permanent identification. These capsules are commonly used with the Embedding Ring System. They are available in two sizes.

To Use: Simply place the tissue in the capsule, close the cover to lock, and the sample is now ready for processing.

- The 38mm(Dia.)x8mm(Deep) are intended for use with normal tissue.
- The 29mm(Dia.)x6mm(Deep) are intended for use with Biopsy tissue.

Cat.#	Color	Capsule Size	Pack
62358-W	White	38mmx8mm	500/pk
62359-W	White	29mmx6mm	500/pk

► Specimen Discs

Accurately machined chrome plated aluminum discs that fit most micro-tomes and cryostats. They have a knurled surface for better specimen handling. The shanks all measure $\frac{3}{8}$ " (10mm) 1 $\frac{1}{8}$ " Long (40mm) in diameter and are straight. Available in a variety of disc sizes. The thickness of the table is $\frac{1}{8}$ " (3mm).



62355-01	Specimen Disc, size $\frac{3}{8}$ " (2.2cm)	each
62355-04	Specimen Disc, size 1 $\frac{1}{8}$ " (2.9cm)	each
62355-07	Specimen Disc, size 1 $\frac{1}{2}$ " (3.8cm)	each
62355-10	Specimen Disc, size 2" (5.1cm)	each

► Embryo Dishes

These dishes are molded from clear glass and come with a glass lid for the viewing or staining of free-floating specimens.



Cat.#	Description	Pack
70543-30	Embryo Dish, 30 mm O.D.	each
70543-45	Embryo Dish, 45 mm O.D.	each

► Paper Biopsy Bags

Due to the amazing demand from our customers, EMS is re-introducing the original Paper Biopsy Bags. These bags are made from porous paper which provides maximum tissue safety during processing. The bags permit proper fluid exchange and drainage.



To Use: Simply introduce the specimen into the bag and fold its end, enclosing the cassette or capsule – you are now ready to process as usual.

Bag measurement: Overall 1 1/4" W x 3" L (45 x 75 mm), Inside Seam: 1 1/8" W (35 mm)

Cat.#	Description	Qty
62326-01	Paper Biopsy Bags	100/pk.
62326-05	Paper Biopsy Bags	500/pk.

► Biopsy Foam Pads

Made from polyester urethane foam. These pads are used to hold biopsies in place and prevent them from being lost during processing. Biopsy samples are sandwiched between two foam pads and are placed either in tissue capsules or cassettes with metal or plastic lids.



Cat.#	Foam Pad Measures	For Use With	Qty
62325-01	25mm Dia x 2mm Thick	Small Capsules	1000/pk
62325-04	34mm Dia x 2mm Thick	Large Capsules	1000/pk
62325-06	30 x 25 x 2mm Thick	Cassettes	1000/pk

► Biopsy Bags

- Made from nylon cloth, 0.2mm mesh diameter. All seams are heat-sealed.
- Allows for unrestricted fluid movement around the tissue.
- Reduces the loss of small biopsy specimens.
- Reduces cross contamination and pressure artifacts by using sponges.



Cat.#	Bag Measures	Qty
62324-35	Nylon Biopsy Bag 35 x 50mm	100/pk
62324-75	Nylon Biopsy Bag 45 x 74mm	100/pk
62324-98	Nylon Biopsy Bag 98 x 75mm	100/pk

► CellSafe™ Biopsy Insert

The CellSafe is a disposable plastic biopsy insert consisting of two hinged inter-locking frames with an integral nylon mesh. The mesh is extra fine and therefore ensures a high level of specimen security.

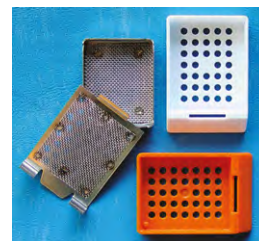


Measurements—Overall: 28 mm x 25 mm x 5 mm high (1.1" x 1" x 1/4"); The mesh area: 18 mm x 18 mm x 2 mm high

Cat.#	Description	Pack
62327-10	CellSafe™ Biopsy Insert	100/pk

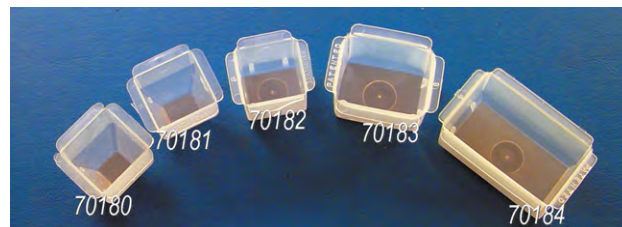
► Stainless Steel Biopsy Inserts

A two-part fitting stainless steel capsule with welded mesh that fits inside the processing cassettes preventing the loss of small or friable material while allowing interchange of fluids.



They fit all process/embedding cassettes such as 70025 and 72025 as well as Uni-Cassettes (62500).

Cat.#	Description	Pack
62328-01	Stainless Steel Biopsy Insert	each



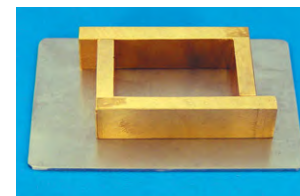
► Peel Away Disposable Embedding Molds

For plastic or paraffin embedding; no block trimming needed. Inside fingers hold ID slip which becomes embedded in the block for positive permanent identification.

70180	Truncated Mold, size 8x8x22mm(Deep)	288/cs
70181	Truncated Mold, size 12x12x22mm(Deep)	288/cs
70182	Square Mold, size 22x22x22mm(Deep)	288/cs
70183	Rectangular Mold, size 22x30x22mm(Deep)	288/cs
70184	Rectangular Mold, size 22x40x22mm(Deep)	288/cs

► Adjustable Embedding Mold

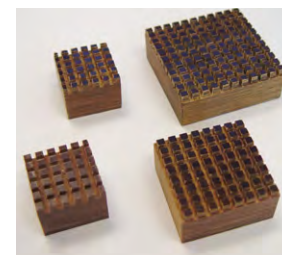
These two "L" shape and stainless steel base plate form an adjustable embedding mold, suitable for embedding various size specimens with a minimum of waste material. Available in 5 different sizes.



Cat.#	Inside Measurements	Pack
62361-01	Adjustable Mold, 7/8" x 1 1/4" x 1/2" (22x44x13mm)	each
62361-03	Adjustable Mold, 7/8" x 1 1/4" x 3/4" (22x44x19mm)	each
62361-05	Adjustable Mold, 7/8" x 1 1/4" x 1" (22x44x25mm)	each
62361-07	Adjustable Mold, 7/8" x 1 1/4" x 1 1/4" (22x44x32mm)	each
62361-09	Adjustable Mold, 3 1/2" x 5 3/4" x 1" (89x146x25mm)	each

► Embedding Blocks

- Precisely machined from hard phenolic resin.
- The faces of the embedding blocks are cut very deeply providing a firm hold of the embedded specimen.
- Suitable for cellodin or paraffin sections.



Available in four sizes.

62363-01	Embedding Block, 19x19x19mm High	each
62363-02	Embedding Block, 25x25x19mm High	each
62363-03	Embedding Block, 38x38x19mm High	each
62363-04	Embedding Block, 51x51x19mm High	each

▶ Coverslip Tape Knives

Coverslip Machine Tape
Cutting Knives



65005-50 Coverslip Tape Knives 5/pk

Glass knife strips, see Specimen Preparation section, page 255 >>>>

▶ Tissue Capture Pen



With one swift application of the EMS Tissue Capture Pen, you are able to change your plain glass slide into a coated one.

The EMS Tissue Capture Pen is a coating pen with a wide point (18mm) for fixing various tissue sections (paraffin embedded, frozen and formalin sections, etc.) The unique pen is unaffected by heat up to 120°C so it offers secure and firm adhesion of the tissue section. It may be used in Microwave staining, immunostaining, in situ etc. . . .

One application is all that is needed, and after it is applied, allow to dry for 1-2 minutes. The EMS Tissue Capture may be used in conjunction with our Pap-Pen (71310) and will allow for easy placement of adherent as well as non-adherent cells on a glass slide. Immunostaining/ISH can be performed by applying a few drops of tissue suspension or liquid media onto the glass slide which is circled by the Pap-Pen, and then your section can be placed.

71314-10 EMS Tissue Capture Pen each

▶ Liquid Blocker-Super PAP PEN

The Newest Staining Guard Pen



New and improved... The Super PAP PEN outperforms the original PAP Pen. The Super PAP PEN may be used at temperatures as high as 120°F. (The old style PAP PEN worked only up to 90°F). With this high temperature feature, one can now use the Super PAP PEN to perform the peroxidase method, ABC method, and Fluorescent antibodies method with satisfactory results.

71310 Super PAP PEN, Large each
71312 Super PAP PEN, Small each

▶ Slide Coating Adhesive

EMS EXCLUSIVE Prepared from 3-aminopropyltriethoxysilane in acetone. Good for coating glass slides to adhere paraffin sections for further processing without sections falling off from the slide. **READY TO USE.**

71302 Slide Coating Adhesive 100ml



For Our Biobond, Tissue Sectioning Adhesive, see page 9 >>>>

▶ Fro-Marker

A wide tipped pen designed for use with frozen sections. The pen provides a sticky membrane which when applied to the slide and onto which the section is placed it eliminates the section from falling off, moving, or wrinkling on the slide during immunostaining procedures. The membrane is stable up to 110°C and is suitable for vigorous applications such as in-situ hybridization.



71313-10 Fro-Marker each

▶ Aqua-Hold Pap Pen

The Aqua-Hold Pap Pen draws a liquid repellent barrier around a section of tissue. Used like a paint



pen, you just draw a well on a slide. The barrier creates the proper surface tension to hold aqueous solutions such as costly antibody and other valuable specimens. After application, the barrier material is insoluble in alcohol and acetone but can be removed after staining with xylene. Each pen holds 13ml of long-lasting material, making hundreds of wells. Red tint distinguishes the well drawing on the slide to easily view.

71311 Aqua-Hold Pen each

▶ Para-Marker

A wide tipped pen, designed for use with paraffin sections. Provides a sticky membrane to the glass slide which not only prevents paraffin sections from falling off but also keeps the sections flat on the slide.



71313-20 Para-Marker each

► Tissue-Tek® SmartWrite Color Slide Printer

On-Demand Color Slide Printing is what you get with this unit

Features and Benefits

- High resolution color printing - reduces need for managing multiple color slide inventory, lowering costs
- On-demand slide printing - streamlines workflow and reduces specimen identification errors
- Small footprint - fits perfectly on a microtome work station or next to a cytology slide processor
- Prints directly onto slides - eliminates errors from hand writing and label application
- Scannable 2D and 1D bar code, alphanumeric and graphic printing capabilities — optimizes flexibility for now and in the future
- Optional SmartWrite™ Software - provides configurable label design and is interfaceable to LIS systems
- Print resistant to Xylene, alcohol, histology reagents, stains, heat, and chemicals*. Ensures reliable identification of slides now and in the future

Applications

- On demand slide printing - color or black labels printed directly onto slides



Specifications

Electrical	
Power	AC100–240VAC, 50/60 Hz, 60 watts
Environmental	
Operational Ambient Temp.	10 - 40 degrees C (50 - 105 F)
Operational Relative Humidity	30 - 85% (non-condensing)
Storage Ambient Temp.	-10 - 60 degrees C (14 - 140 F)
Storage Relative Humidity	10 - 85% (non-condensing)
Physical	
Height	8.6" (218.4mm)
Width	7.08" (179.8mm)
Depth	12.58" (319.5mm)
Weight	16.8 lbs. (7.62 kg)
User Interface	
Power Button	One power switch with LED indicator, located on the upper right side of the control panel on the front of the instrument
Slide Feed Button	One button with LED indicator located on the upper right side of the control panel on the front of the instrument beneath the power button
Lid Open Button	One button located on the upper left side of the instrument
Blue Slide	Illuminates blue slide holder indicating

Holder Light	Proper loading
Diagnostic Function	Self diagnosis, error messages and codes
Functional Printing Technology	Thermal transfer
Print Speed	Up to 9 slides/minute (monochrome) Up to 5 slides/minute (solid colors) Up to 4 slides/minute (blended colors)
Print Resolution	300 dpi
Ink Type	Resin thermal transfer
Ribbon Types	CMYK: 1000 prints; Black: 5000 prints
Printable Colors	Multiple solid colors; others available via software
Slide Types	3" x 1" standard or positive charged, smooth surface white frosted end, clipped corners
Slide Capacity	100 slides - Blue Slide Holder
Output Tray Capacity	15 slides
Construction	Steel frame with powder-coated steel and plastic covers
Data Interface	USB 2.0
Printer Drivers	Windows™ XP/Vista/7
Warranty	One year parts and labor

Applications
On demand slide printing — color or black labels printed directly onto slides

Standard Accessories

- One Operating Manual
- One Quickstart Guide
- One Printer Driver
- One Blue Slide Holder
- One Black Print Cartridge
- One Color Print Cartridge
- One Print Head Cleaning Pen
- One USB Cable
- One Power Cord
- One Power Converter

Optional Accessories

- 2D Bar Code Scanner with Stand
- Tissue-Tek® SmartWrite™ Software
- Touch Screen PC
- Blue Slide Holder one
- Black Print Cartridge 6/case
- Color Print Cartridge 6/case

Ordering Information

Cat. #	Description	Qty.
65455	Slide Printer	each
65456	Scanner With Stand	each
65457	SmartWrite Software	each
65458	PC with touchstone, mouse and keyboard	each
65459	Slide Holder, Blue	each
65455-BL	Print Cartridge, Black	6/case
65455-CO	Print Cartridge, Color	6/case

* CAUTION: Contact with the Tissue-Tek® SmartWrite™ color printed label while wet with organic solvents will result in loss of printed information

► **Optional Accessories for Tissue Tek SmartWrite™**

Shuttle® Computer X50V2 PLUS Touch Screen PC

Specifications

RAM	1GB PC3-10600 1333MHZ DDR3 SODIMM NON-ECC	Power	40W Power Adapter. Input: 100- 240V AC
Hard Drive	250GB SATA 5400 RPM 8MB 2.5"	LCD Panel	15.6" 16:9 Wide Panel, 1366 x 768 pixels
OS Windows®	7 Home Premium 32 BIT. Includes: Windows®7 Home Premium 32 BIT Recovery DVD	Touch Screen	Single Touch
Form Factor	All-in-one PC	Web Cam	1.3M Pixel
Net Weight	3.6kg	MIC	Electret Condenser Microphone
Dimension	(W) 15.4" x (H) 12.8" x (D) 1.4"	Left Side	Power-on button, Stylus pen port, USB port x 2, DC-input for power supply
Processor	Intel® Atom™ D510 Dual Core CPU (1,66 GHz). CPU on board	Right Side	4 in 1 Card reader, USB port x 2, Headphone, Mic, LAN port
Memory	2 Slot (Supports up to 4 GB DDRII, Max 2 x 2GB)	Back Panel	D-sub port x 1, Serial port x 2 (optional), Parallel port x 1 (optional), Kensington lock
Chipset	NM10	Audio	IDT92HD81 2 Channel High, 2W x 2 Stereo speaker
VGA	Intel® GMA 3150 with a powerful 400MHz core. Dynamic Video Memory Technology (DVM) 4.0. Intel® ClearVideo Technology	Accessories	Quick Guide x 1, 65W Power Adapter x 1, power cord x 1, Driver CD x 1
Ethernet	JMC261 IEEE 802.3u 100Base-T specification compliant. 10MB/s,100MB/s. Support Wake-On-LAN function	Wireless LAN	IEEE 802.11b/g/n
Storage Interface Support	2.5" Hard Drive	Card Reader	4 in 1 Card Reader (support SD/MMC/MS/MS-pro)
		Software	Shuttle Control AP

DataLogic® Gryphon™ GD4430-HCK1 2D Barcode Scanner

Specifications

Decoding Capabilities

1D	Linear Codes Autodiscriminates all standard 1D codes including GS1, DataBar™ linear codes
2D	Aztec Code; China Han Xin Code; Data Matrix; MaxiCode; QR Code

Electrical

Current	Operating (Typical)160 mA @ 5 VDC; Standby/Idle (Typical): 65 mA @ 5 VDC
Input Voltage	4.2 - 5.25 VDC

Reading Ranges

Typical Depth of Field	Minimum distance determined by symbol length and scan angle. Printing resolution, contrast, and ambient light dependent.
Code 39	5 mils: 4.0 to 19.0 cm / 1.6 to 7.5 in
Code 39	10 mils: 1.0 to 30.0 cm / 0.4 to 11.8 in
Data Matrix	10 mils: 2.0 to 16.0 cm / 0.8 to 6.3 in
Data Matrix	15 mils: 0 to 23.6 cm / 0 to 9.3 in
EAN-13	13 mils: 1.5 to 40.0 cm / 0.6 to 15.7 in
PDF417	10 mils: 0.5 to 22.0 cm / 0.2 to 8.6 in
QR Code	10 mils: 3.0 to 12.5 cm / 1.2 to 4.9 in

Reading Performance

Image Capture	Graphic Formats: BMP, JPEG, TIFF; Greyscale: 256, 16, 2
Image Sensor	Wide VGA: 752 x 480 pixels
Light Source Aiming	650 nm VLD
Motion Tolerance	25 IPS
Print Contrast	25% Ratio (Min.)
Reading Angle Pitch	+/- 40°; Roll (Tilt): 180°; Skew (Yaw): +/- 40°
Reading Indicators	Beeper (Adjustable Tone); DataLogic 'Green Spot' Good Read Feedback; Good Read LED
Resolution (Max.)	1D Linear: 0.102 mm/4 mils; Data Matrix: 0.178 mm/7 mils; PDF417: 0.102 mm/4 mils

Special

Disinfectant-Ready enclosures treated with anti-microbial additives; Highly visible 4-Dot aimer with center cross for targeted scanning

Electron Microscopy Sciences Announces their State of the Art
Scientific Equipment Repair Center



No equipment is too small or impossible to either
Repair, Refurbish, or Upgrade!

Our facility is equipped to handle the following Manufacturers:

- Balzers/Baltech
- Leica
- Denton
- Reichert-Jung
- Edwards
- LKB
- Emitech
- RMC-Boeckeler
- Emscope
- And Many More...
- Bio-Rad

Our unique service allows us to come to you, or you send the equipment to us, depending on the level of Repair/Refurbishment needed.

Equipment such as:

- Vacuum Systems
- Lynx
- Microtomes
- Freeze Fracture Instruments
- Ultramicrotomes
- High Pressure Freezers/ Slammers/ Propane Jet Freezers
- Tissue Slicers
- Vibratomes
- Ovens
- Shakers
- Baths
- Tissue Processors
- And Much More...

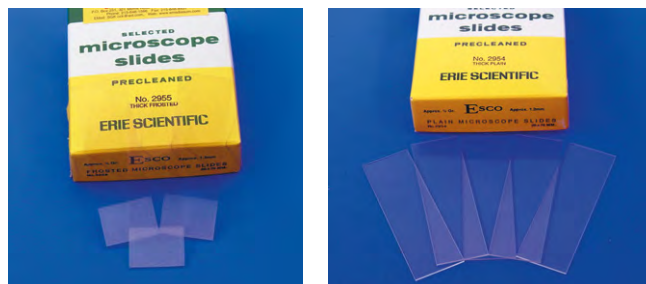
For more information on any of our services, a comprehensive quote, please call, write, or e-mail us today.

► Microscope Glass Slides -Esco

Our microscope glass slides are manufactured by Esco - Erie Scientific Co, where reliability and quality are recognized to be the best.

- Made from the highest quality glass sheets; white glass.
- The dimensions of the slides have been standardized to millimeters according to the U.S. Government Specifications.
- They are packed with care to assure cleanliness.
- The glass is fully annealed to minimize chipping.

Our microscope glass slides are precleaned and are made from clear-white glass. They are individually inspected and free from moisture, dirt, and film. All of our slides are flat, uniform and durable. They are packed 72 slides/box and cellophane wrapped.



Microscope Slide Specifications: Soda Lime Glass

Chemical Makeup	Green (%)	White (%)
Silicon Dioxide	72.2	72.15
Sodium Oxide	14.5	14.25
Calcium Oxide	6.5	6.25
Magnesium Oxide	4.4	4.1
Aluminum Oxide	1.5	1.12
Potassium Oxide	0.3	1.15
Sulfur Trioxide	0.3	0.3
Iron Oxide	0.1	0.3
Titanium Oxide	0.05	0.05

Physical Properties:

Glass Density:	2.4024g/cm ³
Softening Point:	724°C
Annealing Point:	545°C
Strain Point:	511°C
Dispersion Value (Nu Value):	.64
Dimensional Variance:	±1.5000
Thermal Expansion:	(0 -300°C) 8.36x10 ⁻⁶ /°C
Dielectric Constant:	@20°C (68°F) (1MHz):ET =6.7
Young's Modulus:	E = 10,000,000 lbs/sq"
Torsion Modulus:	G = 4,000,000 lbs/sq"
Poisson's Ratio:	μ = 0.2
Luminous Transmittance:	@ 0.040: 91.8%
Refractive Index:	1.517 @ 546.07 nm wavelengths

► 1. Microscope Slide, Plain End

Cat.#	Thickness	Size,mm	Pack
71880-01	1.2 mm	25x75	Gross
71880-10	1.2 mm	25x75	10 Gross
71880-20	1.2 mm	25x75	20 Gross

► 2. Microscope Slide, Frosted End

These slides have 3/4" sandblasted frosting on one end which allows for easy marking.

Cat.#	Thickness	Size,mm	Pack
71870-01	1.2 mm	25x75	Gross
71870-10	1.2 mm	25x75	10 Gross
71870-20	1.2 mm	25x75	20 Gross

► 3. Microscope Slide, SUPERFROST® End

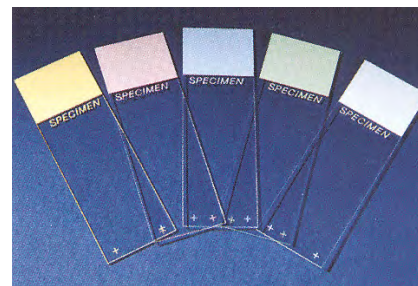
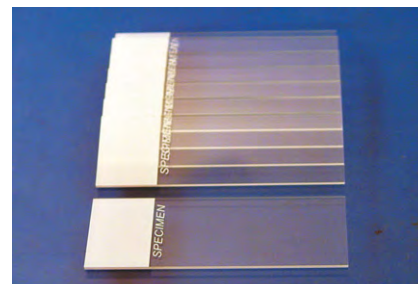
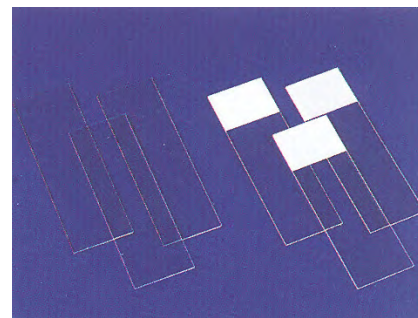
With a superfrosted end. These slides have one side which is frosted with a brilliant white opaque coating that will take and retain all pen markings. They offer superior readability and they are permanent.

Cat.#	Thickness	Size,mm	Pack
71867-01	1 mm	25x75	Gross
71867-10	1 mm	25x75	10 Gross
71868-01	1.2 mm	25x75	Gross
71868-10	1.2 mm	25x75	10 Gross

► 4. Microscope Slide, SUPERFROST® PLUS - Adhesion Slide

These Superfrost Plus(+) glass slides are made by a new process offering the following features:

- They place a permanent positive charge in the microscope slide.
- They electrostatically attract frozen tissue sections and cytology preparations, binding them to the slide.
- They form a bridge so that covalent bonds develop between formalin fixed sections and the glass.
- Tissue sections and cytological preparations adhere better to the Plus glass slides without the need for special adhesives or protein coatings.



continued >>>>

➤ **Microscope Glass Slides -Esco (continued)**

➤ **4. Microscope Slide, SUPERFROST® PLUS - Adhesion Slide (continued)**

BENEFITS:

- Plus glass puts an end to background staining.
- It eliminates blue or red background staining which is often encountered in hematoxylin and eosin staining of tissue sections mounted on albuminized glass.
- No brown background staining occurs when immuno-peroxidase or in situ DNA procedures are performed on our Plus glass. A higher degree of enzyme digestion can be performed on plus glass without the loss of tissue sections.
- Cytological preparations placed on Plus glass resist cell loss during enzyme digestion, DNA denaturation and RNA hybridization.
- Plus glass improves tissue adherence in microwave staining.
- Chromic acid washes are redundant for molecular hybridization because the slides are RNAse-free.
- Plus slides are Color coded to help keep track of specimens during processing as well as filing.

The slides measure: 25x75 mm, 1 mm thick.

71869-10	Superfrost Plus Slide, White	1 gross	71869-31	Superfrost Plus Slide, Green	10 gross
71869-11	Superfrost Plus Slide, White	10 gross	71869-40	Superfrost Plus Slide, Pink	1 gross
71869-20	Superfrost Plus Slide, Blue	1 gross	71869-41	Superfrost Plus Slide, Pink	10 gross
71869-21	Superfrost Plus Slide, Blue	10 gross	71869-50	Superfrost Plus Slide, Yellow	1 gross
71869-30	Superfrost Plus Slide, Green	1 gross	71869-51	Superfrost Plus Slide, Yellow	10 gross



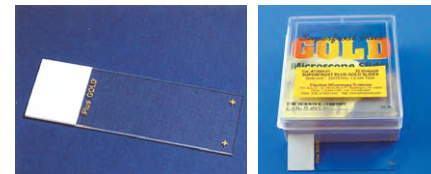
➤ **5. Superfrost® Plus Gold Slides**

These slides are specially designed for the application of fresh or formalin fixed frozen tissue. They are inherently tissue binding so there is no need to add sprays or adhesives to the slides.

FEATURES:

- Securely attach frozen breast, brain, skin and other normally difficult to bond tissue sections to the slide.
- Ideal when special stains, immunocytochemical and in situ DNA hybridization techniques are applied on fresh and fixed frozen tissue.
- Assist tissue adherence during immunocytochemical analysis of estrogen and progesterone receptors in fresh frozen breast tissue.
- They are compatible with both toluidine blue and hematoxylin and eosin rapid frozen section stains.

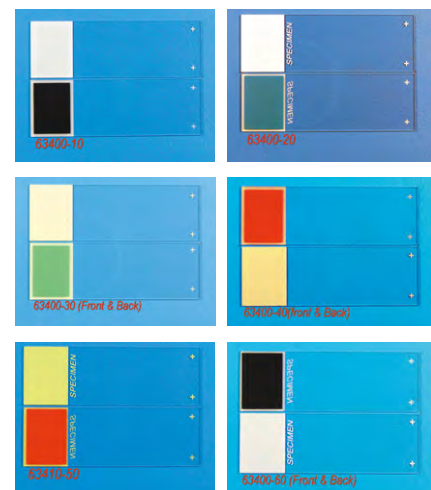
71864-01	Superfrost Plus Gold Slide	25 bx
71864-10	Superfrost Plus Gold Slide	10 cs



➤ **6. Colormark™ Plus Glass Slide**

Specimen Slide identification is VITAL. Automated etched slide labeling instruments ensure specimen slide integrity but are difficult to read on ordinary slides. To clearly read diamond scribed slide labels against any surface, you need the only slide designed to be used with your automated slide labeling instrument. You need COLORMARK slides. These brightly printed slides greatly improve etched labeling visibility and offer all the advantages of Superfrost® slides. A bright contrasting color has been printed on the back of the Superfrost end so that patient or specimen information etched through the painted end on the front is clearly visible. Colormark Plus slides are adhesive coated therefore ensuring the adhesion of the section to the slide during staining procedures.

63400-10	White Frosted End Front, Black frosted End Back	1 gross
63400-11	White Frosted End Front, Black frosted End Back	10 gross
63400-20	Blue Frosted End Front, Blue Frosted End Back	1 gross
63400-21	Blue Frosted End Front, Blue Frosted End Back	10 gross
63400-30	Green Frosted End Front, Green Frosted End Back	1 gross
63400-31	Green Frosted End Front, Green Frosted End Back	10 gross
63400-40	Pink Frosted End Front, Red Frosted End Back	1 gross
63400-41	Pink Frosted End Front, Red Frosted End Back	10 gross
63400-50	Yellow Frosted End Front, Red Frosted End Back	1 gross
63400-51	Yellow Frosted End Front, Red Frosted End Back	10 gross
63400-60	Lavender Frosted End Front, Black Frosted End Back	1 gross
63400-61	Lavender Frosted End Front, Black Frosted End Back	10 gross



continued >>>>

➤ Microscope Glass Slides -Esco (continued)

➤ 7. Control Slides

Use our Histology Control Slides and you will always know for sure which specimen is the Patients and which is the Control.

- Patient and Control tissue samples on the same slide.
- Positive identification of control and patient samples.
- Utmost adhesion of samples to slide throughout staining procedure.
- Proof of correct staining procedures.
- Easy and permanent identification of slides.

Available in two configurations: Style #329+ with 3/4 inch of frosted area; style 334+ with 1 inch frosted area.

63448-10	Control Slide 329+	144/pk
63448-20	Control Slide 334+	144/pk



➤ 8. Special Glass Slides:

➤ A. Cytology Slide: 1x3" (25x75mm), 1mm Thick

- Superfrost letters VCE and lines on the same side as the Superfrost end.

71874-01	Cyto-Slide Letters VCE & Lines	1 gross
71874-10	Cyto-Slide Letters VCE & Lines	10 gross

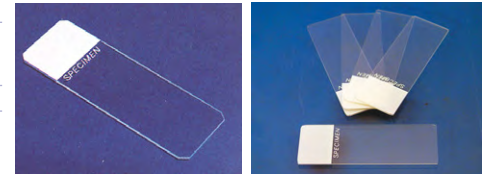
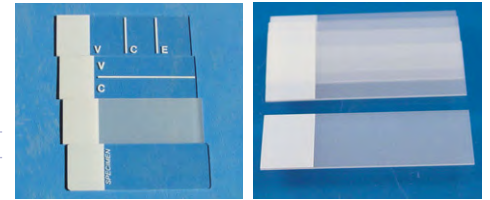
- Superfrost letters VC and lines on the same side as the Superfrost end.

71875-01	Cyto-Slide Letters VC & Lines	1 gross
71875-10	Cyto-Slide Letters VC & Lines	10 gross

- Dakin - A fully frosted sandblasted surface on the same side as the Superfrosted end.

71876-01	Dakin - Fully Frosted Slide	1 gross
71876-10	Dakin - Fully Frosted Slide	10 gross

- B. Round Corner Microslides: This item is discontinued. Please see SuperFrost™ Clipped Corner Slide, #s 71882-01 and 71882-10 below.



- C. Concavity Slides Polished spherical depression. Useful for tissue cultures.

Measurements:

Glass Slide Size:26mm x 76mm
 Concavity Diameter:15 - 18 mm
 Depth of Well:0.5 - 0.8 mm

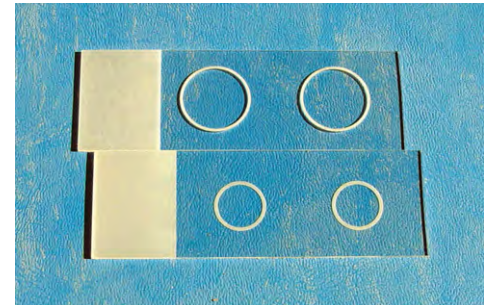
Cat.#	Thickness	No. Wells	Pack
71878-01	1.4-1.6mm	1	12/pk
71878-03	1.4-1.6mm	2	12/pk
71878-04	1.4-1.6mm	3	12/pk
71878-05	1.95-2.35mm	1	12/pk
71878-06	1.95-2.35mm	2	12/pk
71878-07	3.12-3.22mm	1	12/pk
71878-08	3.12-3.22mm	2	12/pk



➤ D. Slides with Etched Rings

Useful for Fluorescent Antibody Examination. The size of the slide is 3"x1", approximately 1 mm thick, with an etched frosted end. Pre-cleaned. Packed 72/bx.

71879-10	Two Etched 10mm Circle Slide	1 gross
71879-11	Two Etched 10mm Circle Slide	10 gross
71879-15	Two Etched 15mm Circle Slide	1 gross
71879-16	Two Etched 15mm Circle Slide	10 gross



➤ 9. SuperFrost™ Clipped Corner Slide

Designed specially for the Sysmex SP-100 slide prep unit and recommended for the Diagnostics. The 45 degree clipped corner slide offers exceptional cleanliness and resistance to sticking. The tight tolerances for the length and width help to reduce accumulation of glass chips within the instrument. The pre-cleaned slide is 25 x 75mm and approximately 1 mm thick.

Ideal for technicians, who routinely prepare large number of slides.

Cat.#	Description	Qty
71882-01	SuperFrost™ Clipped Corner Slide	1 gross
71882-10	SuperFrost™ Clipped Corner Slide	10 gross



► Microscope Slide – Gold Seal®

In our line of slides we proudly introduce GOLD SEAL® microscope slides for your convenience. GOLDSEAL® slides are made from pure white glass (soda-lime) and at accurately cut sizes. To preserve the highest quality from manufacturer to ultimate user, all GOLD SEAL® slides are hermetically sealed in our Moisture-Barrier™ system, providing a dry-slide environments during shipment and storage.

UltraStick™ (adhesion coating: APTES, 3-Aminopropyl Triethoxysilane)– Adhesion coated micro slides- one of the best from GOLD SEAL®- are ideal for histological and cytological applications demanding superior specimen-to-slide adhesion. The enhanced silane coating eliminates tedious procedures and special additives to your water bath. Procedures such as immunoperoxidase, in situ DNA hybridization, enzyme digestion and frozen tissue processing will benefit from the amplified adhesion characteristics of this product. Overall cost savings and assured quality of your prepared specimen will be recognized with UltraStick™ from Gold Seal®



Cat.#	Gold Seal	Description	Pack
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Plain Slides

63710-05	3010	3 x 1", 1 mm Thick	1 gross
63710-25	3010	3 x 1", 1 mm Thick	25 gross
63711-05	3048	3 x 1", 1.2 mm Thick	1 gross
63711-25	3048	3 x 1", 1.2 mm Thick	25 gross
63712-05	3010-P	3 x 1", 1mm Thick – Cytogenetics processing	1 gross
63712-25	3010-P	3 x 1", 1mm Thick – Cytogenetics processing	25 gross

Patented Moistur-Barrier™ enclosing 5 gross inner packages

63718-05	3054	25 x 75mm, 1mm Thick, Plain	5 gross
63718-25	3054	25 x 75mm, 1mm Thick, Plain	25 gross
63719-05	3055	25 x 75mm, 1mm Thick, White Rite-On™ Frost	5 gross
63719-25	3055	25 x 75mm, 1mm Thick, White Rite-On™ Frost	25 gross

Rite-On™ Frosted Slides with brilliant white epoxy ink

63720-05	3051	3 x 1", 1mm Thick, Frosted One End, One Side	1 gross
63720-25	3051	3 x 1", 1mm Thick, Frosted One End, One Side	25 gross
63721-05	3050	25 x 75mm, 1mm Thick, Frosted One End, One Side	1 gross
63721-25	3050	25 x 75mm, 1mm Thick, Frosted One End, One Side	25 gross
63722-05	3050-P	25 x 75mm, 1mm Thick, Frosted End, One Side, Cytogenetics Processing	1 gross
63722-25	3050-P	25 x 75mm, 1mm Thick, Frosted End, One Side, Cytogenetics Processing	25 gross
63723-05	3049	3 x 1", 1.2mm Thick, Frosted One End, One Side	1 gross
63723-25	3049	3 x 1", 1.2mm Thick, Frosted One End, One Side	25 gross

UltraFrost™ Frosted Slides, white epoxy ink frosted one end, one side

63728-05	3063	25 x 75mm, 1mm Thick, Frosted one End with Gold Seal Logo	1 gross
63728-25	3063	25 x 75mm, 1mm Thick, Frosted one End with Gold Seal Logo	25 gross
63729-05	3064	25 x 75mm, 1mm Thick, Frosted one End with Pre-Print Patient Information Label and Gold Seal® Logo	1 gross
63729-25	3064	25 x 75mm, 1mm Thick, Frosted one End with Pre-Print Patient Information Label and Gold Seal® Logo	25 gross

Fluorescent Antibody Slides

63732-05	3032	3 x 1", 1.2mm Thick with Two 10mm diameter circles, Frosted one Side, one End with White Epoxy Ink, including Circles	1 gross
63732-02	3032	3 x 1", 1.2mm Thick with Two 10mm diameter circles, Frosted one Side, one End with White Epoxy Ink, including Circles	25 gross

UltraStick™/UltraFrost™ Adhesion Slides on frosted one end, one side with epoxy ink

63734-01	3039	25 x 75mm, 1mm Thick, Surface Coated with APTES for Adhesion	1 gross
63734-10	3039	25 x 75mm, 1mm Thick, Surface Coated with APTES for Adhesion	10 gross

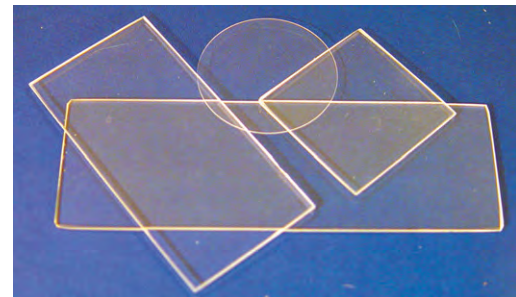
► Large Glass Slides



In addition to our comprehensive collection of glass slides manufactured by ESCO we now carry large glass slides which are available in 75x38mm and 75x51mm. These slides are precleaned, individually selected and are suitable for large specimen sections such as, brain tissue.

71860-01	75x38mm Glass Slide, 1mm Thick	1 gross/pk
71862-01	75x51mm Glass Slide, 1.2mm Thick	1 gross/pk

► Quartz Microscope Slides



There are many applications that require slides that have absolute UV transparency and high temperature properties. EMS now is introducing the highest quality, clear fused quartz microscope slides to meet all of these requirements.

- The window of highest transparency to UV is between 0.15µ to 5µ.
- Typical flatness measured 2" to 4" bands per inch.
- Soften point is about 1250°C (2282°F).
- Standard microscope slide thickness is 1mm.

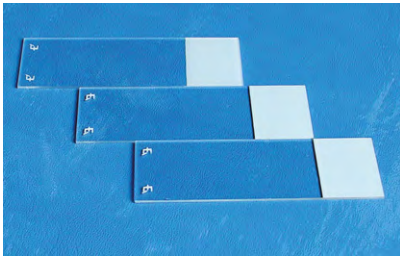
Cat.#	Description	Pack
72250-01	Slide, 1" x 1" (25 x 25 mm)	each
72250-02	Slide, 2" x 1" (50 x 25 mm)	each
72250-03	Slide, 3" x 1" (75 x 25 mm)	each
72250-04	Slide, 2" x 3" (50 x 76 mm)	each
72250-05	Slide, 10mm x 10 mm	each

These slides have all of the same properties of the ones above with the only difference is these are 0.5mm thick:

72250-06	1" x 1" (25x25mm)	each
72250-07	1" x 2" (25 x 50mm)	each
72250-08	1" x 3" (25x76mm)	each

For Quartz Coverslips, see page 569 >>>>

► Excell™ Adhesion Slides



The Excell slide was developed with superior adhesion and wettability properties, and has been shown to perform very well in most applications.

■ **Excell™ Adhesion Surface for Heat Induced Epitope Retrieval** – Excell™ was developed for use in the HIER methods that require high pH antigen retrieval solutions, including EDTA. Formalin fixed paraffin embedded tissue demonstrated more consistent attachment when performing these procedures on the Excell™ surface.

■ **Automated Staining** – Excell™ has a uniform hydrophilic surface that works extremely well with automated staining equipment.

■ **Cell Culture** – Excell™ surface technology conditions the surface to enhance the attachment of anchorage dependent cell lines, including many fastidious lines, such as primary neuronal cells. Attachment and proliferation is increased so cells achieve a confluent monolayer sooner

■ **Plastic** – Excell™ works well for both Epon and Methyl Methacrylate sections. Its uniformly hydrophilic surface allows the sections to spread well during initial attachment. Section adherence is maintained throughout lengthy staining procedure.

■ **Laser Capture Microdissection** – Excell™ gives you the advantage of excellent tissue adherence of all tissue types, yet it easily releases those area of interest identified for Laser Capture Microdissection.

Cat.#	Description	Qty
64370-01	Excell™ Adhesion Slide	144/pk

► Retriever Tissue Slides

Retriever Tissue Slides are high adhesive glass microscope slides for paraffin-embedded tissue section, including tissue arrays. The slides were designed and optimized for the EMS Antigen Retriever (62700 series) to preserve the section attachment and tissue morphology during heat-induced epitope recovery in Retriever in pH6 (Low), pH9 (High), or Universal Retriever buffer.

Slides can also be successfully used in any other epitope-recovery technology (autoclave, microwave, proteolytic) and show superior performance over positively charged or polylysine-coated slides, especially in high pH buffers and recovery buffers containing EDTA.

Cat.#	Description	Qty
71880-50	Retriever Tissue Slides	72/pk

► Adhesion Slide – TruBond™

Adhesive slides with proven performance under high temperature and pH conditions

These adhesive, including the hydrophilic TruBond™ 360, slides work well with automatic IHC applications. EMS is confident that the quality of these slides will exceed your expectations. For problems with tissue loss try our TruBond™ 380.

Available colors: White, Blue, Green and Yellow.



	TruBond™ 380	TruBond™ 360	TruBond™ 200	TruView™ Fine
Glass Type	High Clarity, Low Fluorescence White	High Clarity, Low Fluorescence White	High Clarity, Low Fluorescence White	High Clarity, Low Fluorescence White
Surface Wettability	Hydrophilic	Hydrophilic	Hydrophobic	Hydrophilic
Adhesion	Very Strong	Strong	Strong	Good
Edge Treatment	Ground Corner	Ground Corner	Ground Corner	Ground Corner
For Manual IHC	Yes	Yes	Yes	No
For Automatic IHC	Yes	Yes	Yes	No
For Fluorescence	Yes	Yes	Yes	Yes
Recommended Applications	<ul style="list-style-type: none"> ■ HIER processes when tissue type require extra strong adhesion ■ Epitope enhancement & DNA probe procedures ■ Autopsy & brain sectioning 	<ul style="list-style-type: none"> ■ All IHC applications ■ HIER pH 6 & pH 9 protocols ■ Routine histology ■ Frozen section 	<ul style="list-style-type: none"> ■ All IHC applications ■ Routine histology 	<ul style="list-style-type: none"> ■ All standard procedures

TruBond™ is packaged 100 slides per box, 10 boxes to a case.

Cat#	Description	Color	Qty	Cat#	Description	Color	Qty
63700-W1	TruBond™ 380	White	10/bx	63702-W1	TruBond™ 200	White	10/bx
63700-W10			1000/cs	63702-W10			1000/cs
63700-B1	TruBond™ 380	Blue	10/bx	63702-B1	TruBond™ 200	Blue	10/bx
63700-B10			1000/cs	63702-B10			1000/cs
63700-G1	TruBond™ 380	Green	10/bx	63702-G1	TruBond™ 200	Green	10/bx
63700-G10			1000/cs	63702-G10			1000/cs
63700-Y1	TruBond™ 380	Yellow	10/bx	63702-Y1	TruBond™ 200	Yellow	10/bx
63700-Y10			1000/cs	63702-Y10			1000/cs
63701-W1	TruBond™ 360	White	10/bx	63703-W1	TruView™ Fine	White	10/bx
63701-W10			1000/cs	63703-W10			1000/cs
63701-B1	TruBond™ 360	Blue	10/bx	63703-B1	TruView™ Fine	Blue	10/bx
63701-B10			1000/cs	63703-B10			1000/cs
63701-G1	TruBond™ 360	Green	10/bx	63703-G1	TruView™ Fine	Green	10/bx
63701-G10			1000/cs	63703-G10			1000/cs
63701-Y1	TruBond™ 360	Yellow	10/bx	63703-Y1	TruView™ Fine	Yellow	10/bx
63701-Y10			1000/cs	63703-Y10			1000/cs

General Properties

- Retriever Tissue Slides are made from soda lime glass
- Dimensions approximately 76 x 26mm, Thickness 1.0mm.
- 90° ground edges
- Colored or white marking area 20mm, at one end, on one side
- Pre-cleaned, ready for use

- Autoclavable
- Supplied in plastic boxes of 72 pieces (call for carton price, 20 boxes in a carton)
- Carry recommended best before date and batch number for comprehensive information and traceability

For more information on the Retriever, see pages 612-613 >>>>

► Poly-L-Lysine Coated and Silane Treated Microscope Slide

Our premium glass slides with a frosted end are now available pre-coated with either Poly-L-Lysine or Silane (aminoalkylsilane). These slides improve the adhesion of tissues to the slide.



63410-01	Poly-L-Lysine Coated Slides	72/bx
63410-02	Poly-L-Lysine Coated Slides	144/bx
63411-01	Silane Coated Slides	72/bx
63411-02	Silane Coated Slides	144/bx

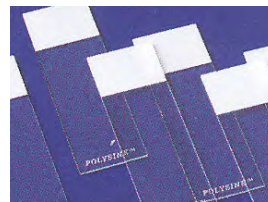
TECHNICAL TIP

Poly-L-Lysine Coating Of Slides

Poly-L-Lysine with a molecular weight greater than 150,000 (150,000-300,000) should be used. To make a stock solution: Take 0.1% Poly-L-Lysine in distilled water and store it in a dispensing vial and freeze it at -20°C. A drop (10-15ml) is dispersed at the end of a clean glass slide and smeared along its length with the end of another clean glass slide in the same way as blood film. Make sure that the film of Poly-L-Lysine is thin enough for interference colors to be seen as it is being smeared. The slide is ready to use within minutes of drying. If the Poly-L-Lysine is properly applied, it will not affect immunostaining, but it may cause precipitation in some silver impregnation methods. Therefore, it should be avoided if immunogold-silver methods are to be used.

► Polysine™ Microscope Adhesion Slide

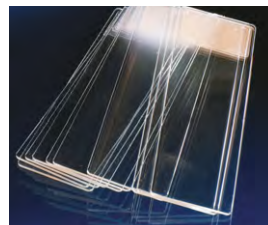
The permanent bio-adhesive material on our Polysine™ slide attracts frozen and paraffin embedded sections, centrifuge preparation and cytology smears.



Cat.#	Description	Qty
63412-01	Polysine™ Adhesion Slide	72/bx
63412-02	Polysine™ Adhesion Slide	2x72/bx

► Permanox™ and Polystyrene Microscope Slides

Permanox™ is a strong, biologically inert material resistant to non-chlorinated hydrocarbons, acetone, and other EM reagents. Permanox™ slides allow you to do cell fixation and staining on the slide; they can be cut with scissors. Permanox™ has not been shown to be autofluorescent. All of the microscope slides are 1" x 3".

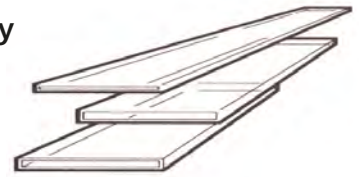


NOTE: Long exposure to solvents will cause the slide to warp. Xylene and Toluene based mounting media should be avoided. Glycerol, gelatin, and other aqueous based media are recommended.

71885	Permanox™ Microscope Slide	20/pk
71886	Permanox™ Microscope Slide	100/pk
71888	Polystyrene Microscope Slide	20/pk
71889	Polystyrene Microscope Slide	100/pk

► Borosilicate Capillary Micro Glass Slide

Made from Corning® 7740 borosilicate, low expansion, type I glass.



Micro glass slides are precision rectangular glass capillary tubes for use in microscopic viewing of liquid samples. Capillary action instantly collects the sample and the thin glass walls minimize evaporation. The design of these cells eliminates the needs for cover glass and the hanging drop method. These micro glass slides can withstand heat up to 500°C. Samples can be retained for future reference by sealing or cementing open ends. Micro glass slide are packaged in plastic vials.

I.D. tolerance ± 10%, Wall tolerance ± 20%

TECHNICAL – CORNING® GLASS 7740

Common Names – Borosilicate, Low Expansion, Type I Glass.

Standards – Type I, Glass A

Borosilicate conforming to federal specification DD-G-541b and ASTM E-438. Also meets the U.S. Pharmacopodia specs for Type I Borosilicate Glass.

Composition:	% Approximate
SiO ₂	80.6
B ₂ O ₃	10
Na ₂ O	4.0
Al ₂ O ₃	2.3
Misc. Traces	0.1

Properties:

Coeff. Of Exp.	32.5 x 10 ⁻⁷ cm/cm/°C
Strain Point	510 °C
Anneal Point	560 °C
Softening Point	821 °C
Density	2.23 g/cm ³
Youngs Mod	6.4 x 10 ³ Kg/mm ²
Refract Index	1.74 @ Sodium D Line
Temp Limits	490°C (Extreme service)
	230°C (Normal Service)
Max. Thermal Shock	160 °C

Cat. #	Dimensions		Wall Thickness	Length mm	Qty.
	Path x Width	ID. mm			
Standard Micro Glass Slides					
63820-05	0.02 x 0.2	0.020	50	30/vial	
63820-10	0.02 x 0.2	0.020	100	30/vial	
63821-05	0.03 x 0.3	0.025	50	33/vial	
63821-10	0.03 x 0.3	0.025	100	33/vial	
63822-05	0.04 x 0.4	0.030	50	36/vial	
63822-10	0.04 x 0.4	0.030	100	36/vial	
63823-05	0.05 x 0.5	0.040	50	44/vial	
63823-10	0.05 x 0.5	0.040	100	44/vial	
63824-05	0.10 x 1.0	0.090	50	40/vial	
63824-10	0.10 x 1.0	0.090	100	40/vial	
63825-05	0.20 x 2.0	0.150	50	36/vial	
63825-10	0.20 x 2.0	0.150	100	36/vial	
63826-05	0.30 x 3.0	0.300	50	31/vial	
63826-10	0.30 x 3.0	0.300	100	31/vial	
63827-05	0.40 x 4.0	0.400	50	28/vial	
63827-10	0.40 x 4.0	0.400	100	28/vial	
63828-10	0.50 x 5.0	0.300	100	14/vial	
63829-10	0.60 x 6.0	0.400	100	12/vial	
63830-10	0.70 x 7.0	0.460	100	9/vial	
63831-10	0.80 x 8.0	0.540	100	7/vial	
63832-10	0.90 x 9.0	0.600	100	6/vial	
63833-10	1.00 x 10.0	0.670	100	4/vial	
63840-05	0.05 x 1.0	0.030	50	50/vial	
63840-10	0.05 x 1.0	0.030	100	50/vial	
63841-05	0.10 x 2.0	0.100	50	45/vial	
63841-10	0.10 x 2.0	0.100	100	45/vial	
63842-05	0.20 x 4.0	0.150	50	36/vial	
63842-10	0.20 x 4.0	0.150	100	36/vial	
63843-05	0.30 x 6.0	0.300	50	24/vial	
63843-10	0.30 x 6.0	0.300	100	24/vial	
63844-05	0.40 x 8.0	0.400	50	18/vial	
63844-10	0.40 x 8.0	0.400	100	18/vial	

► BrightSlide™ D and BrightSlide™ DB

Fluorescence Enhancing Slides and Versatile, (bio)-functionalized coatings for Glass, Metal Oxides and ITO

Fluorescence Enhancing Slide

Fluorescence systems (e.g. microscopes) are today widely used in the life science research. For many applications an increased sensitivity compared to existing glass slides is required. The BrightSlide™ technology uses a proprietary dielectric coating to significantly enhance the signal intensity of fluorescence molecules from the surface. It can be read out with all systems that illuminate and detect from the top. The technology makes use of purely optical principles and substitutes conventional glass substrates.

The BrightSlide™ D (Dielectric) provides a bare SiO₂ surface.

Benefits

- Better signal to noise ratio
- Less sample material can be used
- More genes can be detected
- Existing instrument platform can be used
- Purely optical amplification of fluorescence signal
- Dielectric, high quality SiO₂ surface ready to apply AziGrip4™ or customer bio-functional coating (use your own bio-functional coating, no change of chemical protocol required)

Applications

- Universal detection platform for fluorescence detection on planar surfaces, e.g. fluorescence detection of ultra thin samples
- Differential gene expression using Cy3 and Cy5 labels simultaneously
- Gene expression using Cy3 or Cy5 labels independently

The BrightSlide™ D (Dielectric) comes standard as a bare SiO₂ Surface. However you may also have the slide with the Biofunctional coating (AziGrip4™)

The following is the standard configurations of the slides

1. BrightSlide™ D

Specification

Fluorescence Enhancing Slide optimized for 488nm and 590nm excitation wavelengths (other wavelengths on request)

Both polarizations (s and p-polarization) can be used for excitation and emission

0° - 3° angle of incidence for excitation light

Ultralow fluorescence background

Durable and chemically resistant label with a unique serial number

Suitable for most of commercially available fluorescence microscopes with illumination and detection from the top

Substrate material

D263T eco (other materials on request)

Substrate format

75 ±0.05mm x 25 ±0.05mm x 1.1 ±0.1mm (other formats on request)



Active area

63mm x 22mm

Cosmetic

5/2x0.4; C2x0.4; E1.0 according to DIN ISO 10110

Chemical composition of the top surface

Clean, dielectric, SiO₂ surface (ITO and/or AziGrip4™ bio-functional coating on request)

Environmental stability

Stable against temperatures up to 200°C
All strongly oxidizing cleaning protocols can be used
All organic solvents can be used
Chemical reagents which etch SiO₂ (HF, NaOH, KOH) can destroy the enhancement effect of the BrightSlide™

Storage

Store in clean environment at room temperature

2. BrightSlide™ DB

Specification

Fluorescence Enhancing Slide with Bio-functional coating on the top

Suitable for most of commercially available fluorescence microscopes with illumination and detection from the top

Versatile, (bio)-functionalized coatings for Glass, Metal Oxides and ITO

The AziGrip4™-Bio-functional coating platform is a versatile tool for functionalizing surfaces for Life Science, Fluorescence and Medical Applications. Glass, metal oxides, ITO and plastics can be treated in order to bind different amounts of macromolecules, tune specific cell-adhesion, reduce non-specific binding background, provide better signal-to-noise ratios and patterned surfaces with multi-functionalities.



Benefits

- Provides amino or carboxy functionalized surfaces for high density binding of biomolecules through standard procedures (EDC/NHS)
- Enables direct linking of macromolecules without further functionalization
- Improves adhesion of cells by use of specific binding sequences
- Simplifies depositions of phospholipid by-layers
- Reduces unwanted, non-specific binding to improve signal-to-noise
- Provides patterned surfaces with multi-functionalities

Applications

- Diagnostics
- Bio-analytics
- Lab-on-a-chip
- Fluorescence microscopy
- Cell culture
- Support for lipidic membranes and other emerging application

► BrightSlide™ D and BrightSlide™ DB (continued)

Durable and chemically resistant label with a unique serial number

Optical coating

Optimized for 488nm and 590nm excitation wavelengths (other wavelengths on request)

Both polarizations (s and p-polarization) can be used for excitation and emission

0° - 3° angle of incidence for excitation light

Ultralow fluorescence background

Bio-functional coating

Full surface monolayer with integrated functionality (patterned coating on request)

1-2 nm dry coating thickness

Robust and chemically stable (increased stability in comparison to aminopropylpolysiloxane)

Substrate material

D263T eco (other materials on request)

Substrate format

75 ±0.05mm x 25 ±0.05mm x 1.1 ±0.1mm (other formats on request)

Active area

63mm x 22mm

Optical coating

5/2x0.4; C2x0.4; E1.0 according to DIN ISO 10110

Chemical composition of the top surface

Optical coating

Clean, dielectric, SiO₂ surface (ITO coating on request)

Bio-functional coating

AziGrip4™ with Amine functional group (other AziGrip4™ bio-functional coatings, e.g. brush-like hydrophilic, brush-like non-fouling, hydrogel-like,

with Carboxy, Epoxy, Biotin, NTA, NHS, Cholesterol, ss-DNA or Peptide bio-functionality on request)

Environmental stability (optical coating only)

Stable against temperatures up to 200°C

All strongly oxidizing cleaning protocols can be used

All organic solvents can be used

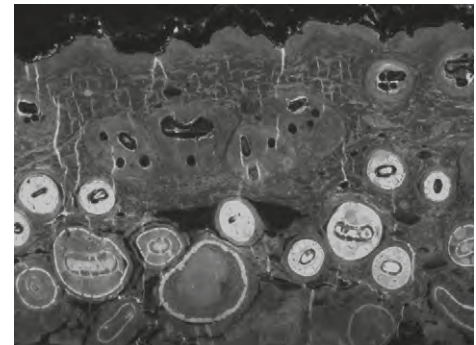
Chemical reagents which etch SiO₂ (HF, NaOH, KOH) can destroy the enhancement effect of the BrightSlide™

Storage

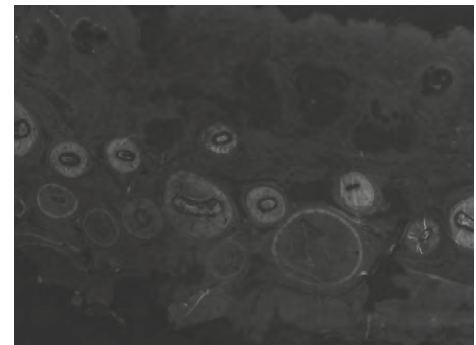
Store in clean environment at room temperature

Technical Data

- Substrate material D263T eco, other materials on request
- Substrate format 75mm x 25mm x 1.1mm, other formats on request
- Active area 63mm x 22mm
- Fluorescence enhancement optimized for one to three customer specific dyes on one slide
- Both polarizations (s and p-polarization) can be used for excitation and emission
- 0° - 3° angle of incidence for excitation light
- Ultralow fluorescence background
- Ultraclean SiO₂ surface
- Laser scribed, durable and chemically resistant label with a unique serial number
- Suitable for most of commercially available fluorescence microscopes with illumination and detection from the top
- Stringent batch to batch reproducibility
- Packed under clean-room (class 100) conditions



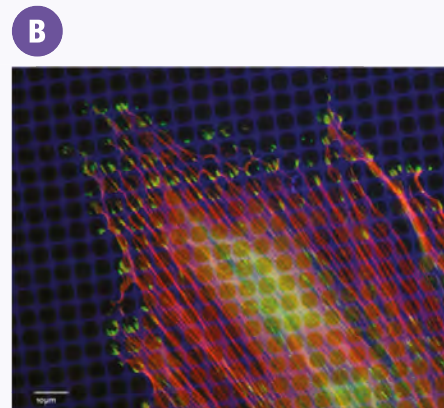
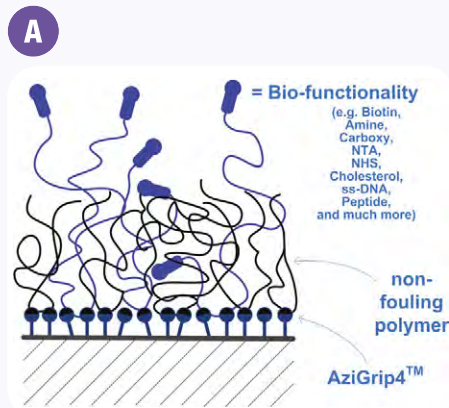
Enhancement of the fluorescence on BrightSlide™ Image of 150nm thick section of biological material using BrightSlide™



Fluorescence signal on standard, glass slide Image of 150nm thick section of biological material using standard, glass slide

Ordering Information

Cat. #	Description	Qty.
63426-D	BrightSlide™D	each
63426-D-10		10/pack
63426-D-100		100/pack
63426-DB	BrightSlide™DB	each
63426-DB-10		10/pack
63426-DB-100		100/pack



A. Sketch of the AziGrip4™ Bio-functional coating Two different polymers (non-fouling and bio-functionalized) are linked to the substrate via the AziGrip4 molecules and form a hydrophilic brush with an end bio-functionalization suitable for use as biosensor, or as specific adhesive site for cell surfaces

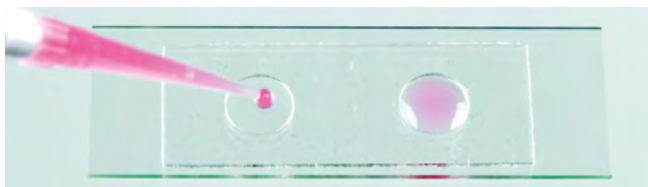
B. Application example: Adhesion sites of Fibroblast grown on 5 x 5 μm adhesive pattern separated by 1 μm Atto633-fluorescently labeled grid.

Courtesy of F. Anderegg, ETH Zurich

AziGrip4™ is a Trademark of SuSOS AG

► Microscope Slide-Wells

Disposable Liquid-Holding Wells



Convenient Pre-cut, twin adhesive well stickers (1cm diameter) firmly adhere to microscope slides. Examine specimens with or without cover slips. Available in depths of 0.25mm and 0.50mm.

Multiple Applications Examine or count tissue culture cells, yeast, bacteria and other microorganisms. Piggy-back with Microscope Slide-Grids to facilitate counting and sizing.

Versatile - Compatible with different styles of microscopes (conventional, inverted or dissecting).

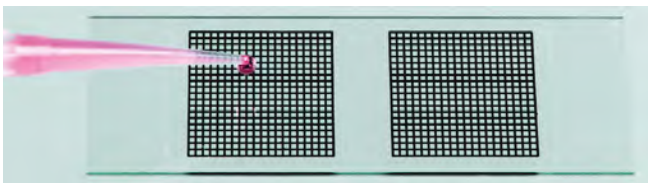
Chemically Inert - Made from polyester with an acrylic adhesive.

Microscope Slide-Wells are inert and stable under most laboratory conditions.

70366-12	Slide Wells, 0.25mm thick	25/pk
70366-13	Slide Wells, 0.50mm thick	25/pk

► Microscope Slide-Grids

Disposable Adhesive Grids



Convenient - Easy-to adhere stickers having side-by-side twin grids (20mm x 20mm each with 1mm line spacing) for microscope slides. Count or measure cells and estimate the size or length of microscopic or semi-micro objects

Versatile - Compatible with different styles of microscopes (conventional, inverted or dissecting). Virtually all cells and specimens placed on top of Slide-Grids can be counted and/or sized.

Dry Or Wet - Use with dry specimens or suspended specimens such as cells held in buffer under cover slips. Separate cover slips can be placed over each Slide-Grid.

Chemically Inert - Made from polyester with an acrylic adhesive. Slide-Grids are inert and stable under most laboratory conditions.

70366-14	Slide Grids, 20mm x 20mm	40/pk
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► Gridded Microscope Slides

These 3 x 1" slides have an indexed grid on the reverse side of the frosted end. The ink is resistant to stains and common laboratory solvents. Each square grid fills one low-powered-field (approximately 100X

magnification). These slides make it easy to locate an organism or cell every time. There are 64 squares in total. The slides are available with coatings of Poly-L-Lysine or Silane, or they can be purchased plain (uncoated). Packaged 72 slides/box.

The grid measures 2 mm square-16mm total. Numbers 1-8 and alpha A-H.



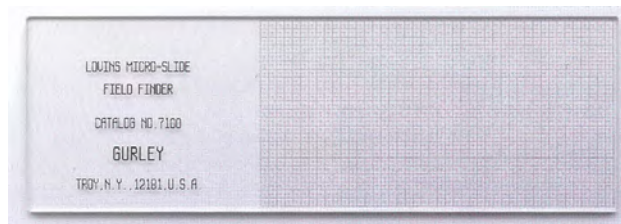
► 1. Gridded Microscope Slides without hydrophobic coating.

63405-01	Grid Slides, Uncoated	72/pk
63405-02	Grid Slides, Uncoated	144/pk
63406-01	Grid Slides, Poly-L-Lysine	72/pk
63406-02	Grid Slides, Poly-L-Lysine	144/pk
63407-01	Grid Slides, Silane	72/pk
63407-02	Grid Slides, Silane	144/pk

► 2. Gridded Microscope Slides with hydrophobic coating.

63408-01	Grid Slides, Round well	72/pk
63409-02	Grid Slides, Square well	72/pk

► Lovins Micro-Slide Field Finder



Marking a microscope slide to identify a particular field of interest for future reference has always been a difficult problem for many microscopists.

The Field Finder has a precision rectangular-coordinate grid pattern, which is accurately positioned on a special microscope slide. The slide has been carefully edge ground to provide straight edges and square corners to ensure repeatable results

Lovins Micros-Slide Field Finder helps you to index points of interest on a microscope slide the same way you find them on a road map. A standard 75 x 25mm glass slide has a photo etched grid pattern of 1mm squares, subdivided into 0.1 mm intervals. Each square is marked with a letter and a number. You center the detail in the field of the microscope, replace the specimen slide with the field finder, and read the coordinates. Note reading on slide, and you can find that detail immediately by reversing procedure.

The pattern is imaged in vacuum deposited chrome for durability.

Cat.#	Slide Size	Qty
72266-01	Micro-Slide Field Finder, 75 x 25 mm	each

► PTFE Printed Slides

PTFE Printed Slides, are extremely hydrophobic, acetone proof, chemical resistant and autoclavable. They are perfect for controlling cross-contamination in staining, immunolabeling and immunofluorescence tests. All printed slides are precleaned. The well surface is 100% wettable, which enhances cell attachment and increases its spreading capabilities within the well. These slides minimize the use of expensive purified antigens and antibodies. The slides measure 3x1" (76x26x1mm).

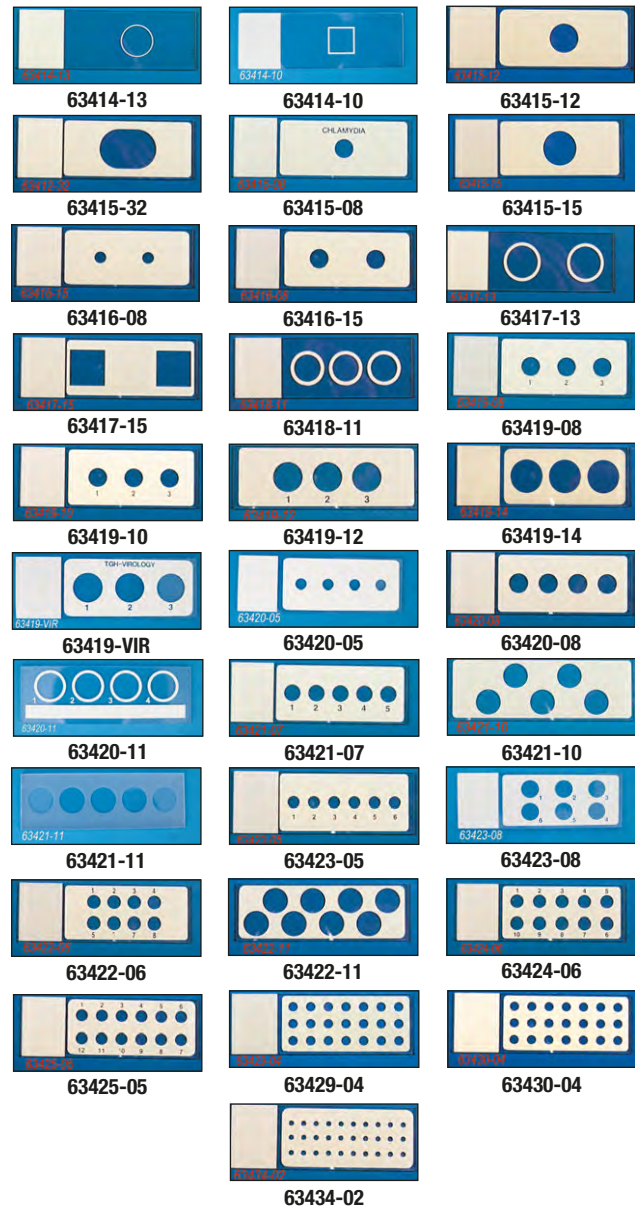
EMS Printed Slides are manufactured to order offering maximum shelf life. The shelf life of PTFE Printed Slides range from 18 months to two years. However, it is recommended that all glass slides (Printed or Un-printed) be used in a timely manner to avoid glass "weathering", (slides becoming cloudy or hazy even with proper storage. All of our Printed Slides are autoclavable and have a frosted end. They are intended for one time use only.

All EMS printed slides are printed with White PTFE other colors are available upon request.

FEATURES:

- Super Hydrophobic Mask
- Clean, Wettable Wells
- A Bioadhesive Surface Treatment to Enhance Cell and Tissue Attachment

Cat.#	Number of Well	Well Size	Pack
63414-13	1 Ring	13 mm Dia.	72/pk
63414-10	1 Square	10.7x10.7mm	72/pk
63415-12	1 Round	12 mm Dia.	72/pk
63415-32	1 Oval	24.4x16.7mm	72/pk
63415-08	1 Round	8 mm Dia.	72/pk
63415-15	1 Round	15 mm Dia.	72/pk
63416-08	2 Round	8 mm Dia.	72/pk
63416-15	2 Round	15 mm Dia.	72/pk
63417-13	2 Ring	13 mm Dia.	72/pk
63417-15	2 Square	15x15mm	72/pk
63418-11	3 Ring	11.28mm Dia.	72/pk
63419-08	3 Round	8 mm Dia.	72/pk
63419-10	3 Round	10 mm Dia.	72/pk
63419-12	3 Round	12 mm Dia.	72/pk
63419-14	3 Round	14 mm Dia.	72/pk
63419-VIR	3 Round TGH	VIROLOGY	72/pk
63420-05	4 Round	5 mm Dia.	72/pk
63420-08	4 Round	8 mm Dia.	72/pk
63420-11	4 Ring	11.43 mm Dia.	72/pk
63421-07	5 Round	7 mm Dia.	72/pk
63421-10	5 Round	10 mm Dia.	72/pk
63421-11	Etched 5 Round	11.43 mm Dia.	72/pk
63423-05	6 Round	5 mm Dia.	72/pk
63423-08	6 Round	8 mm Dia.	72/pk
63422-06	8 Round	6 mm Dia.	72/pk
63422-11	8 Round	11 mm Dia.	72/pk
63424-06	10 Round	6 mm Dia.	72/pk
63425-05	12 Round	5 mm Dia.	72/pk
63429-04	21 Round	4 mm Dia.	72/pk
63430-04	24 Round	4 mm Dia.	72/pk
63434-02	30 Round	2 mm Dia.	72/pk

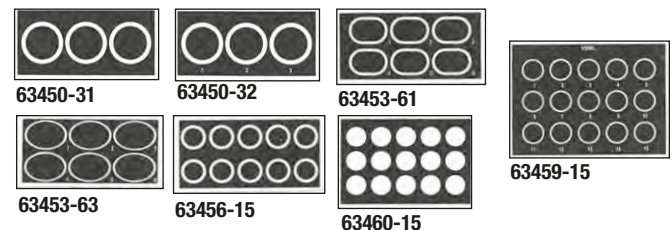


TECHNICAL TIP

Our PTFE Printed slides may be used for all types of Cell Culture work and they may be sterilized by UV light, Autoclave as well as ETOH. These unique slides can be coverslipped with the addition of a little more mounting media than a plain slide would use.

► Macro/Latex Agglutination

Cat.#	Glass Size	Configuration	Well/Ring Size	Pack
63450-31	4" x 3"	3 Ring, yellow	26.4 mm	25/pk
63450-32	4.25"x2"	3 Ring, white	26.4 mm	25/pk
63453-61	4.4"x2.1"	6, white oval	17.4mm x26mm	25/pk
63453-63	4.215"x2"	6 white oval	17.4mmx26mm	25/pk
63456-15	4.331"x2.165"	10 Ring white	15 mm	25/pk
63459-15	4.75"x3.5"	15 Ring white	15 mm	25/pk
63460-15	3"x2"x1.2mm	15 Well	11.28mm (Etched)	25/pk



► Cover Glass – GOLD SEAL®

GOLD SEAL® cover glass is made from pre-selected, pre-cleaned silicate glass. It is available in various shapes and thicknesses and is packaged with desiccants in a lint free box. Both cover glass cases and slide boxes convert to convenient slide storage files.

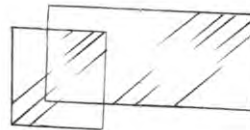
Cat.#	GoldSeal	Standard Sizes	Thickness	Pcs/oz	Pack
No. 0 Thickness					
63750-01	3206	22x22 mm	#0 (.085-.12 mm)	208	1 oz.
63750-10	3206	22x22 mm	#0 (.085-.12 mm)	208	10x1oz.
63751-01	3223	24 x 60mm	#0 (.085-.12 mm)	78	1 oz.
63751-10	3223	24 x 60mm	#0 (.085-.12 mm)	78	10x1oz
No. 1 Thickness					
63756-01	3305	18 x 18mm	#1 (.13-.17 mm)	233	1 oz.
63756-10	3305	18 x 18mm	#1 (.13-.17 mm)	233	10x1oz.
63757-01	3306	22 x 22mm	#1 (.13-.17 mm)	156	1 oz.
63757-10	3306	22 x 22mm	#1 (.13-.17 mm)	156	10x1oz.
63758-01	3307	25 x 25mm	#1 (.13-.17 mm)	124	1 oz.
63758-10	3307	25 x 25mm	#1 (.13-.17 mm)	124	10x1oz.
63760-01	3312	12 x 24mm	#1 (.13-.17 mm)	256	1 oz.
63760-10	3312	12 x 24mm	#1 (.13-.17 mm)	256	10x1oz.
63762-01	3315	22 x 35mm	#1 (.13-.17 mm)	100	1 oz.
63762-10	3315	22 x 35mm	#1 (.13-.17 mm)	100	10x1oz.
63765-01	3318	22 x 60mm	#1 (.13-.17 mm)	58	1 oz.
63765-10	3318	22 x 60mm	#1 (.13-.17 mm)	58	10x1oz.
63766-01	3319	24 x 30mm	#1 (.13-.17 mm)	108	1 oz.
63766-10	3319	24x 30mm	#1 (.13-.17 mm)	108	10x1oz.
63768-01	3321	24 x 40mm	#1 (.13-.17 mm)	80	1 oz.
63768-10	3321	24 x 40mm	#1 (.13-.17 mm)	80	10x1oz.
63769-01	3322	24 x 50mm	#1 (.13-.17 mm)	67	1 oz.
63769-10	3322	24 x 50mm	#1 (.13-.17 mm)	67	10x1oz.
63770-01	3323	24 x 60mm	#1 (.13-.17 mm)	54	1 oz.
63770-10	3323	24 x 60mm	#1 (.13-.17 mm)	54	10x1oz
63771-01	3327	35 x 50mm	#1 (.13-.17 mm)	41	1 oz.
63771-10	3327	35 x 50mm	#1 (.13-.17 mm)	41	10x1oz
63772-01	3328	35 x 60mm	#1 (.13-.17 mm)	37	1 oz.
63772-10	3328	35 x 60mm	#1 (.13-.17 mm)	37	10x1oz
63773-01	3329	43 x 50mm	#1 (.13-.17 mm)	35	1 oz.
63773-10	3329	43 x 50mm	#1 (.13-.17 mm)	35	10x1oz
63774-01	3334	48 x 60mm	#1 (.13-.17 mm)	26	1 oz.
63774-10	3334	48 x 60mm	#1 (.13-.17 mm)	26	10x1oz
63780-01	3350	13mm Dia.	#1 (.13-.17 mm)	575	1 oz.
63780-10	3350	13mm Dia.	#1 (.13-.17 mm)	575	10x1oz
63781-01	3351	16mm Dia.	#1 (.13-.17 mm)	376	1 oz.
63781-10	3351	16mm Dia.	#1 (.13-.17 mm)	376	10x1oz
63782-01	3346	19mm Dia.	#1 (.13-.17 mm)	276	1 oz.
63782-10	3346	19mm Dia.	#1 (.13-.17 mm)	276	10x1oz
No. 1½ Thickness					
63786-01	3400	22 x 22mm	#1½ (.16-.19 mm)	138	1 oz.
63786-10	3400	22 x 22mm	#1½ (.16-.19 mm)	138	10x1oz
63787-01	3405	18 x 18mm	#1½ (.16-.19 mm)	202	1 oz.
63787-10	3405	18 x 18mm	#1½ (.16-.19 mm)	202	10x1oz
63790-01	3419	24 x 30mm	#1½ (.16-.19 mm)	94	1 oz.
63790-10	3419	24 x 30mm	#1½ (.16-.19 mm)	94	10x1oz
63791-01	3421	24 x 40mm	#1½ (.16-.19 mm)	70	1 oz.
63791-10	3421	24 x 40mm	#1½ (.16-.19 mm)	70	10x1oz
63792-01	3422	24 x 50mm	#1½ (.16-.19 mm)	58	1 oz.
63792-10	3422	24 x 50mm	#1½ (.16-.19 mm)	58	10x1oz
63793-01	3423	24 x 60mm	#1½ (.16-.19 mm)	47	1 oz.
63793-10	3423	24 x 60mm	#1½ (.16-.19 mm)	47	10x1oz

Slide warmer, see pages 604-605 >>>>

For the handling of glass slides, see pen vac; grid section page 150 >>>>

► Micro Cover Glasses

Manufactured from clear white, borosilicate glass. They offer super clarity, are perfectly flat, and corrosion resistant. All cover glasses are uniform in size and thickness.



Cat. #	Standard Sizes	Thickness	Pieces/oz	Pack
No. 0 Thickness — Squares				
72198-10	22x22 mm	#0 (.08-.13 mm)	208	1 oz.
72198-11	22x22 mm	#0 (.08-.13 mm)	208	10 oz.
72198-20	22x40 mm	#0 (.08-.13 mm)	116	1 oz.
72198-21	22x40 mm	#0 (.08-.13 mm)	116	10 oz.
No. 1 Thickness — Squares				
72200-10	22x22 mm	#1 (.13-.17 mm)	156	1 oz.
72200-11	22x22 mm	#1 (.13-.17 mm)	156	10 oz.
72200-20	22x30 mm	#1 (.13-.17 mm)	116	1 oz.
72200-21	22x30 mm	#1 (.13-.17 mm)	116	10 oz.
72200-30	22x40 mm	#1 (.13-.17 mm)	87	1 oz.
72200-31	22x40 mm	#1 (.13-.17 mm)	87	10 oz.
72200-40	22x50 mm	#1 (.13-.17 mm)	70	1 oz.
72200-41	22x50 mm	#1 (.13-.17 mm)	70	10 oz.
No. 1½ Thickness — Squares				
72204-01	22x22 mm	#1½ (.16-.19 mm)	138	1 oz.
72204-10	22x22 mm	#1½ (.16-.19 mm)	138	10 oz.
72204-02	22x30 mm	#1½ (.16-.19 mm)	102	1 oz.
72204-20	22x30 mm	#1½ (.16-.19 mm)	102	10 oz.
72204-03	22x40 mm	#1½ (.16-.19 mm)	76	1 oz.
72204-30	22x40 mm	#1½ (.16-.19 mm)	76	10 oz.
72204-04	22x50 mm	#1½ (.16-.19 mm)	61	1 oz.
72204-40	22x50 mm	#1½ (.16-.19 mm)	61	10 oz.
No. 2 Thickness — Squares				
72210-10	22x22 mm	#2 (.17-.25 mm)	116	1 oz.
72210-11	22x22 mm	#2 (.17-.25 mm)	116	10 oz.
72210-20	22x40 mm	#2 (.17-.25 mm)	64	1 oz.
72210-21	22x40 mm	#2 (.17-.25 mm)	64	10 oz.

► Square and Rectangular Cover Glass

■ #1 thickness (0.13 to 0.16mm)

■ Packed one ounce (28 g) per case

■ Clear white borosilicate glass.

Cat. #	Size	Thickness	Pieces/oz	Pack
72190-09*	9x9 mm	#1 (.13-.17 mm)	765	1 oz.
72190-22*	9x22 mm	#1 (.13-.17 mm)	435	1 oz.
72190-35*	9x35 mm	#1 (.13-.17 mm)	260	1 oz.
72190-50*	9x50 mm	#1 (.13-.17 mm)	175	1 oz.
72191-22*	10.5x22 mm	#1 (.13-.17 mm)	335	1 oz.
72191-35*	10.5x35 mm	#1 (.13-.17 mm)	215	1 oz.
72191-50*	10.5x50 mm	#1 (.13-.17 mm)	150	1 oz.
72192-54*	13x54 mm	#1 (.13-.17 mm)	120	1 oz.
72192-50	24x50 mm	#1 (.13-.17 mm)	65	1 oz.
72192-75*	25x75 mm	#1 (.13-.17 mm)	40	1 oz.

* For use with Bellco Leighton Tissue Culture Tubes.

► Circular Cover Glass

Cat. #	Diameter	Thickness	Pieces/oz	Pack
No. 1 Thickness				
72231-01	12 mm	#1 (.13-.17 mm)	692	1 oz.
72231-10	12 mm	#1 (.13-.17 mm)	692	10 oz.
72228-01	15 mm	#1 (.13-.17 mm)	443	1 oz.
72228-10	15 mm	#1 (.13-.17 mm)	443	10 oz.
72229-01	18 mm	#1 (.13-.17 mm)	308	1 oz.
72229-10	18 mm	#1 (.13-.17 mm)	308	10 oz.
72221-01	22 mm	#1 (.13-.17 mm)	206	1 oz.
72221-10	22 mm	#1 (.13-.17 mm)	206	10 oz.
72223-01	25 mm	#1 (.13-.17 mm)	159	1 oz.
72223-10	25 mm	#1 (.13-.17 mm)	159	10oz.

No. 1½ Thickness

72230-01	12 mm	#1½ (.16-.19 mm)	597	1 oz.
72230-10	12 mm	#1½ (.16-.19 mm)	597	10 oz.
72222-01	18 mm	#1½ (.16-.19 mm)	266	1 oz.
72222-10	18 mm	#1½ (.16-.19 mm)	266	10 oz.
72224-01	22 mm	#1½ (.16-.19 mm)	178	1 oz.
72224-10	22 mm	#1½ (.16-.19 mm)	178	10 oz.
72225-01	25 mm	#1½ (.16-.19 mm)	137	1 oz.
72225-10	25 mm	#1½ (.16-.19 mm)	137	10 oz.

No. 2 Thickness

72226-01	12mm	#2 (.17-.25 mm)	502	1 oz.
72226-10	12mm	#2 (.17-.25 mm)	502	10 oz.
72227-01	15mm	#2 (.17-.25 mm)	321	1 oz.
72227-10	15mm	#2 (.17-.25 mm)	321	10 oz.

► Round Cover Slips (Bellco Brand)

- #1 Thickness (0.13 to 0.16mm)
- Packed 1 oz (28g) per case



Cat. #	Diameter	Thickness	Pieces/oz	Pack
72195-05	5 mm	#1 (.13 - .16 mm)	1100	1 oz
72195-12	12 mm	#1 (.13 - .16 mm)	650	1 oz
72195-15	15 mm	#1 (.13 - .16 mm)	378	1 oz
72195-25	25 mm	#1 (.13 - .16 mm)	160	1 oz

► Round Cover Slips, German Glass

- For neural cell cultures
- Shown to be more effective with hard to attach cells
- #1 thickness (0.13 to 0.16mm)
- Packed 1 oz (28g) per case.



Cat. #	Diameter	Thickness	Pieces/oz	Pack
72196-12	12 mm	#1 (0.13 to 0.16mm)	650	1 oz
72196-15	15 mm	#1 (0.13 to 0.16mm)	378	1 oz
72196-25	25 mm	#1 (0.13 to 0.16mm)	160	1 oz

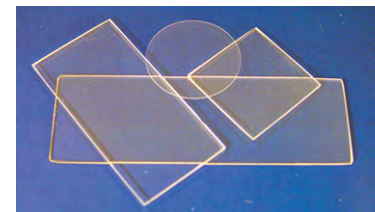
► Round Cover Slips – German Glass

These coverglass which are made from German glass can be used for growing and culturing cells that normally have poor adhesion to plastic or regular glass surfaces. The 5mm size will fit inside the 96 well plates and still have enough room to pick up from the bottom of the well with forceps. The 8 mm size fits inside the 24 well plates. Available with #1.5 (0.16 – 0.19 mm) thickness. Packaged in convenience size: 100 per box

Cat.#	Description	Qty
72296-05	5 mm Round Coverglass, #1.5 Thickness	100/bx
72296-08	8 mm Round Coverglass, #1.5 Thickness	100/bx

► Quartz Microscope Slides and Coverslips

There are many applications that require slides and coverslips that have absolute UV transparency, and high temperature properties. EMS now is introducing the highest quality, clear fused quartz microscope slides and coverslips to meet all of these requirements.



- The window of highest transparency to UV is between 0.15µ to 5µ.
- Typical flatness measured 2 to 4" bands per inch.
- Soften point is about 1250°C (2282°F).
- Standard microscope slide thickness is 1 mm.
- Standard coverslip thickness is 0.2 mm.

Quartz Microscope Slides

Cat.#	Description	Pack
72250-01	Slide, 1" x 1" (25 x 25 mm)	each
72250-02	Slide, 2" x 1" (50 x 25 mm)	each
72250-03	Slide, 3" x 1" (75 x 25 mm)	each
72250-04	Slide, 2" x 3" (50 x 76 mm)	each
72250-05	Slide, 10mm x 10 mm	each

These slides have all of the same properties of the ones above with the only difference is these are 0.5mm thick:

72250-06	1" x 1" (25x25mm)	each
72250-07	1" x 2" (25 x 50mm)	each
72250-08	1" x 3" (25x76mm)	each

Quartz Coverslips

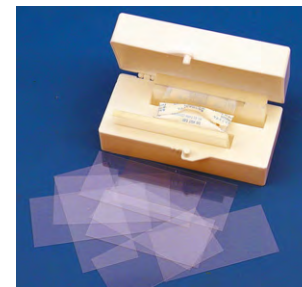
Cat.#	Description	Pack
72255-02	Round 1" (25 mm) dia.	each
72256-02	Square 1" x 1" (25 x 25 mm)	each
72256-03	Round, 18mm (0.71") x 0.2mm Thick (#2)	each
72256-04	Round, 25.4mm (1") x 0.2mm Thick (#2)	each
72256-05	Round, 33.02mm (13.0") x 0.2mm thick (#2)	each
72256-06	Round, 25mm (0.984") x 0.15-0.18mm thick (#1)	each
72256-07	Square, 25.4mm (1") x 0.2mm thick (#2) thick	each
72256-08	Square, 25.4mm (1") x 0.15-0.18mm thick (#1)	each
72256-09	Square, 25mm (0.984") x 0.075-0.125mm thick (#0)	each

► Superslip® Micro Glasses

Finally, your automated coverslipper has the right coverslip to allow it to run smoothly.

These "Superslip®" coverslips are designed to work in automatic coverslip machines and humid environments without sticking or jamming up in the middle of a run.

These new superslips combine specialized production procedures with our unique moisture-resistant packaging which brings you superior coverslips.



72236-40	Superslip, 24x40mm, #1	1 oz
72236-41	Superslip, 24x40mm, #1	10x1 oz
72236-51	Superslip, 24x50mm, #1	1 oz
72236-51	Superslip, 24x50mm, #1	10x1 oz
72236-60	Superslip, 24x60mm, #1	1 oz
72236-61	Superslip, 24x60mm, #1	10x1 oz

► Cover Slips; Thermanox®; TMX Coverslips

NUNC™ Brand Thermanox®, or TMX coverslips are made from a polymer (in the polyolefin family) that is highly resistant to most chemicals. Thermanox® plastic is resistant to alcohols, aldehydes, hydrocarbons, dilute acids (<10%) and dilute

alkalis (<2%). TMX has limited resistance to chlorinated hydro-carbons, however, it is not resistant to concentrated acids or bases. Thermanox® plastic is a flexible, trans-parent polymer that can be sectioned using a microtome and is able to withstand high temperatures (temperature range -70°C to +150°C). Thermanox® Coverslips are culture treated on one side for enhanced cell attachment and growth. The treated side is packaged face up toward the label.

FEATURES:

- Flat and remain flat
- 0.2mm (No. 2) thickness
- Resistant to commonly used solvents
- Safe and easy to handle
- Auto fluorescent in the range 380 to 545 nm
- Thermanox® cover slips can be autoclaved at 20 minutes steam, 20 minutes dry at 120°C

Cat. #	Description	NNI #	Pack
72274-01	Size 10.5x22 mm	174934	100/pk
72274-05	Size 10.5x22 mm	174934	500/pk
72270	Size 22x60 mm	174942	100/pk
72271	Size 22x60 mm	174942	500/pk
72272	Size 24x30 mm	150067	100/pk
72273	Size 24x30 mm	150067	500/pk
72280	13 mm Round	174950	100/pk
72281	13 mm Round	174950	500/pk
72275-01	15mm Round	174969	100/pk
72275-05	15 mm Round	174969	500/pk
72282	22 mm Round	174977	100/pk
72283	22 mm Round	174977	500/pk
72285	25 mm Round	174985	100/pk
72286	25 mm Round	174985	500/pk

Thermanox® is Nalge/Nunc product.

► Disposable Rinzl Plastic Micro Slides

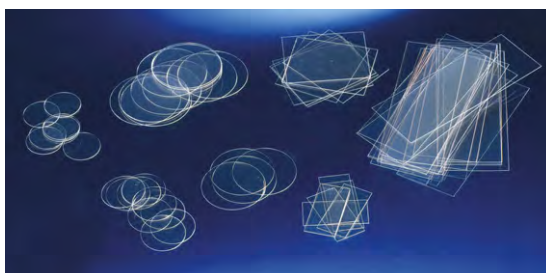
- Made from optical clear vinyl with a refractive index of glass.
- Ideal for wet mount, urines, etc.
- Economical, they can be used and discarded.
- Available standard size 3 x 1" and packaged 144 per box.
- Will not break, scratch or cut fingers.
- Not auto-fluorescent.
- Thickness 0.0180 to 0.022" or 0.46 to 0.56mm.

71890-12	Rinzl Plastic Micro Slides (A)	12/bx
71890-01	Rinzl Plastic Micro Slides (B)	144/bx
71890-10	Rinzl Plastic Micro Slides (B)	10x144/bx

► Rinzl Plastic Coverslips

- Made from clear vinyl plastic.
- Unbreakable, will not scratch or cut fingers.
- Used in Biological and Medical labs, etc.
- Thickness 0.01" or 0.28mm.
- Refractive index of glass.
- Economical and half the price of glass.
- Not autofluorescent.

Cat.#	Description	Pack
72261-18	Rinzl Plastic Coverslips, Size 18 x 18mm	100/pk
72261-19	Rinzl Plastic Coverslips, Size 18 x 18mm	1000/pk
72261-22	Rinzl Plastic Coverslips, Size 22 x 22mm	100/pk
72261-23	Rinzl Plastic Coverslips, Size 22 x 22mm	1000/pk
72261-40	Rinzl Plastic Coverslips, Size 22 x 40mm	1000/pk
72261-50	Rinzl Plastic Coverslips, Size 24 x 50mm	1000/pk
72261-60	Rinzl Plastic Coverslips, Size 24 x 60mm	1000/pk
72261-100	Rinzl Plastic Coverslips, Size 24 x 100mm	1000/pk



TECHNICAL TIP

Permanox plastic is nonfluorescent and may be used with most fluorescent labels. Permanox has better chemical resistance to fixation and staining solvents than polystyrene. An aqueous based mounting medium must be used when cover slipping to prevent warping.

TECHNICAL TIP

A simple method to determine which side of the coverslip is treated is the "droplet" test. A drop of water or culture medium will spread on the hydrophilic, treated side. - If the droplet forms a bead, then the side of the coverslip is not treated. - If the droplet spreads evenly over the coverslip, the side is treated.



► Plastic Cover Slips

Unbreakable .007" (1.57mm) flexible cellulose acetate, square 22x22mm. Trusal, L., Baker C., & Guzman, A., Stain. Tech., 54,2 pg. 77.

72260 Plastic Cover Slip 100/bx



► Photoetched Coverslips

These coverslips are made from pure white glass and photo etched on the surface for a permanent gridded pattern.

- Using No. 2 (.17 -.24mm) thickness cover slips.
- Grid contains 520 alphanumeric coded squares, each square 600 x 600µm (0.6mm x 0.6mm). Numbered 1–200.
- Used to facilitate mounting of micromanipulated cells or chromosome spreads.

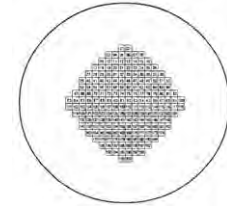
Reference: Lin, Lin-Fang and Frank H. Riddle, 1981.
Photoengraving of Cover Slips and Slides to Facilitate Mounting of Micromanipulated Cells or Chromosome Spreads, Exp. Res. 134:485-488



72264-18



72264-23



72265-25

Cat.#	Coverslip Size	Pack	Cat.#	Coverslip Size	Pack
72264-18	18 x 18 mm	25/pk	72265-25	25 mm Diameter	25/pk
72264-23	23 x 23 mm	25/pk	72265-50	25 mm Photo-Etched	
72265-12	12 mm Diameter	25/pk	German Glass	25/pk	

► Correlative Microscopy Coverslips®

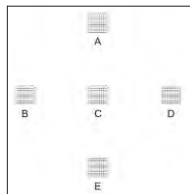
EMS introduces a simple coverslip with a grid image that allows cells to grow and later be analyzed under brightfield or fluorescence microscopy before being further processed and sectioned for EM or other analysis. These unique coverslips do all that.

Applications

Light Microscopy, Fluorescence, Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), High-Pressure Cryofixation

Features

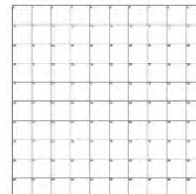
- Reticle film has been thoroughly tested with cell culture
- Good growth of cell culture (equivalent to conventional media)
- Good adhesion to the substrate without cell polylysine
- Resistant to normal chemicals used in electron microscopy
- No oxygen retention, compatible resin LR White
- Good optical quality in bright-field & UV fluorescence
- Excellent transparency
- Does not deform at temperatures (positive 100C and negative liquid N₂)
- Rigid, does not float in the middle of culture
- Easy to handle and cut with a knife or micro-punch
- Simple sterilisation using alcohol or UV
- Detaches easily from resin after polymerisation
- Low cost



66108-01 10x10 grids of 0.1mm squares at 5 positions. Indexed 1-10 along top, A-J down side



66108-02 20x20 grid of 0.5mm squares. Indexed 1-20 along top, A-T down side and centre cross



66108-03 10x10 grids of 1mm squares. Each square individually indexed 0-99

Specifications

Cat. #	Squares	Surface	square unit size	Avg. cells/sq. unit*
66108-01	100	5x1mm	0.01mm ²	2-3
66108-02	200	100mm	0.5mm ²	20-25
66108-03	100	100mm	1mm ²	40-50

* (eg HeLa Cell)

All of the coverslips are produced on a polyester based film, 0.18mm thick, 22 x 22mm, 25/box. All other grid sizes and film sizes are available upon special order.

Ordering Information

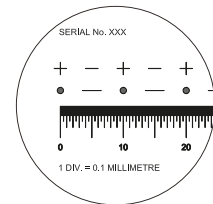
66108-01	10x10 grid of 0.1mm squares at 5 positions	25/pk
66108-02	20x20 grid of 0.5mm squares	25/pk
66108-03	10x10 grid of 1mm squares	25/pk

► Combination Scales

All of the PS-XO series of Calibration Slides is Green Float Glass, Bright Chrome Image

1. PS300-XO

High definition 300mm scale in 0.1mm divisions with extended 0.5mm, 1.0mm and 5.0mm lines to allow calibrations in those increments too. Series of dots and crosses, at 10mm intervals, included for calibrations where these shapes are preferred. Supplied in polished wooden case.

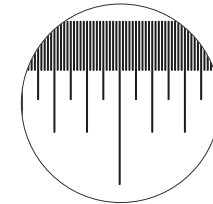


Features

300mm high definition scale in 0.1mm divisions with additional dot and cross series at 10mm centers

2. PS150-XO

High definition 150mm scale in 0.1mm divisions with extended 0.5mm, 1.0mm and 5.0mm lines to allow calibrations in those increments too. Series of dots and crosses, at 10mm intervals, included for calibrations where these shapes are preferred. Supplied in polished wooden case



Features

150mm high definition scale in 0.1mm divisions with additional dot and cross series at 10mm centers

3. PS100-XO

High definition 100mm scale in 0.1mm divisions with extended 0.5mm, 1.0mm and 5.0mm lines to allow calibrations in those increments too. Series of dots and crosses, at 10mm intervals, included for calibrations where these shapes are preferred. Supplied in polished wooden case.

Features

100mm high definition scale in 0.1mm divisions with additional dot and cross series at 10mm centers

Ordering Information

68073-PS300	PS300-XO Combination Scale	330x30x6mm	each
68073-PS300-UK	Same as above with UKAS Certification of Calibration, 10 Points measured on Scale		each
68073-PS150	PS150-XO Combination Scale	180x30x6mm	each
68073-PS150-UK	Same as above with UKAS Certification of Calibration, 10 Points measured on Scale		each
68073-PS100	PS100-XO Combination Scale	130x30x6mm	each
68073-PS100-UK	Same as above with UKAS Certification of Calibration, 10 Points measured on Scale		each

► Microscope Slide Dispenser

Molded from attractive gray ABA plastic. This dispenser provides a method of releasing clean, dust free 1"x3" slides, one at a time. Comes with a clear molded plastic cover to allow for visual checking of unused slides. Measurements: 4 $\frac{3}{8}$ "x4 $\frac{7}{8}$ "x5 $\frac{1}{2}$ ". Holds approximately 72 slides.



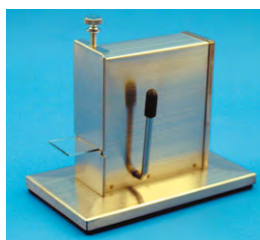
71300 Glass Slide Dispenser

each

► Levered Micro Slide Dispenser

- Holds a full box of 72 slides.
- Get a clean, fingerprint-free slide every time
- Avoid breakage
- Loading is simple
- Made from stainless steel and has suction cup feet to keep the unit in place.

Measures 3"(L)x5"(W)x4"(H) (8x13x10cm)

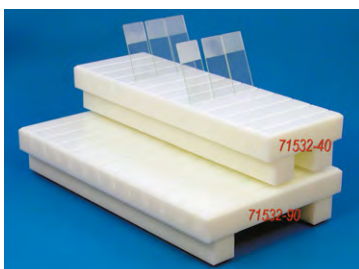


71298-01 Levered Slide Dispenser

each

► Slide Holder Block

Made from solid high density polypropylene blocks with 13 slanted channels (on a 10° angle), $\frac{7}{16}$ "(1.5mm) (W) x $\frac{3}{8}$ " (9mm) (D). It is made to hold 3x1" (75x25mm) slides during cleaning, draining excess immersion oil, and even drying. They are white in color and are chemically resistant. Available in 40 or 90 capacity (vertically held).



71532-40 40-Slide Holder Block, 4"(W)x12"(L)(10x30.5cm) each

71532-90 90-Slide Holder Block, 7"(W)x12"(L)(18x30.5cm) each

► View-Pack™ Microscope Slide Holder With 3-Ring Binder

For the orderly visual display and safe transport of microscope slides. This loose-leaf binder has ten vinyl View-Pack™ pages (hold 160 slides). Each page holds 16 slides 3x1" (75x25mm) in individual pockets with a white back and clear front. A flap in the center keeps slides from falling out. Simply fold the page at the center crease to retrieve slides. The 8 $\frac{1}{2}$ " x 10 $\frac{1}{2}$ " (22x27cm) View-Pack pages comes with a standard 9"x12" (23x30cm) 3-ring binder.



71544-01 View-Pack With 3-Ring Binder each
71544-50 Refill View-Pack 10/pk

► Slide Stand

Made from stainless steel. Stand consists of four rails, which supports various microscope slides almost vertically. Accommodates 68, 3x1" slides



71533-01 Slide Stand, 455x100mm (18x4") each

► Compact Glass Slide Storage Box; The Mini Box

Made from rigid polystyrene, with a removable lid. This 25 capacity slide box measures only 3.625" (92mm)(L) X 3.25"(83mm)(W) X 1.25"(32mm) (H). The box is available in either white, red, or blue.



71455-W 25-Compact Slide Box, White each
71455-B 25-Compact Slide Box, Blue each
71455-R 25-Compact Slide Box, Red each



► Secured Hinge Microscope Slide Boxes

Made from durable polystyrene (with heavy walls). This material is unaffected by humidity and is thoroughly insect proof. Each box is secured with a rust-resistant nickel-plated clasp and hinge pin. The cork lining prevents damage to the stored slides. To ensure proper slide identification, each slot is numbered to correspond to the slide inventory sheet on the inside cover of the box. To save space the boxes are stackable. Each box stores up to 100 3x1" or 25x75mm microscope slides. Available in 5 color coded boxes making the boxes easy to identify Each box measures: 210x162x33mm (8 $\frac{1}{4}$ x 6 $\frac{1}{2}$ x 1 $\frac{1}{4}$ ")

71470-W Hinged 100 Slide Box, White each
71471-W Hinged 100 Slide Box, White 10/pk
71470-B Hinged 100 Slide Box, Blue each
71471-B Hinged 100 Slide Box, Blue 10/pk
71470-G Hinged 100 Slide Box, Green each
71471-G Hinged 100 Slide Box, Green 10/pk
71470-R Hinged 100 Slide Box, Red each
71471-R Hinged 100 Slide Box, Red 10/pk
71470-Y Hinged 100 Slide Box, Yellow each
71471-Y Hinged 100 Slide Box, Yellow 10/pk

► Molded (Living Hinge) Microscope Slide Boxes

Molded one-piece polypropylene construction with an integral living hinge. Numbering in the base corresponds to the printed index in the covers for slide identification purpose. Boxes are designed to be stackable to save space. The tensioned clasp insures a secure closure. Available in 25 or 100 capacity. Fits 1 x 3" (25.4x75mm) microscope slides.

Cat.	Description	Outside Dimensions L x W x H" (mm)	Pack
71472	Molded 100-Slide Box	8 3/4" x 6 3/4" x 1 1/2"	each
71473	Molded 100-Slide Box	(220x175x38mm)	10/pk



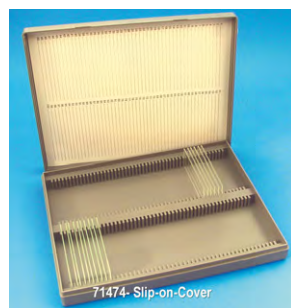
► Carolina™ Blue Box

Molded from blue high-impact styrene, the Carolina™ Blue Box is manufactured to our exacting specifications. Compared to conventional wooden boxes, the Carolina™ Blue Box is smaller in size, lighter in weight, and held to closer dimensional tolerances. The 75x25mm (3x1") slides fit the slots and will not slip out once in place. A shoulder on each box excludes dust and identifies the top of the box. The boxes are available in two sizes: 3 1/4" x 4 1/4" x 1 1/16" (for 25 slides) and 3 1/4" x 2 1/4" x 1 1/16" (for 12 slides).

71482-01	Carolina Blue Box, 12-Slide	each
71482-10	Carolina Blue Box, 12-Slide	10/pk
71483-01	Carolina Blue Box, 25-Slide	each
71483-10	Carolina Blue Box, 25-Slide	10/pk



12-Slide Blue Box



71474 - Slip-on-Cover



71462 - Slip-on-Cover

► 100-Capacity Slide Box

Same construction as (#71470), but with a slip-on cover; gray in color. The box measures: 9"x7 1/4"x1 1/4" (230x185x32).

71474	Slip-on Cover 100-Slide Box	each
71475	Slip-on Cover 100-Slide Box	10/lot

► 50-Capacity Slide Box

Same construction as (#71470), but with a slip on cover; stackable and gray in color. The box measures: 9"x3 3/4"x1 1/4" (230x95x32mm)

71462	Slip-on Cover 50-Slide Box	each
71463	Slip-on Cover 50-Slide Box	10/lot

► Compact 25 Slide Box

Same characteristics as (#71470), but with a slip-on cover; Holds 25 1x3" slides. The box measures 1 1/4"(H) x 3 1/2"(W) x 5 1/2" (L).

71460	Slip-on Cover 25-Slide Box	2/pk
71461	Slip-on Cover 25-Slide Box	10pks/lot (20 bxs)

► Large Glass Slide Storage Box

These storage boxes are available in two sizes.

1. 100-Slide Capacity:

Durable, wood frame, covered with heavy black embossed paper. The hinges and latches are Nickel plated. A numbered plastic insert provides spacing for the handling of the slides. The box accommodates 100 of 3x2" slides. The box measures 9 3/4" (L) x 2 1/4" (H) (24.7x19.7x5.7cm).

71480-01	100 Slide Box, 3x2" Slides	each
71480-10	100 Slide Box, 3x2" Slides	10/pk

2. 25 Slide Capacity:

Made from wood with numbered partitions which correspond to the index card. Very durable and has a detachable lid. The box accommodates 25 of 3x2" slides. The box measures: 9 3/4"x3 3/4"x2 5/8" (174x92x67mm).

71481-01	25 Slide Box, 3x2" Slides	each
71481-10	25 Slide Box, 3x2" Slides	10/pk



► Large Slide Microscope Slide Boxes

Specially designed for the 3 x 2 slides

This reinforced ABS material is rugged and designed not only for storage but transport of slides as well.



- Grooved slots hold individual slides in place
- A soft cork liner ensures that slides will not slip
- Identification card, lining and grooved slots are numbered
- Stackable . The box measures 208mm (L) x 175mm (h) x 60mm. They have a capacity of 100 slides and they are blue in color

Cat No.	Description	W x H x D, mm	Color	Qty.
41149	100 Place Tall Slide Box	208 x 175 x 60	Blue	each

► True North™ Slide Box

These purple unique boxes which are made from durable polycarbonate and rugged stainless steel will protect your slides in ultra-low temperatures (as low as -80 °C). These boxes provide for safe storage and transport of 25x75mm and 1x3" Slides. With temperature sensitive foam lining and grooved slide slots which separate the slides there is always protection for slide contact.

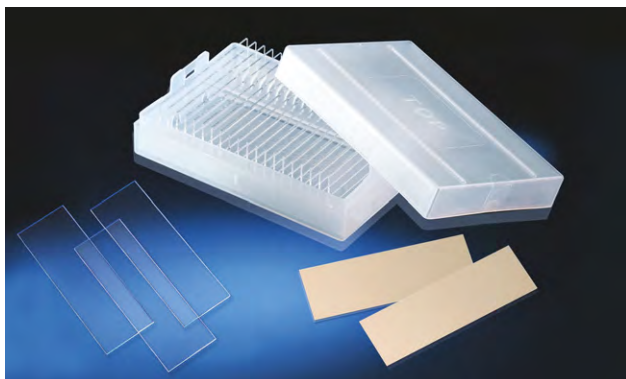


For easy slide retrieval, identification sheet, lining, and grooved slots are numbered. These boxes are stackable and autoclavable. They measure 208x175x34mm.

Cat. #	Description	Qty
71485-01	True North™ Slide Box	each

► mBox® in Microarray Slide Handling

Using mBox – microarray handling without removing slides!



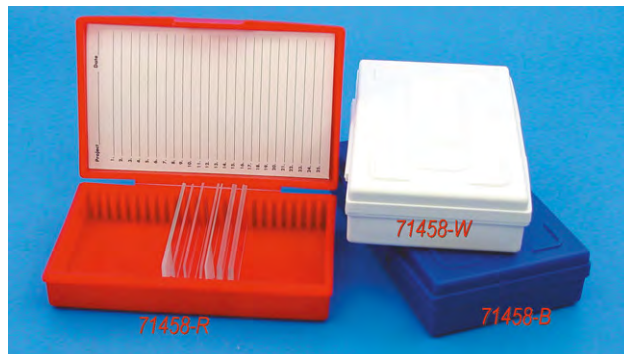
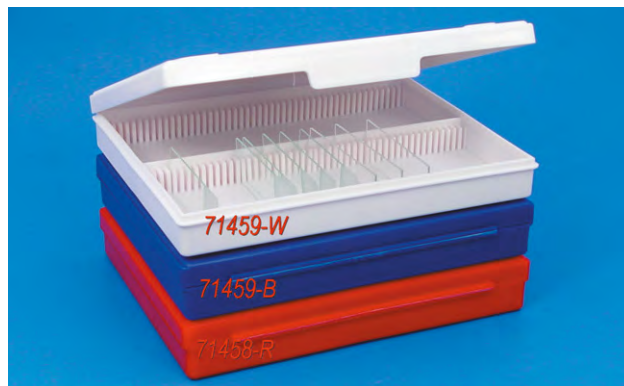
- Immerse 20 slides in liquid during blocking, denaturing, and post-arraying.
- It separates and prevents slide damage during shipping and processing.
- Optimally designed rack spacing for easy slide removal.
- Fits standard microtiter plate formats for centrifuging.
- Manufactured to prevent slide contamination.
- A convenient removable handle available.

Technical

- Material: Polypropylene
- Maximum continuous use temperature: 220°F (104°C)
- Melting point: 334°F (168°C)
- mBox withstand boiling water without softening
- Measures 5" L x 3½" W x 1½" H (127mm x 89mm x 38mm)

EMS #	Description	Qty
72188-01	The mBox	each

► Color Microscope Slide Boxes



Molded from one piece (lid and bottom) polypropylene these slide boxes are able to accommodate either 25 or 100 standard 3x1" (75x25mm) slides. The attached lid is held securely by a closed latch lock. Stacking feet maximize the stability when boxes are stacked up one atop the other. The boxes have a cork liner to protect the stored slides. Comes complete with a numbered slide index card. These boxes are available in blue, red or white.

25-Slide Box measures: 5½" x 3½" x 1¼" (140x90x32mm)
100-Slide Box measures: 8¼" x 6½" x 1¼" (210x170x32mm)

71458-W	25-Slide Box, White	each
71458-B	25-Slide Box, Blue	each
71458-R	25-Slide Box, Red	each
71459-W	100-Slide Box, White	each
71459-B	100-Slide Box, Blue	each
71459-R	100-Slide Box, Red	each

► Clear Lid 100 Slide Box

This 100-Slide Storage box has a clear lid enabling lab personnel to read the contents listed on the enclosed index without opening the box. Made of Black ABS plastic with metal clasp hinge and cork lining. Numbered slots correspond to the paper index. Stackable.

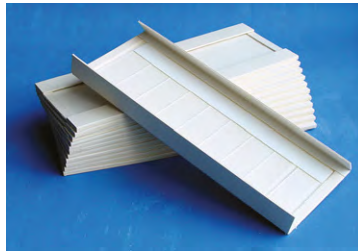
Outside dimension: 8¼"L x 7"W x 1¼"H (210 x 180 x 32mm)



Cat.	Description	Qty
71477-01	Clear Lid 100 Slide Box	1/pk
71477-10	Clear Lid 100 Slide Box	10/pk

► 9/4-Slide Tray

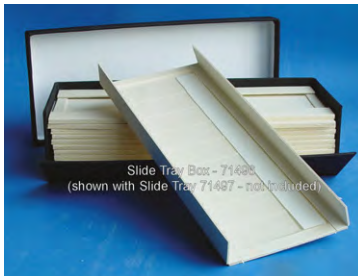
Heavy-duty cardboard construction with cloth hinged flaps to form a single compartment slide holder of various sizes horizontally. Holds 9 3x1" slides or 4 3x2" slides. The tray measures 235 x 78mm (9¼" x 3⅜")



Cat. #	Description	Qty
71497-01	9/4-Slide Tray	each
71497-12	9/4-Slide Tray	12/pk

► Slide Tray Box

Black cloth covered cardboard box 9/4-Slide Tray (#71497). The box has a fall-front and drop on lid. Supplied complete with (6) 9-Slide Trays. Overall measurements of the box : 265 x 112 x 68mm (10½" x 4⅜" x 2 ⅝")

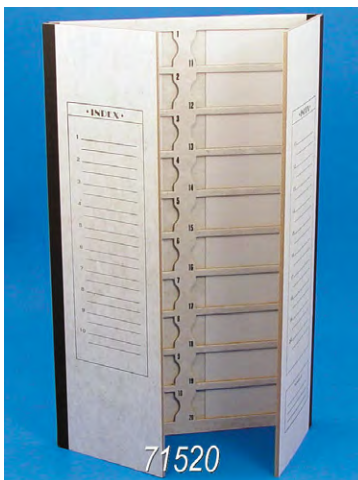


Cat. #	Description	Qty
71496	Slide Tray Box	each

► Pop-Up Slide Holder- 20 or 30 Capacity

Holds 20 and 30 of 1x3" slides in a numbered compartment. The compartments are recessed so the specimen cannot be touched when the cover is closed.

Measurements: 8"(W)x13½"(L)x 1½"(H).



71520	Pop-Up Slide Holder, 20-Place	each
71521	Pop-Up Slide Holder, 20-Place	10/pk
71522	Pop-Up Slide Holder, 30-Place	each
71522-10	Pop-Up Slide Holder, 30-Place	10/pk



► Microscope Slide Tray

White, thermo-formed Polystyrene. Holds 20 of 1"x3" standard slides in a horizontal position. A white background makes it easy to distinguish dyes and stains. The tray features a thumb cut to simplify the removal of slides. Measures: 7½"x13½" (17x34cm).

71500	Microscope Slide Tray	6/pk
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► Slide Tray Cabinet

The outside is made from white polypropylene, the tray rails are polystyrene, and the vertical sliding door is clear acrylic; this 240-slide capacity cabinet holds twelve microscope slide trays (#71500) horizontally, and it is dust free. Measurements: 7¼"x14"x7½" high (17x36x16cm).



71504	Slide Tray Cabinet	each
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► Microscope Slide Tray

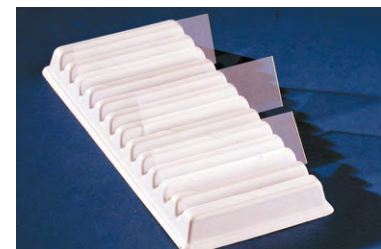
This durable, ABS hard plastic slide tray will hold up to 20 standard microscope slides 75 x 25 mm (3x1"). Ivory color consists of two rows, each with securely holds 10 slides. Each numbered cavity has thumb cut and raise notches for easy to remove the slide. Stackable. Measures: 11 7/8"L x 7 ¾"W x ½"H (300x195x12mm)



Cat.	Description	Qty
71503-01	Hard Plastic Microscope Slide Tray	1/pk
71503-10	Hard Plastic Microscope Slide Tray	10/pk

► 12-Slide Holder

White thermo-formed polystyrene. It keeps microscope slides separated. Ideal for use where slide preparation or staining is performed. Measurements: 3¾"x7"x¾" (H) (86x178x19mm)



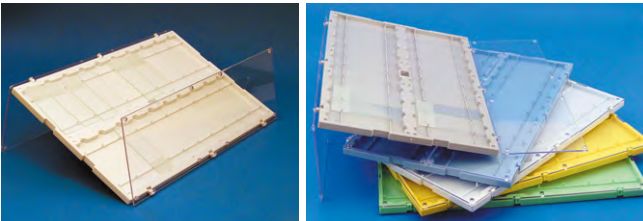
71530	12-Slide Holder	6/pk
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► Microscope Slide Folder

Made from heat resistant injection molded plastic

The Slide Folder™ will hold up to twenty standard microscope slides 75 x 25mm (3x1") and is made of two parts: a base holding the slides horizontally offering numbered space for easy identification, and transparent doors which can either cover the slides or be swung behind the SlideFolder™ for space conservation while using the tray. The base is available in 5 different colors, offering color-coding for each job. Each slide location is identified with a number from 1 to 20. Removal of the slides is made easy by simply pressing on one end, which will lift the other end up. The two transparent hinged covers offer a full view of each stored slide, even bar codes can be read without removing of the slide. All units are stackable and will resist temperatures between -80°C and +100°C. They are not autoclavable.

Measures 7¾ x 11¾".



Cat #	Slide Folder Color	Pack
71502-B1	Blue	Each
71502-B10	Blue	10/pk
71502-G1	Green	Each
71502-G10	Green	10/pk
71502-GR1	Gray	Each
71502-GR10	Gray	10/pk
71502-W1	White	Each
71502-W10	White	10/pk
71502-Y1	Yellow	Each
71502-Y10	Yellow	10/pk
71502-10	Assorted Colors	10/pk

► 5-Slide Container

Holds 5 slides; no contact with one another. Ideal for Air Conveyor Transport System.

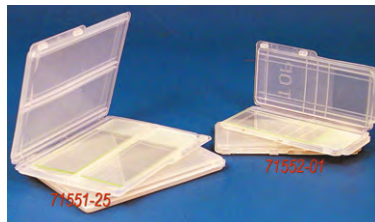
Measures: 3"(L)x¾"(W)x1¼"(H)
(51mmx16mmx32mm)



71550 5 Slide Container 25/pk

► Plastic Slide Mailers

Economical and reusable. These polyethylene mailers have a sturdy resealable clasp. The top of the mailer is clearly labeled and slide labeling is visible through the plastic cover.



71551-25 Plastic Double Slide Mailer 25/pk

► 5-Slide Mailer – Open Top

Made from polypropylene, rigid, strong and durable with convenient flip-tops, snap-on lids. When they stand in their upright position, they can be used as staining containers, with a minimal amount of solution being used. (Note: they are not leak-proof). Available in 2 models. Model 1 needs 14 ml of solution to stain five slides up to the frosted area; Model 2 needs 12 ml of staining solution. Model 1 measures 3½"L x 1¼" W x ¾" (87x30x22mm).

Model 2 measures 3¼"L x 1¼"W x ½" (82x30x17mm). Packaged 25 mailers per pack, 200 per case.



71548-01	5-Slide Container, Model 1	25/pk
71548-08	5-Slide Container, Model 1	200/cs
71549-01	5-Slide Container, Model 2	25/pk
71549-08	5-Slide Container, Model 2	200/cs

► LockMailer™ - Microscope Slide Jar

This is tamperproof multi purpose container for mailing, staining or storing microscope slides.

Constructed of extra strong and opaque clear polypropylene, and high density polyethylene leakproof tamper evident screw cap (The LockMailer can also be used without the tamper evident feature by not used the lock tab), it will hold up to 4 standard 3 x 1" or 25 x 75mm slides vertically. Inside chambers are slotted to keep slides safely separated. For color coding purposes, use Capinsert™ (#61805-series) that may be inserted on top of closure.

This LockMailer™ can be used as small staining vessel. This unit is designed for maximum stability on a bench top with liquid volume only 14 ml. Each standard volume of one slide is 2 ml, therefore when you want to stain 4 slides in this vessel you need only 6 ml of staining solution.

Dimensions: 35 x 87mm H (1⅜" x 3⅜"H). Packaging: 100 per pack.



EMS #	Description
71406-10	LockMailer™ Microscope Slide Jar

Color coded CapInsert™ is available for the LockMailer™

EMS #	Description
61806-W	CapInsert™, White, 100/pk
61806-B	CapInsert™, Blue, 100/pk
61806-R	CapInsert™, Red, 100/pk
61806-L	CapInsert™, Lilac, 100/pk
61806-Y	CapInsert™, Yellow, 100/pk
61806-AS	CapInsert™, Assorted Colors, 100/pk

Five Slide Gripper, See Grids section, page 146 >>>>

► The UniMailer™

Following many suggestions made to us from our customers in the labs—The UniMailer™ is a truly versatile new model mailer which can easily be used for handling and shipping one or as many slides as needed with one type of mailer.

Made from high impact polystyrene, the UniMailer™ is a one-slide tray. Not only do they fit snugly on top of each other but they are also secured by an innovative locking mechanism. You may also want to insert a tamperproof tie or attach an ID label. Each tray allows for the placing of slide in a horizontal position for full visibility. Slides can be easily inserted or removed. As well UniMailer™ can also be used to provide safe storage for those valuable slides you want to protect.

It accommodates 25 x 75 mm (1" x 3") slides with or without cover glass. The mailer measures 89 mm x 29 mm x 6 mm (3½" x 1½" x ¼").

Identification can be made on three sides or on top. The mailer is available in many popular pastel colors for easy identification. Packaging: 50 per box, 200 per case.

Cat. #	Description	Pack
71537-B	UniMailer™, Blue	50/pk.
71537-G	UniMailer™, Green	50/pk.
71537-P	UniMailer™, Pink	50/pk.
71537-W	UniMailer™, White	50/pk.
71537-Y	UniMailer™, Yellow	50/pk.

► Cyto-Tek® Slide Mailer

Sakura Finetek - Designed for safe transport or mailing of up to two glass slide 1x3". Unbreakable plastic container with flip top cap fits through mail system.

Cat. No.	Tissue-Tek	Description	Pack
62625-10	4310	Cyto-Tek® Slide Mailer	100/cs

► Solid Cardboard Slide Mailers

► 1-Slide Mailer

Made from 0.050" (1.29 mm) solid cardboard, measures 3¼" x 1½" when folded. The mailer holds one 3" x 1" glass slide with or without cover glass and has a thumb groove for easy removal. A special cut corner identifies the top of the mailer.

Cat. #	Description	Pack
71539-01	Single Slide Mailer	100/pk.
71539-10	Single Slide Mailer	1,000/pk.

► 2-Slide Mailer

Made from .085" (2.17 mm) chipboard and measures 3" x 4¼" when folded. This mailer is unprinted on both sides which provides warnings for medical specimens and as well as address. Each mailer conforms to U.S. Postal regulations regarding minimum size for First Class.

Cat. #	Description	Pack
71540	2-Slide Mailer	25/pk.
71540-CS	2-Slide Mailer	1,000/pk.

► 4-Slide Mailer

The same construction as 2-slide mailer above, but holds 4 of 3x1" slide.

Cat. #	Description	Pack
71541	4-Slide Mailer - Cardboard	20/pk
71541-CS	4-Slide Mailer - Carboard	200/case

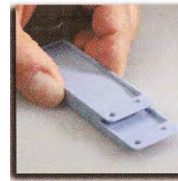
The UniMailer™ is easy to use



Identify content by writing on sides.



Place slide in tray.



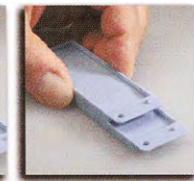
Place another tray on top and slide forward until a click is heard.



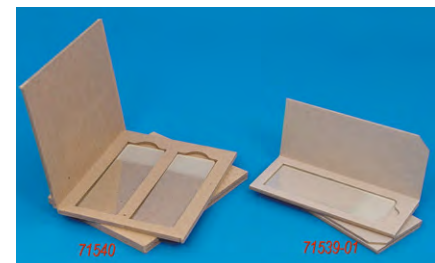
Identify content by writing on sides.



Place slide in tray.



Place another tray on top and slide forward until a click is heard.



► The SlideFile™

The most convenient, organized and versatile way of storing 3" x 1" (75 x 25 mm) microscope slides vertically. This impact resistant SlideFile™ Storage System can hold up to 400 slide per unit in just 1720 cm³ (105 cu. in.) and are stackable for space saving.

Each SlideFile System includes a slide box and two removable trays. A transparent hinged cover makes it easy to see at a glance the content of the box.

Features:

- SlideFile™ System is a removable tray inside the storage box having 100 numbered slots. All slides are stored vertically for easy insertion and removal.
- In the upright position, one is able to read bar codes without having to remove the slide from the box.
- For space saving purposes, you can double the amount of slides simply by storing two slides side-by-side per slot. And for maximum storage space—long-term storage—simply remove the SlideFile Tray and line up 400 slides in three rows.
- Six drain holes incorporated into the tray ensure complete emptying of the liquid when using the slide holder for drying purposes.
- Two index cards numbered from 1 to 100 are included to allow for slide recording titles.

Dimensions: 86 mm x 248 mm x 83 mm high (3³/₈" x 9³/₄" x 3¹/₄" high)

The SlideFile™ System is available in five colors: White, Blue, Green, Pink and Yellow

Cat.#	Description	Pack	Cat.#	Description	Pack
71450-01	SlideFile System, White	each	71452-10	SlideFile System, Green	10/pk.
71450-10	SlideFile System, White	10/pk.	71453-01	SlideFile System, Pink	each
71451-01	SlideFile System, Blue	each	71453-10	SlideFile System, Pink	10/pk.
71451-10	SlideFile System, Blue	10/pk.	71454-01	SlideFile System, Yellow	each
71452-01	SlideFile System, Green	each	71454-10	SlideFile System, Yellow	10/pk.

► SlideFile™ Jr. – Storage System

Similar to the SlideFile™, the junior model can hold up to 200 slides per unit in just 860cm³ (53 cu. in.), and it is stackable to save space. Each SlideFile™ Jr. includes a slide box and a removable tray. A tinted hinged cover makes the contents of the box easy to see at a glance.

Removable tray inside the storage box having 50 individual numbered slots. All slides are stored upright for easy insertion and removal as well as reading the bar codes without removing the slides.

To save space, you can double the amount of the slides simply by storing 2 slides per slot. And for maximum storage space, simply remove the tray and line up 200 slides in 3 rows for long term storage. This system is not autoclavable. The system measures: 82mm x 140mm x 86mm(H). (3¹/₄" x 5¹/₂" x 3³/₈"H)

Cat.#	SlideFile™ Jr. Color	Qty	Cat.#	SlideFile™ Jr. Color	Qty
71448-B1	Blue	each	71448-W1	White	each
71448-B10	Blue	10/pk	71448-W10	White	10/pk
71448-G1	Green	each	71448-Y1	Yellow	each
71448-G10	Green	10/pk	71448-Y10	Yellow	10/pk
71448-P1	Pink	each			
71448-P10	Pink	10/pk			

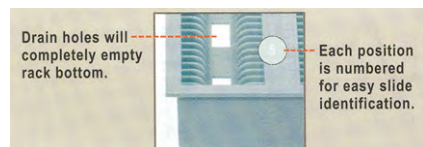
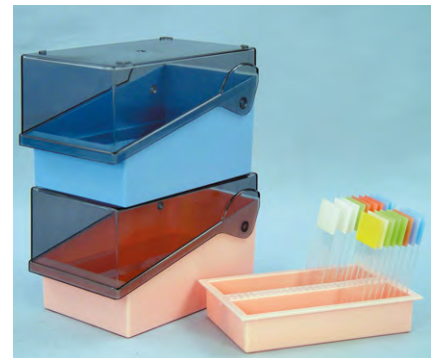
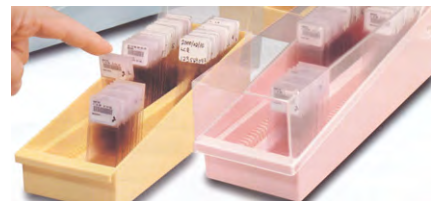
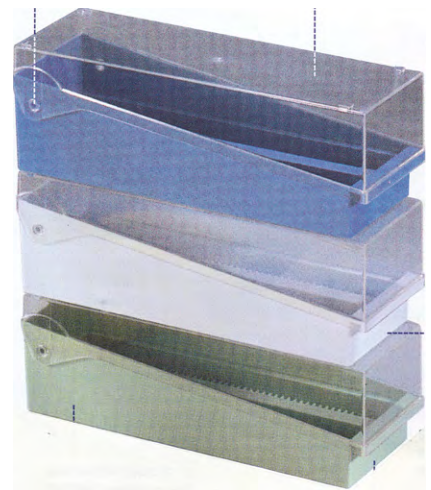
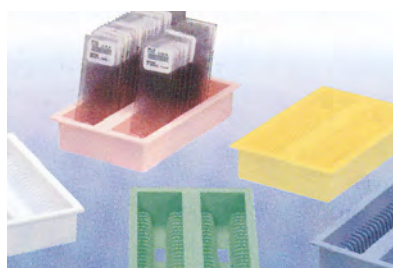
► Drain Rack™

Made from high impact polystyrene.

This rugged tray used as a drain rack can hold up to 200 microscope slides in 100 individual numbered slots. All slides are stored upright for easy insertion and removal. A unique feature with the DrainRack™ is the ability to read bar codes without having to remove the slides from the rack. For space saving purposes, you can double the amount of slides simply by storing 2 slides per slot, giving you a capacity of 200 slides per tray instead of 100. The racks are not autoclavable.

They measure: 75mm x 231mm x 25mm H (3" x 9" x 1" H)

Cat.#	DrainRack™ Color	Qty	Cat.#	DrainRack™ Color	Qty
71446-B	Blue	10/pk	71446-W	White	10/pk
71446-G	Green	10/pk	71446-Y	Yellow	10/pk
71446-P	Pink	10/pk			



► DrainRack Jr.

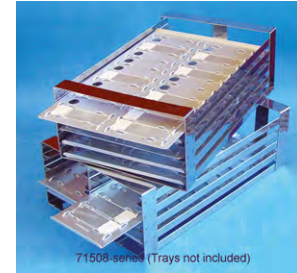
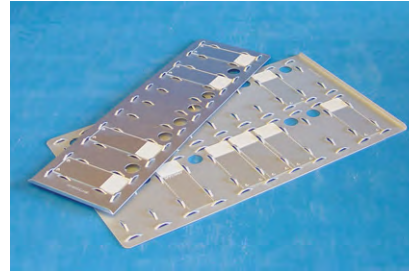
Made from high impact polystyrene

This model is similar to the DrainRack™ above but can hold up to 100 microscope slides in 50 individual numbered slots. The rack is autoclavable. Dimensions: 75mm x 125mm x 25mm H (3" x 5" x 1" H)

Cat.#	DrainRack™ Color	Qty
71445-B	Blue	10/pk
71445-G	Green	10/pk
71445-P	Pink	10/pk
71445-W	White	10/pk
71445-Y	Yellow	10/pk

► Slide Tray Racks & Aluminum Slide Trays

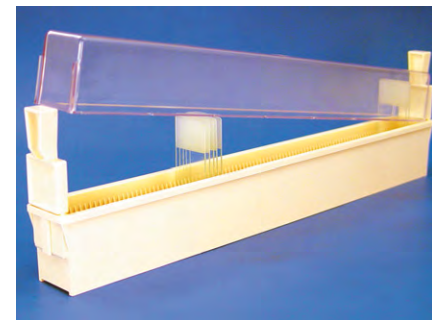
Stainless Steel slide tray racks that accept aluminum slide trays. The rack allows air to circulate over the slides and both sizes of racks hold up to 100 slides. The aluminum slide trays have elevated ridges to separate 76 x 26mm slides and finger holes for easy removal. Ideal for drying fresh mounts. THE Aluminum slide trays are available in two configurations: 10 slide position and 20 slide position.



71506-10	Aluminum Slide Tray, 10-Slide – 13"L x 4" W (330 x 100mm). Accommodates 10 slides	each
71506-20	Aluminum Slide Tray, 20-Slide – 13"L x 7½" W (330 x 190mm). Accommodates 20 slides	each
71508-10	Stainless Steel Slide Tray Rack for 10-Slide Tray Accommodate 10 Aluminum Slide Tray, 10-Slide - 13"L x 8¾"W x 4¼"H (330 x 212 x 112mm)	each
71508-20	Stainless Steel Slide Tray Rack for 20-Slide Tray Accommodate 5 Aluminum Slide Tray, 20-Slide - 13"L x 7¾"W x 4¼"H (330 x 197 x 112mm)	each

► Slide Tray for 100 Slides

Made from tough, resilient ASB plastic which offers long life. Holds 100-standard 1 x 3" slides positioned vertically for easy insertion in pre-numbered grooves allowing for simple identification and retrieval. Dimensions: 14¼"L x ¼"W x 3¾"H (360 x 38 x 100mm). A cover which is optional is made from clear polystyrene offering full visibility and it protects the slides from dirt and dust when they are not in the drawer.



71510-01	100-Slide Tray, Vertical	each
71510-10	100-Slide Tray, Vertical	10/pk
71511-01	100-Slide Tray Cover	each
71511-10	100-Slide Tray Cover	10/pk

71510-10

Slide Warmers, see pages 604-605 >>>>

For all of our Slide Storage and Filing Cabinets, see pages 607-610 >>>>

► Specimen Mailers

1. Single Mailing Container, These fiberboard screw cap mailing cases meet all US Postal Regulations in mailing biological specimens. It also meets IATA regulations regarding shipments of infectious substances. They are constructed of heavy duty fiberboard and have crimped metal rims and seamed metal bottoms. The metal screw caps are autoclavable and offer a secure closure.



Available in several sizes:

61003	SM2, size 1¼"ID x 7"L	12/pk
61004	SM3, size 2¼"ID x 5½"L	12/pk

2. Double Mailing Container

The set consists of an inner aluminum screw cap container and an outer fiberboard screw cap mailing tube. This double type unit is required by US Postal for mailing of etiologic agents or biohazard specimens. Each aluminum container is autoclavable and the cap is lined to prevent leakage.



61011	DM2, tube size 1¾" x 7" Alum. can size 1½" x 6"	12/pk
61015	DM4, tube size 2¾" x 6¼" Alum. can size 2½" x 6"	12/pk

► Histology Containers

- Designed for the storage and transport of histology specimens in fixatives.
- Made from durable polypropylene (except 8L size, which is made of polyethylene)
- Leak-proof self-seal caps



All of the containers (except the 5ml size) have graduated markings on three sides. 2L to 8L sizes are supplied with snap-top lids and carrying handles, and has no graduations.

Cat.#	Visibility	Inside Height x Top I.D.	Size	Pack
64233-10	Semi-Clear	2" x ½" (50 x 13mm)	5ml	500/pk
64233-11	Semi-Clear	1½" x 1½" (40 x 28mm)	20ml	200/pk
64233-12	Semi-Clear	1½" x 1¾" (40 x 42mm)	40ml	200/pk
64233-14	Semi-Clear	2¼" x 1¾" (55 x 42mm)	60ml	100/pk
64233-16	Semi-Clear	2¾" x 1¾" (75 x 42mm)	90ml	400/pk
64233-17	Semi-Clear	3" x 1¾" (75 x 48mm)	120ml	300/pk
64233-18	Opaque	2¼" x 3¾" (55 x 88mm)	250ml	100/pk
64233-20	Opaque	4" x 3½" (110 x 88mm)	500ml	100/pk
64233-22	Opaque	5¼" x 4¾" (135 x 110mm)	1000ml	100/pk
64233-24	White	4¾" x 7¾" (120 x 184mm)	2000ml	20/pk
64233-26	White	7½" x 8¾" (190 x 126mm)	5000ml	10/pk
64233-28	White	9¾" x 9" (245 x 230mm)	8000ml	10/pk

► Sectioning For Histology

► Microtome Blade Holders

Stainless Steel, Disposable Microtome Blade Holders which fit most microtomes and cryostats. If you are looking for a system that combines the quality cutting characteristics of reusable blades with the convenience and consistency of disposable ones our blade holders are your answer.

Our blade holders are:

Versatile - The holders are designed to readily accommodate blades of differing thicknesses. Such adaptability allows the histologist maximum flexibility especially when difficult tissues are encountered.

Durable - Because we use the highest quality stainless steel and the most advanced manufacturing processes, these blade holders are less susceptible to nicks and normal wear and tear.

Convenient - Insert, clamp, adjust the angle, and cut. That's all it takes.

Universal - For the first time, the quality and convenience of disposable blades are available for all rotary microtomes and cryostats - Even the popular Miles Tissue Tek™ (adapter required).

Order information:

Cat.#	Description	Pack
63050	Standard Microtome Blade Holder – 100% stainless steel construction. 2 years warranty. For use with our blades #63060-01 and #63061-01. The holder measures: 6" (152mm) L x 1½" (38mm) W x 7/16" (10mm) T	each
63050-E	Blade Holder w/Extended Handle – Same as #63050, but with an Extended Handle to eliminate the knife guard interference. 6¾" (160mm) long	each
63050-LP	Blade Holder for Low Profile Blades – Same as #63050 but designed for use with any Low Profile (LP) Microtome Blades, #63063, #63065-LP, #63068-LP	each
63050-LPE	Blade Holder for Low Profile Blades, w/Extended Handle – Same as #63050-LP, but with an Extended Handle to eliminate knife guard interference.	each
63050-HP	Blade Holder for High Profile Blades – Same as #63050 but designed for use with any High Profile (HP) Microtome Blades, #63062-01, #63065-HP, #63068-HP	each
63050-HPE	Blade Holder for High Profile Blades w/Extended Handle – Same as #63050-HP, but comes with an Extended Handle to eliminate knife guard interference.	each
63050-LH	Universal Blade Holder – Patented SHUR/Sharp™ blade holder designed for interchangeable use of Low and High profile blades.	each



63050



63050-E



63050-LP



63050-HP

► Cryostat Adapter

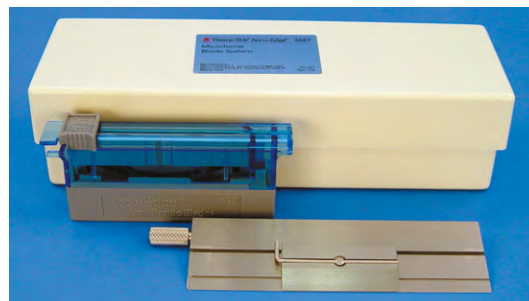
With this device, you can adapt all the above Blade Holders (63050-) to the Sakura Tissue-Tek® Cryostat. The adapters simply screw onto the back of the blade holder for mounting directly to the Cryostat. Guaranteed to improve the quality of your sections.

Cat.#	Description	Pack
63050-CA	Cryostat Adapter for using Our Blade Holders (63050-) in Tissue-Tek Cryostat	each

► Tissue-Tek® Accu-Edge® Rotary Microtome Blade Holders

Sakura Finetek - The Original One-touch and Heavy-duty holders. The one-touch holder offers easy and quick clamping of disposable blades. The heavy-duty holder has no internal parts to clean or maintain, making it virtually maintenance-free. These holders fit any rotary microtome, including Leica, Shandon, Leitz, Surgipath and Tissue-Tek. Each set includes a blade holder, one dispenser of Accu-Edge® Disposable Blades (63068-LP), maintenance tools, replacement parts and a storage case.

Cat.#	Tissue-Tek	Description	Pack
63048-10	4687	One-Touch Holder	each
63048-20	4683	Heavy-duty Holder	each



► Sectioning For Histology (continued)

► Tissue-Tek® Accu-Edge® Cryostat Disposable Blade Holders

Sakura Finetek

1. For Tissue-Tek II® Cryostat

Designed for use with Tissue-Tek II® Microtome/cryostat. Long lasting, easy-to-maintain. This stainless steel blade holder provides easy access to the blade and the tissue section. A anti-roll device keep sections from curling. Built-in magnets facilitate blade positioning.

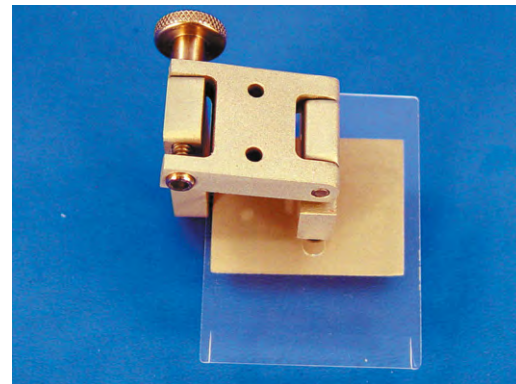
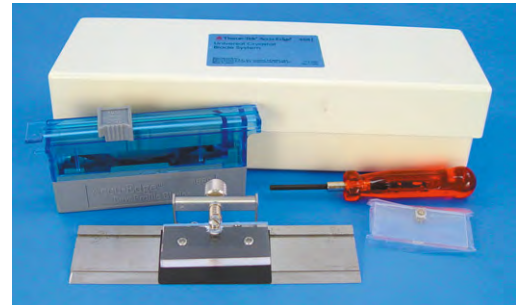
2. For AO/Reichert Cryostat

Designed for AO/Reichert cryostat microtome. It has a right mounted plate to accommodate its off-center blade position and anti-roll device and fits older AO/Reichert cryostat models.

3. Universal Cryostat Holder

Designed to fit IEC, Bright, Leitz, Shandon-Lipshaw and other models. It features a centered blade fixing plate, an anti-roll device. All the above Holders comes with a black resin coated faceplate which offers better visualization of specimens. Each set includes a blade holder, one disposable blade (#63068-LP), maintenance tools, replacement anti-roll plate and storage case.

Cat.#	Tissue-Tek	Description	Pack
63046-02	4682	Tissue-Tek II Blade Holder	each
63046-10	4680	AO/Reichert Blade Holder	each
63046-20	4681	Universal Blade Holder	each



► Anti-Roll Device

An Anti-Roll (A/R) Device which may be used with all our blade holders. It snaps on or off by a unique magnetic attachment system. Its clear plastic plate which is positioned above the sectioning blade prevents any sample curling.

63051-10	Anti-Roll Device	each
63051-12	Extra Plate	each

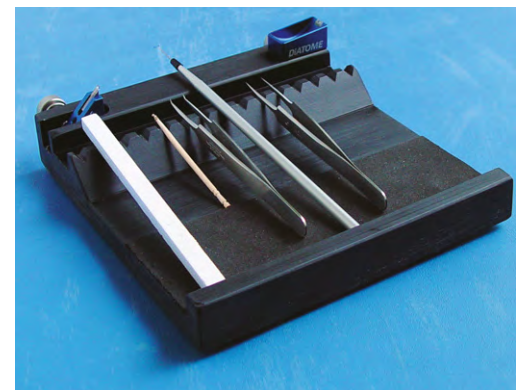
► EMS Ultra-Microtome Aid

Made from hard plastic (Delrin) with a beautifully machined finish to handle many of your instruments that need to be at your fingertips during sectioning.

This EMS Ultra-microtome Aid is a safe place to rest your diamond knife, diamond trimming tool, tweezers, hair curl or eye lash, diamond knife cleaning rods, perfect-loop for picking up sections.

Note: This unit is not a safe device to store your sectioning knives, such as diamond or glass knives, after you're done the sectioning.

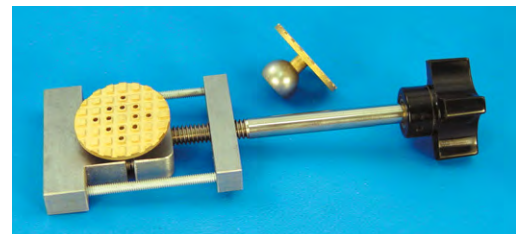
70612	EMS Ultramicrotome Aid	each
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► Tissue-Tek Object Holder Mechanism

The Tissue-Tek Object Holder Mechanism is a unique device which conveniently fits into existing Miles Tissue Tek cryostats and permits X,Y and Z orientation of ball end chucks. It speeds up the process of cutting frozen sections. The Object Holder also enables the histologist to orient the specimen at any plane making sectioning of the correct portion of the specimen much easier. The holder comes complete with clamp and three ball end chucks.

63055-10	Tissue-Tek Object Holder	each
63055-12	Extra Ball End Chucks	each



► Leica® Disposable Microtome Blades

Made from high quality stainless steel. High and low profile disposable blades for use with all Leica microtomes as well as the Cryocut and Cryostat. A PTFE-fluorocarbon resin-coated edge allows sections to slide off the edge without distortion. They minimize compression. Comes 50 blades in a dispenser box.

Low profile blade measures: 2.98"(L) x 0.318"(W) x 0.010"(T) (75.74 x 8.09 x 0.27mm)

High profile blade measures: 2.98"(L) x 0.557"(W) x 0.012"(T) (75.74 x 14.14 x 0.32mm)

Cat.#	Description	Leica #	Pack
63065-LP	Low Profile Leica Blade	819	50/bx
63065-HP	High Profile Leica Blade	818	50/bx



► Disposable Microtome Blades; Stainless Steel

The quality of sectioning depends on the quality of the blade being used. With sharp durable edges, our blades represent a new standard in sectioning quality.

Our blades are available in three different types:

Standard Blade

For routine tissue samples, the standard blade offers an unsurpassed level of quality at an affordable price.

Premium Blade

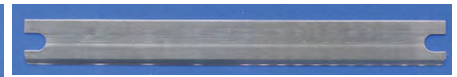
When more difficult specimens are encountered, simply switch to our premium type- a heavy duty blade which allows you to achieve ribbons of unsurpassed quality.

The Edge

Years of research went into choosing the optimum stainless steel and edge combination. Repeated testing was performed by histologists to assure that SHUR/SHARP blades represent the ultimate in consistency for sectioning technology. Chatterless and compression free ribbons will become routine no matter what the tissue is.



63061-01



63063-01



63062-01



63064-01

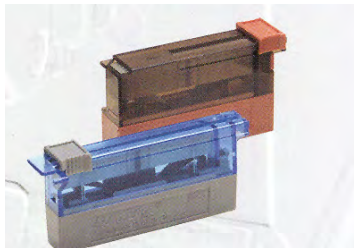
Description	Cat.#	Pack
Disposable Microtome Blade, Uncoated, Heavy Duty. Measures: 3"L x 0.498"W x 0.02"T (76.22 x 12.6 x 0.52mm). 35 blades/box, 10boxes/case.	63061-01	35/bx
	63061-10	10bx/cs
Disposable Microtome Blade, Uncoated. Use with 63050-HP, 63050-HPE and all high profile blade holders. Measures: 3"L x 0.562"W x 0.012"T (76.22 x 14.28 x 0.32mm). 60 blades/box, 10 boxes/case.	63062-01	60/bx
	63062-10	10bx/cs
Disposable Microtome Blade, Low Profile, Coated. Measures: 3"L x 0.312"W x 0.012"T (76.22 x 7.92 x 0.32mm). 50 blades/box, 10 boxes/case.	63063-01	50/bx
	63063-10	10bx/cs
Disposable Microtome Blade, High Profile, Coated. Measures: 3"L x 0.553"W x 0.012"T (76.22 x 14.05 x 0.32mm). 50 blades/box, 10 boxes/case.	63064-01	50/bx
	63064-10	10bx/cs

Note: Coated Blades: blades are coated with PTFE

► Tissue-Tek® Accu-Edge® Disposable Microtome Blades

Sakura Finetek - These ultra sharp, high quality microtome sectioning blades offer striation, distortion and chatter free sections.

Comes in a dispenser with 50 blades. Low profile blades fit all Accu-Edge® Blade Holders for microtomy and cryotomy #63048-10, #63048-20, #63046-02, #63046-10, #63046-20. The high profile blades are suitable for blade holders that are 14mm in height. Packed 50 blades per dispenser.



Low profile blade measures: 3.15"(L) x 0.314"(W) x 0.010"(T) (80.07x8.31x0.26mm)

High profile blade measures: 2.982"(L) x 0.550"(W) x 0.012"(T) (75.74 x 13.98 x 0.31mm)

Cat.#	Description	Tissue-Tek	Pack
63068-LP	Low Profile Accu-Edge Blade	4689	50/bx
63068-HP	High Profile Accu-Edge Blade	4685	50/bx

► Disposable Microtome Blades - Feather® Blades



These ultra-sharp blades section specimens without striations, distortions, or chattering. The dispenser delivers a new blade in seconds, automatically ejecting the used blade. Holds 50 blades. Low profile blades fit all Accu-Edge Blade Holders for microtomy and cryotomy: 63048-10, 63048-20, 63-46-10, 63046-20, and 63046-02 (see page 325). 50 blades per dispenser, 10 dispensers per case. The blades measure: 3.15" x 0.31 x 0.09" (80.0 x 8 x 0.24mm)

Cat.#	Description	Pack
63069-LP	Low Profile Microtome Feather® Blade	50/bx

➤ Sectioning For Histology (continued)

➤ Tissue-Tek® Microtome Lubrication Kit

This kit contains special low temperature blended lubricants and grease for the routine maintenance of all of the Tissue-Tek microtomes. Tissue-Tek® II and Tissue-Tek® brand Cryo 2000™.



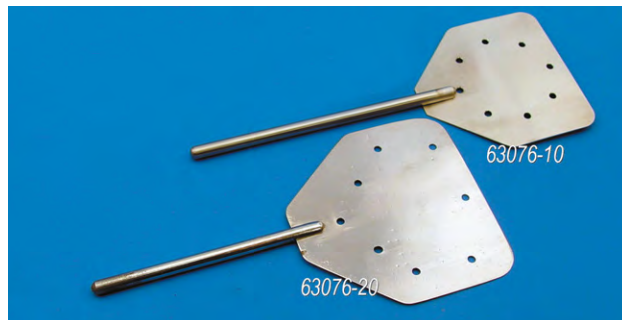
Cat.#	Tissue-Tek	Description	Pack
62556-01	4556	Tissue-Tek™ Lubricating Kit	each

➤ Section Lifters

Made from polished stainless steel. These section lifters come in three sizes:

Model A: Blade measures 1½"x1½" (38 x 38mm), overall length is 6" (138mm)

Model B: Perforated blade. Blade measures: 2¾"x2¾" (60 x 60mm). Overall length is 7" (150mm)



63076-10	Section Lifter Model A	each
63076-20	Section Lifter Model B	each

➤ Microtome Oil

A chemically pure, high-grade lubricant used in precision instruments. Should be used periodically to lubricate cross-rollerbearings for microtomes.



60744	Microtome Oil, 100ml	each
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➤ Top Shelf with Light

This optional Workshelf with light is an added for user convenience when operating Tissue-Tek® Cryo 2000™ Microtome/Cryostat.

Cat. #	Tissue-Tek	Description	each
62547-06	4706	Top Shelf with Light	each

➤ For our Ralph Maker *see page 596* >>>>

➤ For our Glass Knife Strips *see page 255* >>>>

➤ Tissue-Tek® Quick Ray™

Tissue Microarray System: Building Superior Results

The Tissue Microarray are a collection of multiple tissue cores that are arranged in an XY fashion inside of a paraffin block allowing for histological analysis

The Tissue-Tek® Quick-Ray™ technique produces superior quality TMA's in less time than with traditional methods, and accomplishes finished products at a fraction of the cost. The Tissue-Tek® Quick-Ray™ uses a hollowed tip to remove tissue cores as small as 1 mm from paraffin-embedded tissue (donor block). The extracted tissue is then inserted into a preformed recipient block—the Quick-Ray™ System is the only system available that uses a preformed paraffin recipient block.

The finished block is sectioned using a microtome; the sections are mounted on glass slides and then stained. Each TMA block can be cut into 300-400 sections at 4-5 μ, which can then be subjected to independent tests. Common tests include immunohistochemistry and fluorescent in situ hybridization.

Compact design and versatility make building a Tissue-Tek® Quick-Ray™ TMA astoundingly simple. The construction of a TMA block can be done on any clean counter, and does not require a dedicated space.

The Quick-Ray system is the only system available that uses a preformed paraffin recipient block. There is no other system or instrument that provides a ready to use paraffin recipient block. The finished block is then sectioned using a microtome; the sections are mounted on glass slides and then stained. Each TMA Block can be cut into 300-400 sections at 3-4 microns.

FEATURES:

- Ready-to-use paraffin recipient block
- Compact design and versatility
- No dedicated space required for TMA block formation

The Tissue-Tek® Quick-Ray™ Tissue Microarray System consists of:

- One puncher
- Four paraffin recipient blocks (1 mm, 2 mm, 3 mm, and 5 mm)
- One basemold
- Four punch tips (1 mm, 2 mm, 3 mm, and 5 mm)
- One 1-mm punch guide

Cat. #	Description	Qty.
62595-01	Tissue-Tek® Quick-Ray™ System	each
62595-02	Punch Guide, 1 mm	each
92595-03	Quick-Ray™ Punch Tip 1 mm	each
62595-04	Quick-Ray™ Punch Tip 2 mm	each
62595-05	Quick-Ray™ Punch Tip 3 mm	each
62595-06	Quick-Ray™ Punch Tip 5 mm	each
62595-07	Quick-Ray™ Recipient Block 1 mm	each
62595-08	Quick-Ray™ Recipient Block 2 mm	each
62595-09	Quick-Ray™ Recipient Block 3 mm	each
62595-10	Quick-Ray™ Recipient Block 5 mm	each
62595-11	Quick-Ray™ Basemold	3/pack



► TISSUE-TEK® VIP® 5 ACCESSORIES

EMS #	Tissue-Tek	Description	Qty.
62592-50	4899	Activated Carbon Cartridge, 2/case – Used with Tissue-Tek® VIP™5, VIP™ E150 and E300 Tissue Processors. The activated carbon cartridges can be incinerated for disposal.	each
62592-40	4397	Printer - For QA purpose, a printer can be connected to the Tissue-Tek® VIP™ processor. It allows to keep printed records of the processed runs, noting any error conditions. System parameters and other useful information can be printed	each
62592-51	5181	Retort Gasket – The Retort Gasket can be used with all models of Tissue-Tek® Tissue Processor. This gasket must be replaced periodically to ensure proper sealing of the retort during processing, each	each
62590-50	1550	Paraffin Scraper	each
62592-54	5264	Basket Transport Tray	each
62592-55	5265	150-Cassette Basket with Handles	each
62592-56	5266	65-Cassette Basket with Handles	each
62592-57	5267	150-Cassettes Basket without Handle	each
62592-58	5268	75-Cassettes Basket without Handles	each
62592-59	5269	Basket Hook for Basket 5267	each
62592-60	5270	Basket Hook for Basket 5268	each
62592-61	5271	Basket Divider,	6/case
62592-62	5272	Reagent Bottle (s/n 52140294 or 52150705 and lower)	each
62592-70	5280	Reagent Bottle (s/n 52140295 or 52150706 and higher)	each
62592-63	5273	Reagent Bottle Labels (150/300),	each
62592-64	5274	Paraffin Container (with Inserts),	each
62592-65	5275	Displacement Block,	each
62592-66	5276	Drain/Fill Hose	each
62592-68	5278	Paraffin Container Back Insert	each
62592-69	5279	Paraffin Container Front Insert	each

► TISSUE-TEK® VIP® E Series 150, 300 ACCESSORIES

EMS #	Tissue-Tek	Description	Qty.
62591-61	1521	Cassettes Basket (Complete)- Used with Tissue-Tek® VIP™ E150 & E300 Tissue Processors. Each basket can hold up to 150 Uni-cassette®. Lid and dividers are included	each
62591-62	1522	Reagent Bottle, each - (If all the attachments are also needed, order item number 62591-66)	each
62591-63	1523	Reagent Bottle Cap – Rear, each. (For use with item 62591-62)	each
62591-64	1524	Reagent Bottle O-Ring – Rear, each. (Install on the back connector of item 62591-62 to provide a sealed connection with instrument)	each
62591-65	1525	Reagent Bottle Cap/O-Ring – Front, each. (Install on the front connector of item number 62591-62)	each
62591-66	1526	Reagent Bottle (Complete with all the attachments)	each

► Sakura Processing Reagents & Tissue Processor Supplies

Tissue-Tek® VIP™ Fixative

Eliminate the need for routine warm water flushing with the Tissue-Tek® VIP™ Fixative. Using the unique Neutra-pHase™ technology, the Tissue-Tek® VIP™ Fixative produces no precipitates in the presence of alcohol, contrary to all other 10% neutral buffered formalin products. The Tissue-Tek® VIP™ Fixative will not promote formation of salts within the tissue processor lines which can cause costly damages to any brands of tissues processors unless regular maintenance is performed. Since the base ingredient is formalin, it is fully compatible and can replace 10% NBF without any adjustments to your procedures. The product is offered in three convenient package sizes: 1 gallon, 2.5 gallons and 5 gallons.



Tissue-Tek® Processing/Embedding Medium

Tissue-Tek® VIP™ Paraffin – its unique composition allows reduced compression sections as thin as 2µm. The low melting point (56°C) protects samples from heat damage. Will not dis-color under normal processing conditions. Leaves no plasticizer residue to clog paraffin lines in tissue processors and embedding centers. Supplied in small pellets for rapid melting. Eight convenient 1 kg bags per case.



Tissue-Tek® Filter Carbon

Tissue-Tek® VIP™ Vacuum Infiltration Processor Filter Carbon Replacement activated filter carbon, 3.25 lb carton. For use with VIP™ Tissue Processor: 1000, 2000, 3000 series



EMS#	Tissue-Tek	Description	Qty
62582-01	5990	Tissue-Tek™ VIP® Fixative	1gal
62582-04	5990	Tissue-Tek™ VIP® Fixative	4 x 1gal
62582-02	5989	Tissue-Tek™ VIP® Fixative	2.5 gal
62582-05	5991	Tissue-Tek™ VIP® Fixative	5 gal
62582-50	5992	Spigot for items 5889 & 5991	each
62580-01	4005	Tissue-Tek™ VIP® Paraffin	1 kg
62580-08	4005	Tissue-Tek™ VIP® Paraffin	8 x 1 kg
62583	4663	Tissue-Tek™ Filter Carbon	3.3 lb (1.5kg)

► Tissue-Tek® TEC™ 5 Tissue Embedding Console System

The Tissue-Tek® TEC™ 5 System provides a compact, single workstation that enable both specimen orientation and paraffin embedding. It can be customized to

user preferences by placing the TEC™ 5 modules in a left-to-right or right-to-left arrangement for optimal workflow.

Other included advances that optimized operations include a finger touch-plate and optional foot pedal for precise control of paraffin flow, a dispensing tower knob to adjust the flow rate to specific tasks, and an automatic ON/OFF switch that allows manual override for greater flexibility. The TEC™ 5 also offers other advances for heightened performance, like temperature control over key areas for uniform regulation (all heated areas from 50°C to 75°C in 1°C increments; Cryo Module plate from -10°C to 0°C in 1°C increments) individual temperature control for left and right Thermo Storage Compartments to allow use as either paraffin baths or warming caddies for base molds, and an efficient cooling system to maintain temperature levels even when the plate is full.

More TEC™ 5 features includes six easy-to-reach forceps wells, an ample chilling area for approximately 60 specimens blocks, a panel display of temperatures in all heated and cooled areas and easy-to-clean surfaces with no hidden corners to catch paraffin debris. Electrical forceps are optional.

FEATURES:

- **Two module configuration option (left-to-right or right-to-left)**
- **User control over paraffin**
 - Paraffin flow control via finger touch-plate and optional foot pedal
 - Adjustable gravity feet paraffin dispenser
- **Temperature control**
 - 50°C to 75°C in 1°C increments in all heated areas
 - -10°C to 0°C in 1°C increments in Cryo Module plate
 - Efficient cooling system
 - Individual temperature control over left and right Thermal storage Compartment (can be used as a paraffin bath or warming caddy for base molds)
 - Panel temperature display for all heated/cooled area
- **Fully programmable ON/OFF control**
 - Automatically starts up and shuts down
 - Allows manual override to bypass timer operation
- **Environmentally safe refrigerant**
- **Six forceps wells**
- **Optional electrical forceps available**
- **Chilling area for approximately 60 cassette specimens**



SPECIFICATIONS

Application:Modular system aid in embedding histology specimen
 Product Codes:#5100 Complete System
(Modular, including 1 Embedding Module
[#5101] and 1 Cryo Module [#5102])
 Dimensions
 (complete system):.....35.6"W x 25.3"D x 14.8"H
(90.4 x 64.2 x 37.7 cm)
 Embedding Console: 22.6"W x 25.3"D x 14.8"H
(57.5 x 364.2 x 37.7 cm)
 Cryo Console: 13.0"W x 24.3"D x 14.8"H
(33.0 x 61.7 x 37.57cm)
 Weight:
 Embedding Console:26kg (57 lbs)
 Cryo Console:22 kg (48 lbs)
 Power Requirement:115 VAC, 60Hz
 Paraffin Chamber Capacity:..... 4 Liters
 Left and Right Thermal Chamber capacity:1.5 Liters each
 Temperature Ranges:
 Paraffin Chamber:50°C to 75°C (122°F to 167°F)
 Thermal chambers:50°C to 75°C (122°F to 167°F)
 Heating Forceps Wells:50°C to 75°C (122°F to 167°F)
 Cooling Plate: -10°C to 0°C (23°F to 32°F)
 Optional:Electric Forceps: 1 to 5
 Cooling Plate:Up to 60 blocks
 Working Area:Insulated warm area holds up to 20 cassettes

EMS #	Tissue-Tek	Description	Qty.
62590	5100	Tissue-Tek® TEC™5 Embedding System	each
62590-01	5101	Tissue-Tek® TEC™5 Embedding Module	each
62590-02	5102	Tissue-Tek® TEC™5 Cryo Module	each
62590-03	5200	Tissue-Tek® TEC™Plus, Cryo Console - provides a large, refrigerated surface for the rapid cooling of paraffin blocks. The nylon work surface matches the Embedding Console height for optimum efficiency. Accommodates approximately 60 base molds/cassettes. Quiet compressor; reduces noise fatigue. Constant digital display indicates cold plate temperature during operation. Plates cools to -5°C in about 20 minutes. Temperature is adjustable from -10°C to 0°C	each
62590-50	1550	Paraffin Scraper	each
62590-51	1551	Tamper, Large	3/pk
62590-52	1552	Tamper, Small	3/pk
62590-53	1553	Lamp	2/case
62590-71	5781	150-Cassette Transfer Tray	each
62590-72	5782	75/65-Cassette Transfer Tray	each
62590-73	5783	TEC™ 5 Base Mold Divider	each
62590-74	5784	TEC™ 5 Magnifying Glass	each
62590-75	5785	TEC™ 5 Foot Pedal	each
62590-76	5786	TEC™ 5 Electric Forceps	each
65290-78	5788	TEC™ 5 Arm Rest - consists of 2 individual parts with an adhesive backing that can be placed on either side of the TEC™ 5 working space for added protection against contact with the hot plate while embedding. They are packaged 2 per set.	each

► **ACCU-CUT® SRM™ 200 Rotary Microtome**

The Accu-Cut® SRM™ 200 Rotary Microtome is designed to work with the Accu-Edge® Blade System to offer unparalleled performance. This manual microtome features a smooth-running hand-wheel helps minimize stress on the operator's hands and optimize both efficiency and productivity, three-axis specimen orientation, specimen retraction, lateral displacement of the Blade Holder and trimming functions.



The SRM™ 200 was designed with blade compatibility in mind, maximizing the performance of the Accu-Edge Blades.

Dimensions:16"W x 18.5"D x 12"H (40 x 47 x 29.5 cm)
 Weight: 29 kg (64 lbs)
 Thickness setting range:.....0.5 – 60 microns.
 Available two models: retracting and non-retracting.

FEATURES

- The universal cassette clamp ensures that the specimen block is held securely in place, while the orienting clamp allows the user to precisely position the specimen surface to the blade.
- Specimen retraction not only protects the specimen surface, it helps ensure that the microtome blade remains sharp and effective.
- A trimming lever allows the user to advance the specimen 10 or 50 microns to facilitate accurate and fast trimming of the specimen block
- The micron thickness setting is an adjustable visual display, which ensures accuracy with each rotation of the handwheel. For ease of use, the handwheel brake engages in any position.
- For added convenience and safety, the Universal Blade Holder base has a lateral displacement feature. This allows the operator to utilize the full length of the microtome blade without having to release the blade clamping mechanism or directly manipulate the blade.
- Cleaning and maintenance is easy, thanks to the sliding cover that protects the inside of the instrument from sectioning debris. (Waste Tray #63318-01 and Bag #63318-25 are available separately)
- Accessories included for use with low- and high-profile.

EMS #	Tissue-Tek	Description	Qty.
62660	1429	Accu-Cut® SRM™ 200 Rotary Microtome, Retracting	each
62660-NR	1429N	Accu-Cut® SRM™ 200 Rotary Microtome, Non-Retracting	each
Accessories included with system			
62660-54	1434	Blade Holder Base Assembly	each
62660-55	1435	Holder for Disposable Blades	each
62660-56	1436	High-Profile Back-Plate	each
62660-57	1437	Low-Profile Back-Plate	each
62660-58	1438	Orienting Clamp Attachment	each
62660-59	1439	Universal Cassette Clamp	each
62660-60	1440	Maintenance Kit (Including Microtome Oil)	each

EMS #	Tissue-Tek	Description	Qty.
Optional Accessories			
62660-61	1441	Dust Cover	each
62660-62	1442	Holder for Reusable Knife	each
62660-63	1443	Fixed Clamp Attachment	each
62660-64	1444	Specimen Clamp, 40 x 40 mm	each
62660-65	1445	Specimen Clamp, 50 x 55 mm	each
62660-66	1446	V-Insert	each
62660-67	1447	Microtome Oil, 50 ml	each
62660-69	1469	Holder for High Profile Blades	each
63318-01	4657	Microtome Waste collection	Set
63318-25	4658	Waste Collection Bags	250/case
62536-04	4650	Cold Plate	24/case

► **Tissue-Tek® Film® Coverslipper**

Tissue-Tek®Film® Coverslipper is designed to automate the manual task of permanently mounting a histology or cytology stained slide. The Film® Coverslipper has the ability to link with Prisma Slide Stainer which makes this instrument a fully integrated system offering complete walk away convenience. Coverslips up to twenty slides per minute with a cellulose tri-acetate film coated with a xylene-activated resin on the lower surface. The flexible film, with optical clarity equal to glass, is automatically applied to the slide, eliminating the use of sticky mounting media and extended xylene contact. Selectable mounted film length and batch or single slide operating capabilities.



SPECIFICATIONS

Dimensions:28.3" W x 23.2" D x 27.1" H (72 x 59 x 69 cm)
 Weight:165 lbs (75 kg)
 Electrical:115VAC, 60 Hz
 Coverslipping Capacity:Continuous loading of 60 slides at a time
 Throughput:Coverslips 1 slide every 3 seconds,
 up to 1,080 slides per hour
 Operational Temperature:10°C to 40°C

► **Tissue-Tek® Film® Coverslipper Accessories**

Link System (6134) – The Link System combines the Prisma® and the Film® into one fully integrated system offering complete walk away convenience. The Link performs an automatic robotic transfer of slide basket from stainer to coverslipper

Solvent Bottle (4745) – 500 ml glass bottle holds xylene for use in the Film™ Coverslipper



Solvent Bottle Caps (4746) – The xylene bottle cap is positioned on the xylene bottle to prevent excess fumes. The cap is designed with a hole to fit into the xylene dispensing area.

Waste Bottle (4748) – 200 ml glass bottle used to collect excessive xylene drained from the dispensing area of the Film® Coverslipper

Waste Bottle Cap (4749) – The Waste Bottle Cap is positioned on the waste bottle to prevent excess fumes. The cap is designed with a hole to fit into the waste area.

Exhaust Duct Adapter (4750 & 4751) – The Tissue-Tek® Film® Coverslipper offers an optional Duct Connection Adapter which connects to an external exhaust system, for added protection. Two sizes are available, 38 mm and 75 mm.

continued on next page >>>>

► Tissue-Tek® Film® Coverslipper Accessories (continued)

Stainer & Coverslipper Slide Basket (4768) - Basket for Tissue-Tek™ Stainers and Coverslipper for use with the Film® and SCA™ Coverslippers, the Prisma®, DRS-601™ Histology/Cytology Slide Stainers and the RSG-61™ Hematology Slide Stainer. The special basket design reduces cross contamination and carry-over. The basket can also be used in a microwave oven. The slide baskets are available in case quantity.



Coverslipping Film (4770) – Cellulose tri-acetate film coated with a xylene-activated resin on the lower surface. The flexible film, with optical clarity compatible to glass, is automatically applied to the slide, eliminating the use of sticky mounting media and extended expose to xylene. Selectable mounted film length and batch or single-slide operating capabilities. The Film is available 5 rolls per case, each roll can coverslip 1,000 slides.



Coverslipper Film Cutter Blades (4772) – Blades are used inside the Film® Coverslipper to precisely cut each roll of film to the precise dimensions of the slide. The Coverslipper Film Cutter Blades are available 5 blades per case.

Fume Filter (6160) – The fume filter for the Film® Coverslipper is sufficient in removing fumes that are generated during routine use. It is recommended that the filter be replaced once a month. Fume Filter are packaged 2 to a case.



Activated Carbon Filter Block (4775) – Activated Carbon Filter Block for use with Tissue-Tek® SCA™ Coverslipper Fume Controller. This Filter Block is easily installed to provide fume filtration during operation, coverslipping 5,000 slides.



EMS #	Tissue-Tek	Description	Qty.
62665	4740	Tissue-Tek® Film® Coverslipper	each
62666-PR	6134	Link System for Connectivity Film® and Prisma® Stainers	each
62665-55	4745	Solvent Bottle, 500 ml	each
62665-56	4746	Solvent Bottle Cap	each
62665-58	4748	Waste Bottle, 200 ml	each
62665-59	4749	Waste Bottle Cap	each
62665-60	4750	Exhaust Duct Adapter, 38mm	each
62665-61	4751	Exhaust Duct Adapter, 75mm	each
62665-67	4768	Stainer & Coverslipper Slide Basket	each
62665-68	4768	Stainer & Coverslipper Slide Basket	10/case
62665-71	4770	Coverslipping Film	5 rolls/case
62665-72	4772	Film Cutter Blades	5/case
62593-70	6160	Fume Filter	2/case
62662-75	4775	Activated Carbon Filter Block (SCA® Coverslipper)	2/cs

► Tissue-Tek® Glas™ g2 Coverslipper

Elevate Traditional Glass Coverslipping With Tissue-Tek® Automation

Introducing Tissue-Tek® Glas™ g2 – the premier automated glass coverslipper that link to the Tissue-Tek® Prisma® Stainer to provide a true walkaway system

The Tissue-Tek® Glas Coverslipper is a state-of-the-art instrument automated coverslipping procedures to a new level. With a throughput of up to 400 slides per hour, the Tissue-Tek® Coverslipper provides clean bubbles-free slides fast and consistently. The flexibility design accommodates both histology and cytology specimens. Mounting medium volume is easily and adjustable for all type of specimens. Coverglass size 40, 50, 55 and 60 mm can be changed easily and the speed of coverslipping can be modified for specimens more difficult to coverslip. This Coverslipper is enabled to be used with xylene or xylene substitutes.



FEATURES:

- Links with Tissue-Tek™ Prisma® Stainer
- Unloading station accommodates 12 slide baskets (240 slides)
- Continuous loading
- Low mounting medium alert
- 500 ml mounting medium capacity
- Slide gripper accommodates slides with paper labels
- Programmable drying time
- Independent operation and loading when linked to Prisma® Stainer
- Up to 9 programs accommodate 8 different sizes of glass coverslips
- 2 drying fans on top and bottom of slides
- Advanced filtration system for safe, comfortable

SPECIFICATIONS

Application:Histology, cytology specimens
 Products:#6500 - Tissue-Tek® Glas™ g2 Automated Coverslipper
 #6168 – Link System to Tissue-Tek® Glas g2 Coverslipper with Tissue-Tek® Prisma® Automated Slide Stainer #6130
 Dimensions:29.53" W x 24.41" D x 29.53" H (75 x 62 x 75 cm)
 Electrical:115 VAC, 1.7 Amps, 60 Hz
 Weight:242 lbs (110 kg)
 Alarm:Audible beeps, including low mounting medium alert and screen display messages
 Process Mode:Continuous loading – intelligent loading
 Slide Retrieval Speed:Variable – 5 speeds
 Process Capacity:Up to 20 slides per basket
 Mounting Medium:500 capacity
 Fume Controls:Exhaust fan and activated carbon

Tissue-Tek® Glas™ Mounting Medium is designed specially to be used on the Glas™ Coverslipper to maximize performance, producing clean, bubble-free slides. This xylene-based mounting medium is medium viscosity and can be opened and placed directly onto the mounting medium area of the coverslipper, no pouring needed. Each 16 oz bottle coverslips up to 10,000 slides.

Link System combines the Prisma® Stainer and the Glas™ g2 into one fully integrated system offering complete walk away convenience.

EMS #	Tissue-Tek	Description	Qty.
62664	6500	Tissue-Tek® Glas™ g2 Coverslipper	each
62666-G2	6168	Link System	
62552-01	6419	Tissue-Tek® Glas™ Mounting Medium	each
62664-54	6504	Receiving Rack	each
62664-55	6505	Waste Bottle	each
62664-56	6506	Exhaust Hose Assembly, 38 mm Diameter	each
62664-57	6507	Exhaust Hose Assembly, 75 mm Diameter	each
62593-70	6160	Fume Filter	2/case

► TISSUE-TEK® GLAS™ COVERSLIPPER SUPPLIES

► **Tissue-Tek® Glas™ Mounting Medium (6419)** – Is designed specially to be used on the Glas™ Coverslipper to maximize performance, producing clean, bubble-free slides. This xylene-based mounting medium is medium viscosity and can be opened and placed directly onto the mounting medium area of the coverslipper, no pouring needed. Each 16 oz bottle coverslips up to 10,000 slides.

Loading Drawer (6421) – This loading drawer for the Tissue-Tek® Glas™ Coverslipper is for holding slides prior to coverslipping. The loading drawer is divided into three sections, accommodating up to three slide basket per section, holding total of 60 slides. Xylene or xylene substitute may be added to the loading drawer to prevent slides from drying out prior to coverslipping. The drawer may be removed from the loading area and covered to prevent evaporation when not in use.

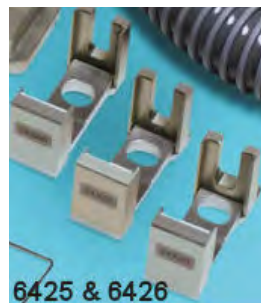


Drawer Cover (6422) – The drawer cover is used to cover the Loading Drawer, which helps prevent evaporation of solvent when the instrument is not in use.

Nozzle Reservoir (6423) – The nozzle reservoir consists of small plastic bottle and lid which is sealed inside a metal housing. The nozzle reservoir is used for keeping the mounting medium nozzle tip from drying out during use. It should be filled with xylene or a compatible solvent. The mounting medium tip is positioned inside the reservoir when the instrument is in the stand by mode or not in operation.



Coverglass Holders (6425, 6426, 6427 & 6428) – The coverglass holders is used for holding coverglass which will be used for application during coverslipping operations. Three standard sizes are available for use on the Glas™ Coverslipper, 40 mm, 50 mm, and 60 mm. Each holder can hold up to 200 coverglasses at one time. These holders are seated on the coverglass stage of the instrument and are removable for ease of loading.



Receiving Rack (6429) – This receiving rack is for retrieve slides which have been completed by the coverslipping process. Each metal rack is grooved and capable of holding up to 20 slides. As each slide enters the rack, the rack is advanced to the next position, anticipating receiving the next slide. Rack are easy to remove and replace with the convenient handle.



Plastic Waste Tray (6430) – The plastic waste tray is seated in the metal housing next to the nozzle reservoir. The purpose of the waste tray is to collect any mounting medium waste that may be generated during coverslipping operations. The plastic tray is removable and disposable. It should be replaced periodically as necessary.



Priming Bottle (6433) – The priming bottle is used only during set up procedure prior to normal operation of the instrument. The priming bottle has a narrow tube extending from the bottle, which is used to connect to the mounting medium tube located on the instrument. This priming bottle should be filled with xylene and manually pumped through the mounting medium line to remove any trapped air or air bubbles which may be present in the line before operation.



Waste Bottle (6435) – The purpose of the waste bottle is to collect xylene waste which was generated during priming procedures. This plastic waste bottle and lid are used only during set up procedures.

Exhaust Hose (6439) – The DRS 200 exhaust hose can be used to externally vent off the instrument fumes if desired. The DRS 2000 is equipped with an internal fume exhaust system

Stainer and Coverslipper Slide Basket (4768) - Basket for Tissue-Tek™ Stainers and Coverslipper for use with the Film® and SCA™ Coverslippers, the Prisma®, DRS-601™ Histology/Cytology Slide Stainers and the RSG-61™ Hematology Slide Stainer. The special basket design reduces cross contamination and carry-over. The basket can also be used in a microwave oven. The slide baskets are available in case quantity.



EMS #	Tissue-Tek	Description	Qty.
62552-01	6419	Tissue-Tek® Glas™ Mounting Medium, 16 oz	each
62663-61	6421	Loading Drawer	each
62663-62	6422	Loading Drawer Cover	each
62663-63	6423	Nozzle Reservoir	each
62663-65	6425	Coverglass Holder for 40 mm	each
62663-66	6426	Coverglass Holder for 50 mm	each
62663-67	6427	Coverglass Holder for 55 mm	each
62663-68	6428	Coverglass Holder for 60 mm	each
62663-69	6429	Receiving Rack, each	
62663-70	6430	Plastic Waste Tray	each
62663-73	6433	Priming Bottle	each
62663-75	6435	Waste Bottle	each
62663-79	6439	Exhaust Hose	each
62665-67	4768	Stainer and Coverslipper Slide Basket	each
62665-68	4768	Stainer and Coverslipper Slide Basket	10/case

► Tissue-Tek® Prisma® Slide Stainer Automatic Slide Stainer

Suitable for high volume laboratories which do not want to sacrifice quality. The Prisma® has the ability to be linked with the FilmCoverslipper (by use Link System for Connectivity with Prisma® Stainers #62666) which makes this instrument a fully integrated system, offering complete walk away convenience. Continuous loading of baskets enables high throughput and the intelligent loading feature allows Prisma® to handle as many as 360 slides per hour. The Prisma® is compatible with histology and cytology staining protocols. Reagent reservoir configurations allows for simultaneous runs of H & E and special stains.



ADDITION FEATURES:

- Ability to set multiple loading and unloading stations based on slide volume
 - Program up to 3 stations for continuous loading
 - Program up to 5 stations for efficient unloading
- 2 drying stations to reduce potential bottlenecks
- 2 optional heating stations for special stains like PAS, Giemsa stain, and Mucicarmine stain
- Compatible with histology and cytology protocols, including PAP and non-gyn
- Touch sensitive color menu screens

SPECIFICATIONS

Dimensions:49.2" W x 28" D x 24.8" H (125 x71.3 x 63 cm)
 Weight:330 lbs (150 kg)
 Electrical:115VAC, 60 Hz
 Process Capacity:Continuous Loading of up to 60 slides in three baskets
 Throughput:Up to 500 slides per hour (method dependent)
 Operational Temperature:.....10°C to 40°C

► PRISMA® ACCESSORIES:

Tissue-Tek® Prisma® Slide Stainer with Special Stains (6131)
 – The Prisma® complete with all option for use with special stains like PAS, Giemsa, Mucicarmine stain.

Link system for Connectivity with Film® Coverslipper (6134)
 – The Link System combines the Prisma® and the Film® into one fully integrated system offering complete walk way convenience. The Link performs an automatic robotic transfer of slide baskets from stainer to coverslipper

Link System to Tissue-Tek™ Glas g2 Coverslipper (6168) – The Link System combines the Prisma® and the Glas g2 Coverslipper (Tissue-Tek #6500) into one fully integrated system.

Stainer and Coverslip Slide

Basket (4768) – Basket for Tissue-Tek™ Stainers and Coverslipper for use with the Film® and SCA™ Coverslippers, the Prisma®, DRS-601™ Histology/Cytology Slide Stainers and the RSG-61™ Hematology Slide Stainer. The special basket design reduces cross contamination and carry-over. The basket can also be used in a microwave oven. The slide baskets are available in case quantity.



20-Slide Basket Load/Unload

Adapter (6135) – The 20-Slide basket load/unload adapter allows users to align the slide baskets in the middle position of the start station when the expanded reservoir are being used.



20-Slide Basket Adapter (6136) – 20-Slide Basket Adapters are to be used in conjunction with the Slide Baskets on the Tissue-Tek® Prisma® Slide Stainer.



10-Slide Basket, Special Stain

(6137) – Basket for the Tissue-Tek® Plasma® Slide Stainer. For use with the Tissue-Tek® Plasma® Slide Stainer with special stain capability. The basket has a 10 slide capacity and is specifically designed to reduce carry-over and contamination



10-Slide Basket Adapter (6138)

– Slide Basket Adapters are to be used in conjunction with the Slide Baskets on the Tissue-Tek® Plasma® Slide Stainer with Special Stain.

10-Slide Basket Load/Unload

Adapter (6139) – The 10-Slide basket load/unload adapter is used with the special stain setup to accommodate the 10-slide basket. When the adapter is placed in a start station the Tissue-Tek® Plasma® recognizes the 10-slide basket and prepares to run it in the special stain mode.



► Tissue-Tek® Prisma® Slide Stainer (continued)

Special Stain reservoir 180 ml (6140) – The Special Stain Reservoirs can be combined with the standard or expanded solution configuration. The special stain configuration includes eight solution reservoirs. The special stain reservoirs can accommodate a volume of 160 - 180 ml of solution

Heated Solution Reservoir 180 ml (6141) – The heated Solution Reservoir works in conjunction with the special stain setup. The two independent heated stations can be programmed to heat special stains to 30 – 70°C.

Special Stain Reservoir Lid (6144) – The Lid for the Special Stain Reservoir is a single lid used to cover the special stain reservoir when not in use.

Small Solution Reservoir, 285 ml (6145) – The Small Solution Reservoir can be used with the standard solution reservoir. With the expanded configuration there are a total of 54 stations and are arranged with 6 station in the front row and eight station in the other six rows> The small solution reservoirs can accommodate 255 – 285 ml of solution.



Small Solution Reservoir Lid (6146) – The Lid for the Small Solution Reservoir is a single lid use to cover the small solution reservoirs when not in use.

Standard Solution Reservoir, 820 ml (6147) – The Standard configuration of standard solution reservoirs is a total of 30 stations with six stations in the front row and eight stations in the other three rows. The standard reservoir accommodates 680 – 820 ml of solution



Load/Unload Reservoir, 830 ml (6148) – This is a Standard Solution Reservoirs with handles are placed in the front row of the instrument. These reservoirs have a handle for easy removal and are used as the start/end stations. The reservoir volume is 830 ml.



Wash Reservoir, 850 ml (6149) – The Wash Reservoir is a specially designed reservoir to be used exclusively with the Tissue-Tek® Prisma® Slide Stainer that contains openings positioned for maximum water flow. Each reservoir has an 850 ml volume.

820/830 ml Reservoir Lid (6151) – The Lid for the Standard Solution is a single lid used to cover the reservoirs when not in use.



3 Position Reservoir Tray (6152) – The solution reservoirs are arranged in a one level configuration and are positioned in either a 3 or 4 position reservoir tray. These trays can hold multiple solutions to allow for easy placement into and removal from the instrument. The trays are designed to ensure proper orientation when placed into the instrument.



3 Position Reservoir Tray Lid (6153) – This 3-Position Reservoir Tray Lid is a one piece lid to cover all reservoirs located in the 3-position reservoir tray.

4 Position Reservoir Tray (6154) – Same as 3-position reservoir tray but has 4-position.

4 Position Reservoir Tray Lid (6155) – Same as 3-position reservoir tray lid but designed for 4-position reservoir tray.

Special Stain Reservoir Tray (6156) – This special stain reservoir tray is a 8-position tray that holds the special stain reservoirs inside the Prisma® Slide Stainer.

Fume Filter (6160) - The fume filter for the Tissue-Tek® Film® Coverslipper and Tissue-Tek® Prisma® Stainer is sufficient in removing fumes that are generated during routine use. It is recommended that the filter be replaced once a month. Fume filters are packaged 2 to a case.



Start & End Labels (6161) – The station labels are designed to be attached to the Start, End or PE station for reservoir identification.

Basket Adapter Labels (6162) – Color coded basket adapter labels are positioned on the basket adapters for easy stain identification

Screen Protection Sheet (6163) – This accessory is for use exclusively with the Tissue-Tek® Prisma® Slide Stainer, to protect the control panel from scratch.

Compact Flash Card (6164) – The compact flash card allows data to be transferred to the PC. This accessory is for use exclusively with the Tissue-Tek® Prisma® Slide Stainer.



Exhaust Duct Adapters (6165 & 6166) – The Tissue-Tek® Prisma® Slide Stainer offers an optional Duct Connection Adapter which connects to an external exhaust system for added protection. Two sizes are available, 38 mm and 75 mm,

ORDERING:

EMS #	Tissue-Tek	Description	Qty.
62667	6130	Tissue-Tek® Prisma® Automated Stainer	each
62667-SS	6131	Tissue-Tek® Prisma® Automated Stainer with Special Stain Option	each
62666-PR	6134	Link System for Film® Coverslipper to Prisma® Stainer	each
62666-G2	6168	Link System for Glas® g2 Coverslipper to Prisma® Stainer	each
62665-68	4768	Stainer & Coverslipper Slide Basket	10/cs
62667-55	6135	20-Slide Basket Load/Unload Adapter	each
62667-56	6136	20-Slide Basket Adapter	each
62667-57	6137	10-Slide Basket	4/case
62667-58	6138	10-Slide Basket Adapter	each
62667-59	6139	10-Slide Basket Load/Unload Adapter	each
62667-60	6140	180 ml Solution Reservoir	each
62667-51	6141	180 ml Heated Solution Reservoir	each
62667-54	6144	180 ml Reservoir Lid	each
62667-65	6145	285 ml Solution Reservoir	each
62667-66	6146	285 ml Reservoir Lid	each
62667-67	6147	820 ml Solution Reservoir	each
62667-68	6148	830 ml Load/Unload Reservoir	each
62667-69	6149	850 ml Wash Reservoir	each
62667-71	6151	820/830 ml Reservoir Lid	each
62667-72	6152	3-Position Reservoir Tray	each
62667-73	6153	3-Position Reservoir Lid	each
62667-74	6154	4-Position Reservoir Tray	each
62667-75	6155	4-Position Reservoir Lid	each
62667-76	6156	Special Stain Position Reservoir Tray	each
62593-80	6160	Fume Filter	2/case
62667-81	6161	Start & End Labels	each
62667-82	6162	Basket Adapter Labels	each
62667-83	6163	Screen Protection Sheet	each
62667-84	6164	Compact Flash Card	each
62667-85	6165	Exhaust Duct Adapter, 38 mm	each
62667-86	6166	Exhaust Duct Adapter, 75 mm	each

► Tissue-Tek® DRS™ 2000 Slide Stainer Supplies

EMS #	Tissue-Tek	Description	Qty.
62668-40	2008	DRS Carbon Filter	2/case
62668-08	2208	DRS Hose Assembly	each
62665-67	4768	Stainer & Coverslipper Slide Basket	each
62665-68	4768	Stainer & Coverslipper Slide Basket	10/cs
62668-64	4974	DRS 2000 Solution Reservoir	each
62668-65	4975	DRS 2000 Wash Reservoir	each
62668-66	4976	DRS 2000 Reservoir Lid	each
62668-67	4977	DRS 2000 Basket Hook	each
62668-68	4978	DRS Basket Adapter	each
62668-69	4979	DRS Wash Station Plug	each
62668-71	4981	DRS 2000 Drain Hose	each
62668-75	4985	DRS 2000 Wash Reservoir Grommet	each
62668-76	4986	DRS 2000 Six Reservoir Lid	each
62668-83	4993	DRS 2000 Seven Reservoir Lid	each

► Tissue-Tek® DRS™ 601 Slide Stainer Supplies

EMS	Tissue-Tek	Description	Qty.
62668-40	2008	DRS Carbon Filter	2/case
62669-53	2203	DRS 601 Plastic Stain Reservoir	each
62669-55	2205	DRS 601 Reservoir Lid	each
62669-56	2206	DRS 601 Tray Assembly	each
62669-57	2207	DRS 601 Washing Reservoir	each
62668-08	2208	DRS Hose Assembly	each
62669-59	2209	DRS 601 Basket Hook	each
62669-60	2210	DRS 601 Water Drain Hose	each
62665-67	4768	Stainer & Coverslipper Slide Basket	each
62665-68	4768	Stainer & Coverslipper Slide Basket	10/cs

► Tissue-Tek® CryO3® Microtome/Cryostat

The Tissue-Tek® CryO3® Microtome/Cryostat is the redefining state-of-the-art, the next generation of excellent, with 3 different models to meet your laboratory needs and budget demands: select motorized sectioning, or automated dissection, or both. But no matter which model of CryO3® you choose, you'll also benefit from time-proven features, operating simplicity and reliability, minimal maintenance.



FEATURES

- Safe, integral disinfection and productivity-enhancing features
- Rapidly disinfect the chamber without exposure to liquid toxic chemical or residue
- Stable ±10° (Z) and 360° (Y) specimen orientation – better control for precision sectioning
- 12 configurable Cryobar® positions
 - Round specimen holder in 3 sizes
 - Round biopsy and standard Cryomold® position offer standardized specimen orientation
 - Cryo® area cools to -20°C below chamber temperature; down to -50°C



Orient specimen in Cryomold® with Tissue-Tek® O.C.T. Compound



Place specimen on Cryobar®



Obtain a standardized, flat-surface frozen block with the specimen precisely oriented to speed up sectioning

- Menu-driven software; all digital control

- 240 x 60 pixel graphic LCD display

► Smooth precision, reliable performance

- Ball-bearing microtome, computer controlled
- Precise sectioning – from 1 µm to 99 µm
- Motorized advance/retract – with limit protection
- Easy-to-use anti-roll-rack – simplifies specimen transfer to the slides.
- Manual or optional motorized trimming and sectioning
- Blade holder accepts both Accu-Edge® low-profile and high-profile
- Maintenance-free microtome located outside the chamber
- 12 Cryobar® specimen positions, including 4 Cryo+® position that enable rapid cooling to -50°C
- Easy to operate, yet sophisticated
- Preconfigured memory settings allow rapid recall of the parameters specific to a specimen type
- Streamlined, all-digital control panels; multilingual
- Easily customized parameters to operator and/ or procedure

continued >>>>

► Tissue-Tek® CryO3® Microtome/ Cryostat (continued)

- Easily programmed setup menu
- 12- or 24-hour format time setting
- LCD contrast adjustment allows adaptation to various light conditions.
- ON/OFF settings for
 - Key sound
 - Audible alarms (though always displayed)
 - Auto disinfect after defrost
- Chamber temperature: 0°C to -35°C ±1°C
- Section thickness: 1 µm to 99 µm ±1 µm
- Retract/advance speed: 500 µm/sec or 800 µm/sec.
- Retraction: no retraction or retraction distance from 1µm to 99 µm ±1 µm
- Defrost start time: one cycle per day.
- Automated defrost may be programmed to run at night or on-demand as desired
- Innovative ozone disinfection Models #5801 D & #5802 DM) designed for maximum safety in routine operation
- Disinfection performed within 75 minute
- Abort sequence takes less than 15 minutes
- Defrost cycle not required prior to initiating disinfection cycle
- No residue inside chamber: by-product is O2
- Password-secure chamber access
- Chamber window is interlocked and sealed until all ozone is catalyzed into oxygen
- Chamber also can be locked at any time to minimize accidental exposure to pathogens
- User –selectable warning messages alert of potentially hazardous conditions
- Dynamic debris removal system

Application:Cryotomy
 Models:#5800 Basic – Standard features: High- & Low-profile blade holders, specimen orientation; motorized advanced/retract#5801 – Standard features plus ozone disinfection and vacuum debris removal system#5802 – Standard features plus ozone disinfection, vacuum debris removal system, plus motorized sectioning
 Dimensions:23.5" W x 29.5" D x 46.5" H (60 W x 75 D x 118 cm H)
 Weight (with microtome):387 lbs (176 kg)
 Electrical:115 VAC @ 11 amps, 50/60 Hz.

► TISSUE-TEK® MICROTOME/CRYOSTAT Cryo3® ACCESSORIES

Cryomold®, Round , Standard (4728) – Clear plastic with handling tab, measures 22mm diameter x 5mm deep

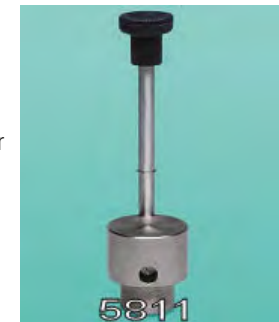


Cryomold®, Round , Biopsy (4730) – Clear plastic with handling tab, measures 15mm diameter x 5mm deep

Specimen Holder, Small (5807, 5808 & 5809) – Tissue-Tek Cryo3® specimen holders are used for mounting specimens with O.C.T. Compound, which will be frozen for sectioning. Three sizes are available. The small holder can accommodate a specimen size up to 25 mm. In addition, Tissue-Tek® Cryomolds™, standard and biopsy sizes, can be used to create a uniformly shaped flat surface to aid in trimming and sectioning. An O-ring is positioned around perimeter of the holder for added protection while handling. An etched marking at the base of the post can be used for positioning if the specimen holder is removed from the chuck.



Heat extractor, Standard (5811 & 5815)– This flexible heat extractor is used to aid in rapidly freezing specimens for frozen sectioning technique. The flat side of the heat extractor allows for positioning directly on top of the specimen. Changing the surface orientation allows for the indented side of the extractor to be used with the Cryomold technique. The extractor may be mounted on left side of the chamber, above the cryobar for easy access. Using the heat extractor greatly reduces the rate of freezing specimens.



Cryobar Insert, 4-Cavity (5819) – These unique inserts enable flexibility in configuring the Cryo3 cryobar to meet the needs of each laboratory. Each insert is easily removed and replaced. The 4-cavity insert is used to accommodate the specimen holder post, which can be positioned directly into each well for freezing



Cryobar Insert, 4-Post (5820) – These unique inserts enable flexibility in configuring the Cryo3 cryobar to meet the needs of each laboratory. Each insert is easily removed and replaced. The 4-post insert is used to accommodate cryomolds, which can be positioned directly into each well for freezing. Cryomolds create a uniformly-shaped, that surface, which make trimming and sectioning easier and faster.

Utility Tray (5824) – This removable utility tray is positioned inside the Cryo chamber to the right of the Microtome. It provides ample space to accommodate miscellaneous items such as OCT Compound, disposable blades, brushes etc. The four holes may be used to store extra specimen holders for future use.



Waste Bottle (5825) – This 2-liter waste bottle is a plastic container which is positioned on the lower left front side of the Cryo3 instrument. The waste bottle is responsible for collecting residual moisture and debris generated from the defrost cycle or manual disinfection procedures.



Vacuum Filter Set (5826) – This set is used with Cryo3 models 5801 and 5802, consists of a microbial filter, a coarse debris filter and a corrugated vacuum hose. The filter is connected to a port located inside the chamber and the other end is connected to the blade holder port. When the vacuum system is on, debris and unwanted trimmings generated during sectioning are collected and contained in the filter. The filter is disposable and should be removed and replaced every 2 months or as often as necessary.



Vacuum Hose attachment (5827) – This vacuum hose attachment is used in conjunction with the vacuum filter set and can be attached to the corrugated vacuum hose, which connects the microbial filter. When the vacuum system is powered on, the hose attachment can be used to remove debris from the base of the chamber or other areas inside the instrument. Tissue-Tek® Cryo3® models 5801 & 5802 come standard with the vacuum debris removal system.



Ozone Lamp Assembly (5828) – The ozone lamp is responsible for generating ozone inside the chamber for the purpose of automatically disinfecting the cryo chamber. Ozone disinfection is standard in both CryO3 models, 5801 & 5802. The ozone lamp assembly should be replaced every 1000 cycles. The instrument software provides a reminder message when the useful life is nearing its end.



Foot Pedal (5829) – The optional foot pedal is designed to be used for hand-free automated sectioning when using CryO3 model 5802, which comes standard with motorized sectioning. It can be used to take the place of using the control panel to operate the motorized function of the instrument. The foot pedal is an optional item.



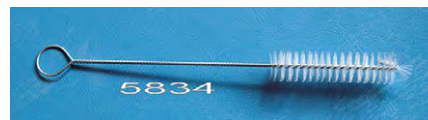
Anti Roll Rake (5831) – The newly designed anti-roll rake is a unique anti-roll device mounted above the microtome chuck, which is used to easily and consistently obtain sections from frozen specimen blocks. The grooved edge of the rake attaches to frozen O.C.T., preventing the section from curling to produce a clean flat section to mount on a microscope slide. The anti-roll rake can be easily adjusted by manipulating the back knob located on the left side of the rake. This technique independent method is ideal when using Cryomolds®.



► Tissue-Tek® CryO3® Microtome/Cryostat (continued)

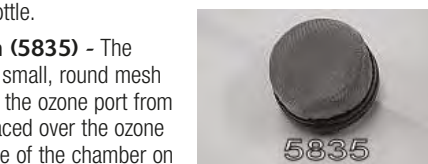
Anti Roll Plate (5832) – The anti-roll plate is used on the CryO3 to assist in stopping tissues from rolling while performing microtomy.

Steel Knife Holder (5833) – The steel knife holder is an adapter which holds a steel knife in place on the Cryo3.



Drain Cleaning Brush (5834) –

This device is used to periodically clean the drain hole inside the instrument, located at the bottom left-side of the chamber. The drain is responsible for channeling residual fluid generated from the defrost cycle into the waste bottle.



Ozone Port Screen (5835) – The ozone port screen is a small, round mesh screen used to protect the ozone port from debris. It should be placed over the ozone port located at the base of the chamber on the right side.



Fluorescent Lamp (5836) – The fluorescent lamp is mounted inside the chamber and is used to light the chamber while sectioning. The light is illuminated each time the chamber window is open. A function key located on the display can be pressed to illuminate or turn off the lamp manually.



ORDERING

EMS #	Tissue-Tek	Description	
62548	5800	Tissue-Tek CryO3® Microtome/Cryostat Basic	each
62548-D	5801	Tissue-Tek CryO3® Microtome/Cryostat Automatic Disinfection	each
62548-DM	5802	Tissue-Tek CryO3® Microtome/Cryostat Select Motorized and Automatic Disinfection	each
62532-12	4728	Plastic Cryomold®, Round, Standard,	1200/case
62532-01	4728	Plastic Cryomold®, Round, Standard,	100/case
62533-12	4730	Plastic Cryomold®, Round, Biopsy	1200/bx
62533-01	4730	Plastic Cryomold®, Round, Biopsy	100/bx
62548-57	5807	Specimen Holders – Small	6/cs
62548-58	5808	Specimen Holders – Medium For specimen up to 38 mm	6/cs
62548-59	5809	Specimen Holders – Large For specimen up to 55 mm	6/cs
62548-61	5811	Heat Extractor Standard	each
62548-65	5815	Heat Extractor Large	each
62548-69	5819	Cryobar Insert, 4-Cavity	each
62548-70	5820	Cryobar Insert, 4-Post	each
62548-74	5824	Utility Tray	each
62548-75	5825	Waste Bottle	each
62548-76	5826	Vacuum Filter Set	each
62548-77	5827	Vacuum Hose Attachment	each
62548-78	5828	Ozone Lamp	each
62548-79	5829	Foot Pedal	each
62548-81	5831	Anti-Roll Rake	each
62548-82	5832	Anti-Roll Plate	each
62548-83	5833	Steel Knife	each
62548-84	5834	Drain Cleaning Brush	each
62548-85	5835	Ozone Port Screen	each
62548-86	5836	Fluorescent Lamp	each
62548-87	5837	Drain Cover	each

➤ **Cyto-Tek® Centrifuge and Accessories; Sakura Finetek**

Enhance Your Cell Preparation - Proven Reliability

➤ **CYTO-TEK® Cyto-centrifuge**

Three Chamber sizes for samples from 0.1 to 12 ml:

- 1, 6, and 12 ml disposable chambers accommodate a wide range of sample sizes.
- One size fits all: the 1 ml filter combines versatility with convenience; handles all routine specimens up to 1 ml with only one set of accessories.
- User-selectable, rectangular viewing/target areas: 49, 196, and 420mm² essentially eliminates the need for multiple slides.
- Viewing area up to 14 x 30 mm.

Place acceleration, automatically controlled:

- Ensures specimen integrity through automatic, microprocessor-controlled, optional acceleration.
- Paced acceleration is "Always On", eliminating operator bias in assessing cell fragility.
- Accommodates fragile cells requiring delicate handling.
- Speed adjusts from 500 to 2,500 rpm in 100-rpm increments.
- Programmable times range from 1 to 60 minutes in 1 minute increments.

Digital controls:

- Speed and time settings are retained in memory with a battery backup.
- Streamlined touch pad and 2 digital displays control and monitor all functions.
- Easy to use, easy to train.

Forced airflow control:

- Unique design, no rotor cover to sterilize.
- Eliminates aerosol for greater operator safety.

Reliable:

- Manufactured with the same quality care as all other Tissue-Tek® instruments.
- Enjoy years of trouble-free operation with virtually no maintenance required.

Efficiently silent:

- Even at maximum speed, the Cyto-Tek runs smoothly and quietly.

Superior clinical performance:

- A consistently high rate of cellular recovery is extremely important for accurate morphological evaluation of cerebrospinal fluid.
- Well-defined rectangular target area for optimal results.
- Better preservation of cellular structure.
- With a G force of up to 735, the Cyto-Tek can handle low molecular weight organisms such as microbacteria and viruses.
- Operates on 115 VAC, 60 Hz.

Dimensions

36.0cm(W) x 23.0cm(H) x 38.0cm(D) (14.2" x 9.1" x 15.0")

Weight: 154.5 kg (32.0 lb)

References:

1. Kobayashi TK, Ueda M, Yamaki T, Yakushiji M. Evaluation of cyto-centrifuge apparatus with special reference to the cellular recovery rate. *Diagn Cytopathol.* 1992; 8(4): 420-423
2. Saceanu CA, Pfeiffer NC, McLean T. Evaluation of sputum smears concentrated by cyto-centrifugation for detection of acid-fast bacilli. *J. Clin Microbiol.* 1993; 31:2371-2374.



➤ **Cyto-Tek® Centrifuge Funnel Chambers**

Enhance your cell recovery up to 100%

- Highly polished specimen chamber that minimizes cell attachment.
- 33% thicker clamp wall (for greater clamping tension) that provides paced fluid absorption.
- Window ledge to help secure filter and keep cells in target area.
- "V" cutout to add rigidity helping to hold funnel chamber in place.



Ordering:

Cat.#	Tissue-Tek	Description	Pack
62610-01	4329	1 ml Fluid Chamber	200/cs
62610-50	4333	1 ml Filter Paper	200/cs
62610-55	4336	1 ml Base Holder	200/cs
62610-60	4335	1 ml Chamber Cap	200/cs
62612-06	4331	6 ml Fluid Chamber	12/cs
62612-50	4327	6 ml Gasket	25/pk
62614-12	4328	12 ml Fluid Chamber	12/cs
62614-50	4337	12 ml Gasket	25/pk
62615-12	4326	6-/12 ml Base Holder	12/cs
62615-25	4334	6-/12 ml Chamber Cap	25/cs

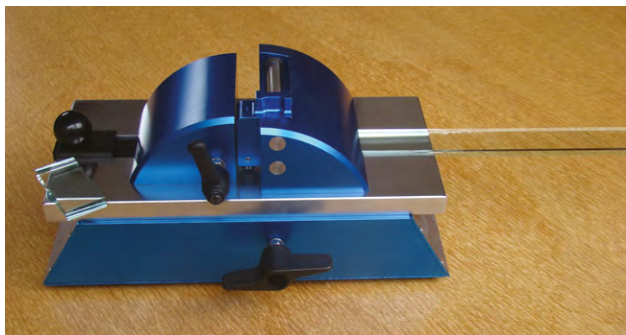
EMS ROR (Residual Oil Remover)

EMS is proud to introduce the ROR-It is not a lens cleaner in the usual sense-it goes far beyond what a routine cleaner does. ROR is specifically designed to emulsify and remove microscopic oil residues- a by product of environmental pollution -from the surface and pores of glass and plastic.

For more information, see page 736. >>>>



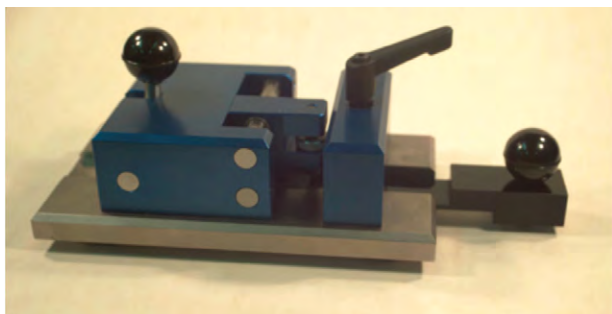
► Histology Ralph Knife-Maker Model EMS-2



Precision designed, easy to use, reliable knife maker to produce 25.5mm (1") or 38 mm (1-5/16") wide Ralph glass knives when used with EMS histology grade microtomy glass or any other 5.8mm to 6.2mm thick quality glass strips. This glass knife maker will automatically compensate for changes in thickness of the glass strips (typically 5.8mm to 6.2mm thick).

Cat. #	Description	Qty
90051-06	Ralph Knife Maker EMS-2 for 25.4mm Knife Edge	each
90051-38	Ralph Knife Maker EMS-2 for 38mm Knife Edge	each

► Histology Glass Ralph Knife Maker Model EMS-1



Rugged designed, easy to use, reliable glass knife maker to produce 25.4mm (1") wide Ralph glass knives when used with EMS histology grade of microtomy glass or any other 6 mm thick quality glass strips. These Ralph glass knives can be used on Rotary or Retracting Microtomes, for sectioning paraffin, JB-4 or methyl methacrylate specimen blocks.

Cat. #	Description	Qty
90050-06	Ralph Knife Maker EMS-1 for 25.4mm Knife Edge	each
90050-38	Ralph Knife Maker EMS-1 for 38mm Knife Edge	each



► The EMS 3030 Histo Pro H and E Slide Stainer

The new EMS slide stainer offers the end user the ability to have a stainer with 30 stations and a continuous load option with multiple protocols. This state of the art stainer which is only 32" long has a built in fume extraction as well as the ability to connect to a lab fume hood.

Specifications of Slide Stainer

1. Capacity

- Number of Stations: 30
- Number of Rinse Stations: 5 (user selectable)
- Rinse Water Flow Control: Software programmable for 1 station individually adjustable for 5 stations
- Number of Load Station: 1
- Number of Unload Station: 1
- Reagent Container Volume: 350 ml
- Slide Carrier Capacity: 30 slides
- Drying Station Temp. Range: 40–70° C

2. User Interface:

- Display: Active matrix TFT 6.5" display
- Touch Screen: Resistive touch pad
- Number of programs: 50
- Number of steps in a program: 50
- Programmable Flow Rates: 500, 1000, 1500, and 2000 ml/min, programmable for individual step.

3. Physical Characteristics

- Width: 32" (80 cm)
- Depth: 25" (63 cm)
- Height: 18" (45 cm)
- Weight: 65 lbs (30 kg)

4. Electrical Characteristics

Voltage: Available for 115 Volts AC or 230 volts AC

Cat.#	Description	Quantity
63122	H and E Slide Stainer	each

► **Histo-Tek® SL Slide Stainer**

Automated Slide Staining for Low Volume Labs

Introducing Histo-Tek® SL, an automated slide stainer that offers a new level of convenience and standardization for low-volume labs.

The Histo-Tek® SL provides reliable automated slide staining with countertop convenience. Able to stain up to 100 slides per hour, the Histo-Tek® SL eliminates labor-intensive manual staining while standardizing the process for optimal quality and error reduction. The

Histo-Tek® SL features 15 programmable staining protocols with up to 35 steps each for maximum flexibility. Protocols can be saved and shared across multiple devices via USB drive for complete slide staining standardization.

Key Features and Benefits

- Stains ~100 slides per hour
- Eliminates labor intensive hand staining
- Smaller footprint fits most countertops
- Standardizes the staining process for optimal quality error reduction
- 22 Stain Reservoirs for many staining protocols
- Bi-directional robotic arm allows for progressive and regressive staining protocols
- Two plumbed rinse stations for wash flexibility
- 30 slides per arm movement for small batch control
- Charcoal filter or optional vent kit
- 15 easily programmable staining protocols with 1 - 35 steps each for maximum staining flexibility
- Optional special stain reservoirs
- Save staining programs onto a USB drive for multiple Histo-Tek® SL Stainers
- Tinted fume cover to protect from UV light



Specifications

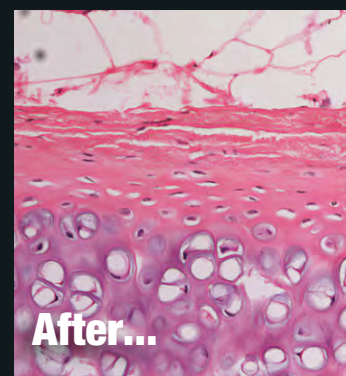
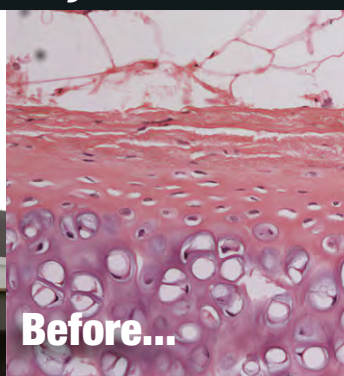
Dimensions:.....Centimeters (W x D x H): 81 X 79 x 41
Inches (W x D x H): 32 x 31 x 16
 Weight:25 kg (55 lb)
 Number of Stations:24
 Dedicated Stations:1 unload station and 1 load station
 Rinse Stations:2
 Reagent Volume:.....350 mL
 Number of Programs:Up to 15
 Steps in a Program:Up to 35
 Slide Baskets:.....30-count basket, 20-count basket, 10-count basket

Cat. #	Description	Qty
62669-90	Histo-Tek® SL Slide Stainer	each

Accessories and consumables for the Histo-Tek SL Slide Stainer

62669-91	Slide Rack 30 Count	each
62669-92	Slide Rack Adapter	each
62669-93	Slide Rack Adapter 20 count	each
62669-94	Slide Rack 20 Count	10/Pack
62669-95	Slide Rack Adapter 10 Count	each
62669-96	Slide Rack 10 Count	each
62669-97	Special Stain Reservoir	each
62669-98	Charcoal Filter	2/Pack
62669-99	Vent Kit and Hose	each
62669-85	White Slides	each
62669-86	White Slides - Charged	each

Datacolor ChromaCal™
 Color Calibration System



See how it's done, pages 160-163 >>>

Vibrating Microtomes

Our top-of-the-line high precision, vibrating microtomes, are the finest slicers in the world for all specimen preparation

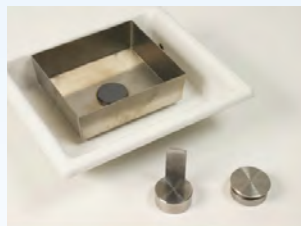


Features at a Glance

- Z-axis blade adjust minimizer
- Custom blade holder with angle set to user requirement
- Set START and STOP position for blade travel
- Vibration speeds from 50 to 120 Hz
- Amplitudes from 0.5mm to 2.25mm
- Controlled blade advance at 10 microns per sec.
- Ice water bath easily removed for cleaning
- Optional LED light source
- Optional magnifier for clear observation
- Optional stereoscope, choice of x5-x10 fixed or x10-40 zoom for optimal observation

On the 7000smz-2 additional features:

- Includes a Z-axis calibration device
- Choice of manual or automatic operation
- Auto programming by storage of the first slicing speed and distance profile



***New models new options,
see pages 994-997 >>>***

EMS is proud to introduce the HistoPro 200

► HistoPro® 200

Paraffin Infiltration Processor

HistoPro® 200 offers unique reagent / paraffin infiltration capability with programmable processing time, temperature, agitation and vacuum in an easy to use, compact, cost conscious package.

- Up to 100 Cassettes
- 2.0 Liter Reagent / Paraffin Capacity
- Compact Footprint: Only 9" wide x 20" depth
- Programmable Processing Time
- Programmable Processing Temperature
- Programmable Vacuum Cycle

Designed and Made in U.S.A.



Specifications

Capacity

Number of Cassettes:100 max in a basket
Paraffin Capacity2.0 Liters (without samples)
.....1.5 Liters (with samples)

Processing Parameters:

Reagent Temperature:37 deg C – 65 deg. C
Temperature Accuracy +/- 2 Deg C at Sensor Location
Vacuum:5 PSI (25 cm) below ambient
Vacuum Cycle0 – 100% in 20% increments
.....over 5 Minute Cycle Time
Agitation:Stir Bar Agitation

User Interface:

Display:16 Characters x 2 lines LCD display
Membrane Keypad6 Keys
AlarmAudible Beeper

Physical Characteristics

Width:9" (23 cm)
Depth:20" (51 cm)
Height:15" (38 cm)
Weight:13 lbs (6 kg)

Electrical Characteristics

Voltage:100 - 230 volts AC, 50/60 Hz
Power150 watts max.

Ordering Information

Cat. #	Description	Qty
62596-10	HistoPro® 200 Paraffin Infiltration Processor	each

► Tissue Embedding Center

Introducing a new Tissue Embedding Center with the latest in circuit board and component technology. Uniquely designed with microprocessor temperature sensors, a single console which maximizes space utilization, high-contrast viewing areas and multifunctional work stations. The entire unit is encased in a durable, non-heat conductive housing.



Features:

- Microprocessor controlled for dependability and performance.
- Single module design.
- Low and flat work-surface which facilitates operator efficiency.
- User friendly membrane switches.
- 4-liter capacity paraffin reservoir which minimizes refilling frequency.
- Heated forceps warmer and illuminated paraffin dispenser enhance user friendliness.
- Warming oven with removable shelf and double hinged lid for convenient access to preheated base mold.
- Wax bath complete with drainage shelf, debris screen, and hinged lid.
- Heated work area which provides a flat working surface with the excess paraffin draining under the surface into the wax bath; complete with a hand and foot switch for activating the dispensing head.
- Generous illumination.
- The cold plate offers 170 sq. in. (1100cm²) of compressor cooled working surface with removable stainless steel drainage tray beneath.
- Tactile membrane touch-pad for easy temperature setting and monitoring.
- Full one year warranty.

SPECIFICATIONS:

Dimensions:

Overall23.75"(L)x31.5"(W)x11"(H) (60x81x28cm)
 Hgt of Work Surface.....Workstage 2.75"(7cm) above countertop
 Wax Reservoir75"(L)x4.75"(W)x4"(D) (19.5x12x9.5cm)
 Wax Bath10.25"(L)x8.5"(W)x1.75"(D) (26x21.5x4cm)
 Warming Oven6.5"(L)x7.5"(W) x min 2.5" max 6" (14 - 16.5cm)
 Cold Plate11.75"(L)x14.5"(W) (29.5x36.6cm)
 WeightOverall 72 lbs (33kg)

Temp Ranges:

Wax Reservoir40° - 70°C +/-2°C
 Work Surface.....40° - 70°C +/-5°C
 Wax Bath.....40° - 70°C +/-2°C
 Cold Plateambient to -5°C
 Power SupplyOverall 120 VAC, 50 Hz
 Fuse RatingPower plug 5 amps

62300 Tissue Embedding Center each

► THE EMS Tissue Embedding Center

The Histo-Pro 150 offers superior operating convenience for tissue embedding processes in a modular ergonomic design.

FEATURES AND BENEFITS:

- Two Module system.
- All stainless steel work surfaces
- User friendly proprietary PAT interface
- Large cold plate and cassette bath.
- Fully programmable time and temperature
- Adjustable paraffin flow rate
- Self draining forceps holder.
- Auto Defrosting cold plate
- Four Liter paraffin tank.
- Ability to turn on automatically



System Specifications: Histo Pro 150H Hot Module

Capacity:

Paraffin Tank:	4 liters
Mold Oven:	7" (17.5 cm) Wide x 7" (17.5 cm) Deep x 2.25" (5.7 cm) Tall
Cassette Bath:	8" (20 cm) Wide x 11" (28 cm) Long x 2.1" (5.3 cm) Deep

User Selected Temperature Ranges:

Paraffin Tank:	40-70° C
Mold Oven:	40-70° C
Cassette Bath:	40-70° C
Forceps Holder:	40-70° C
Work Surface:	40-70° C

Physical Characteristics:

Width:	20" (51 cm)
Depth:	22.5" (57.2 cm)
Height:	12.5" (32 cm)
Weight:	35 lbs (16 kg)

Electrical Characteristics:

Voltage:	115 Volts AC or 230 Volts AC
Power:	800 Watts Max

Histo Pro 150CS Cold Module

Capacity:

Cold Plate Area:	15.8" (40 cm) x 14" (35 cm)
Temperature Range	-10°C - +10°C

Physical Characteristics:

Width:	16" (40 cm)
Depth:	22.5" (57.2 cm)
Height:	12.5" (32 cm)
Weight:	35 lbs (16 kg)

Electrical Characteristics:

Voltage:	115 Volts AC or 230 Volts AC
Power:	200 Watts Max

Cat.#	Description	Quantity
63120	HistoPro 150 Tissue Embedding System	each

► CryoJane™ The Cryostat Frozen Sectioning Aid System

The CryoJane® Tape-Transfer System creates frozen sections as thin as 2 microns with the same quality as sections cut from paraffin blocks. Sections are wrinkle-free, uncompressed, and fully intact when bonded to the microscope slide. The CryoJane uses adhesive coated slides and adhesive tapes to capture sections instead of using an anti-roll plate or brush. CryoJane is suitable for routine cryosections and is indispensable for sectioning difficult tissues including fatty breast and undecalcified bone.

- Preserves sample morphology
- Increases quality, reduces repeats and streamlines workflows
- Allows fast and virtually effortless serial sectioning

With the CryoJane Tape-Transfer System, thin tissue sections remain unflawed even after mounting. This makes CryoJane ideal for applications that require perfectly thin sections to clarify structural relationships and reveal morphological detail. The CryoJane Tape-Transfer System is adaptable to most cryostats on the market.

- Sections can be fixed "anhydrously" to preserve virtually all fine structures present in the snap-frozen block of tissue
- Water-soluble enzymes, antigens and nucleo-proteins are preserved in situ
- With appropriate fixation and staining, true localization of enzyme and antigen activity can be visualized
- The bond between the section and the slide is solvent resistant and permanent, preventing section loss during staining

APPLICATIONS

- Histological stains
- Immuno stains
- In situ hybridization
- Laser Microdissection and Laser Capture Microdissection
- Frozen tissue arrays and other molecular diagnostic studies

ADVANTAGES

- Ideal for fatty tissues - Keeps fatty tissues such as skin, breast & undecalcified bone together. Excellent for serial sections of brain.
- Consistent results - Consistent results help operators maintain productivity and preserve tissue samples
- Safe for protocols - 8 millisecond, long-wave UV (360 nm) is safe for protocols such as In situ Hybridization
- 2-60 um - Sections can be cut between 2-60 um in thickness
- Temperature controlled - Temperature controlled pad for optimal section transfer conditions



CryoJane® System Includes the Following:

The Leica CryoJane Tape-Transfer System includes the control unit, (ECU) with a power cord, UV Flash Unit with Temperature Controlled Pad, Hand Roller and Mounting, Bracket, Door Bar, five Cable Clamps, one Slide Storage Shelf, 125 1X Adhesive Slides, 10 1/2X Adhesive Slides, 10 4X Adhesive Slides, one roll of Tape Windows (400 tapes per roll), a manual, one set of Replacement Fuses, Knife Facet Wipers and a one year Parts Warranty from date of install.

Note: System does not include: Snap Freezer, oil bath or oil embedding accessories

Products required by the CryoJane System:

► Protective Oil Accessories Kit

Oil in the bath is maintained at -8°C inside the cryostat and will not melt the tissue when brushed on the frozen block-face. Frozen blocks coated with this protective oil can be stored for up to one year in a freezer without dehydration.



The Protective Oil Accessories Kit includes the following: Temperature controlled Oil Bath, 4 oz Bottle of Protective Oil, and Oil Brush. Please note that when purchased separately from the CryoJane system, installation of the Protective Oil Bath Accessory requires that the CryoJane® system be returned to Electron Microscopy Sciences.

CryoJane™ System Ordering

Cat. #	Description	Qty.
62800-10	CryoJane® Tape-Transfer System, 110Volt	each
62800-20	CryoJane® Tape-Transfer System, 220Volt	each
62803-30	*Protective Oil Accessories Kit	each

*Installation of the Protective Oil Bath Accessory requires that the CryoJane® system be returned to Electron Microscopy Sciences.

CryoJane Tape-Transfer Process



► CryoJane™ The Cryostat Frozen Sectioning Aid System (continued)



Tape Windows



Hand Roller

Cat. #	Description	Application Notes	Qty.
62800-40	Block-Holder	Deep-waffled, large face block-holder securely anchors frozen embedding medium or tissue.	5/pk
62800-44	Microtome Chuck Adapter	Adapts to the microtome chuck for the use of Block-Holders above.	each
<i>(Please specify cryostat model when ordering)</i>			
62800-46	Hand Roller	Hand Roller, required in the CryoJane® process for laminating Tape Window to block-face.	each
62800-53	Fuses - 1-Amp	SLO-BLOW ceramic core wound. Used in the CryoJane™ ECU.	5/pk
62800-X	Adhesive Slides	Glass slide with adhesive coating, when polymerized, bonds the still-frozen section from the tape to the slide.	125/pk
<i>Avoid thawing the section. ½ x coating slides for mild to normal tissues.</i>			
62800-1X	Adhesive Slides	Glass slide with adhesive coating, when polymerized, bonds the still-frozen section from the tape to the slide.	125/pk
<i>Avoid thawing the section. 1x coating slides for mild to normal tissues.</i>			
62800-4X	Adhesive Slides	Glass slide with adhesive coating, when polymerized, bonds the still-frozen section from the tape to the slide.	100/pk
<i>Avoid thawing the section. 4x coating slides for use with hard un-calcified bone) or fatty tissues.</i>			
62800-72	Tape Windows	CryoJane Tape, applied to the block-face with the Hand Roller to capture the frozen section as it is being cut.	200/pk
<i>Eliminate the need for a brush or anti-roll device.</i>			
62800-74	Protective Oil	Used for coating frozen section blocks to prevent dehydration during long-term storage.	4oz
62800-76	Aqueous Buffer Salt Mix	Used in the preparation of the aqueous fixative, which preserves morphological detail in frozen sections.	2/pk
<i>2 vials per package, (each vial makes 180 ml of buffer).</i>			
62800-78	Knife Facet Wipers	Effectively cleans both facets of knife-edge without dulling the blade.	10/pk

CryoJane® Accessories and Supplies Ordering

Cat.#	Description	Qty.
62800-40	Block-Holder	5/pk
62800-44	Microtome Chuck Adapter (Please specify cryostat model when ordering.)	
62800-46	Hand Roller	
62800-53	Fuses - 1-Amp	5/pk
62800-X	Adhesive Slides - ½ x Coating	125/pk
62800-1X	Adhesive Slides - 1x Coating	125/pk
62800-4X	Adhesive Slides - 4x Coating	100/pk
62800-72	Tape Windows	200/pk
62800-74	Protective Oil	4 oz.
62800-76	Aqueous Buffer Salt Mix	2/pk
62800-78	Knife Facet Wipers	10/pk

► Cryogenic-Gel

- Replaces the messy "runny" embedding media.
- Easy to use.
- Stick to where you want it.
- Will not run – No waste.

It is a highly viscous, water-soluble embedding medium for frozen sections that "stays put". The gel is packaged in a pump-dispenser bottle that can instantly dispense the gel in any position. The dispenser has a built-in "guillotine" that cleanly severs the gel from the pump spouts and prevents any "stringy" medium from pulling away when the bottle is removed. Simply dispense gel on room temperature blockholder. Use cold heat extractor to form a base layer. Dispense additional gel. Place the tissue on top of gel. Use cold heat extractor to freeze tissue and form block. Each bottle contains 4.3oz (128ml), 12/case



Cat.#	Description	Pack
62806-01	Cryo-Gel™, 4.3oz (128ml) per Dispenser	Each
62806-06	Cryo-Gel™, 4.3oz (128ml) per Dispenser	12/cs

► CureMount™ - Mounting Medium

CureMount™ is a UV curable mounting medium of low viscosity for use with all dehydrated sections. CureMount™ is a polymer that cures to a refractive index of 1.55. It closely matches the refractive index of dehydrated tissue. The coverslip can be optimally positioned and cured under UV fluorescent illumination. The coverslipped slide is "dry" in less than 30 seconds. The coverslip can easily be removed by heating the slide briefly, soon after curing or after a longer time by immersing in xylene. All unstained tissue elements and the cured polymer will be invisible, making the stained elements stand out in exquisite detail. Comes in brown glass dropping bottle, 60 ml.



The CureMount™ Starter Kit contains: One CureMount™ Curing Lamp and two bottles of CureMount™

Cat.#	Description	Pack
62804-02	CureMount™ II, Mounting Medium for Paraffin Section	60ml

► Accessories for Paraffin Tape-Transfer System – Paraffin Sectioning Aid (PSA)

The Paraffin Tape-Transfer System is not available. Kit components are available for purchase.

Cat.#	Description	Pack
62820-1X	Regular Adhesive Slide, 1x	100/pk
62820-4X	Adhesive Slide for Bone and Fatty Tissue, 4x	100/pk
62820-35	TPC Solvent, 1 pt (473 ml)	each
62820-36	TPC Solvent Can	each
62800-72	Tissue Tape Window, 400/Roll	each
62800-46	Hand Roller	each

► Forceps Warmer

This forceps warmer is indestructible: An all metal, space saving unit. Three heated wells prevent wax build-up and allow for easy tissue orientation at the embedding centers.



Features and Benefits:

- 80°C warming temperature provides consistent and constant heat to forceps
- Angled forceps wells make retrieving and replacing the forceps easy
- Heat resistant housing is constructed for safety to prevent burns
- Three convenient wells provide ample space for different forceps
- Small compact size to maximize laboratory bench top space
- Portable for easy accompany to Embedding Station area
- Select switch – Light indicator and fused for safety, ON/OFF
- Switch protector casing prevents paraffin wax contamination

Cat. #	Description	Qty
63201-10	Forceps Warmer, 100-120 VAC, 50/60Hz, 0.5A; 5"W x 3 3/4"D x 3" H	each
63201-20	Forceps Warmer, 220-240 VAC, 50/60Hz, 0.25A 5"W x 3 3/4"D x 3" H	each

► Paraffin Wax Dispenser

ELECTROTHERMAL

The most reliable Wax Dispenser on the market

- Provides immediate 'Wax-on-Tap.'
- For use in Pathology laboratories, etc.
- Thermally insulated tap heater with independent temperature control eliminates wax solidification.



Product Description

- Anodized black interior, stove enamel black and white aluminum exterior with a black metal lid which is durable and easy to clean.
- 1 gallon Capacity (4.5 liters).
- Built-in controller provides temperature control from ambient to 75°C.
- A non-drip swivel lever with replaceable filter makes the dispensing of wax easy.
- Tap heater maintains temperature within the tap to keep the wax molten.

SAFETY

- Safety over-temperature at 105°C.
- Non-resettable thermal fuse.

PRODUCT SPECIFICATIONS

Model #	Chamber Capacity (L)	Chamber Dimensions Inches (cm)		Overall Dimensions Inches (cm)		Shipping Weight Lb. (kg)
		H	Dia	H	Dia	
MH8523BX1	4.5	8.25	8.25	12	11	10
		15	15	30	28	4.5
MH85238	4.5	8.25	8.25	12	11	10
		15	15	30	28	4.5

Ordering

Cat.#	Model #	Electrical, 50/60 Hz	
		Volts	Watts
62839-10	MH8523BX1	115	175
62839-20	MH8523B8	230	175

► Histo Orientator

The convenient 2"x2" (51x51mm) heated surface can be used for either "de-wrinkling" of paraffin sections or for the "rapid attachment" of fresh frozen sections. A quick touch of the slide to the hot plate will remove wrinkles and bubbles on your sections.



You can also keep a unit on your cryostat to ensure solid attachment of frozen sections to the slide which prevents loosening of the tissue during agitation in hand staining.

The unit measures: 4 1/2"x2 3/4"x 3 1/4" (114x70x82mm). 120 Vac, 60 Hz, 12 Watts. Temperature range: Ambient to 65°C.

63205	Histo Orientator	each
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► Large Paraffin Wax Dispenser

6.25 Gallons of Liquid Paraffin on Demand!

Holds 6.25 gallons of paraffin wax with clear lexan lid permits easy viewing of paraffin without contamination. High spigot accommodates large transfer vessels. The unit comes with microprocessor temperature regulation, built-in clock. Ambient to 65°C. Dimensions: 14" W x 15"D x 23"H (35.6 x 38.1 x 58.4 cm), weight 45 lbs (20.5 kg).



- Microprocessor controlled – Accurate and uniformity temperature control
- Security – Advanced software & mechanical devices assure safety. The Paraffin Dispenser have been tested by a registered independent body to rigorous international quality and safety standards, and, have been found to be in compliance with UL, CSA and CE.

EMS #	Description	Qty.
62840-10	Large Paraffin Dispenser, 100-120VAC, 50/60Hz, 4.5 Amp	each
62840-20	Large Paraffin Dispenser, 220-240VAC, 50/60Hz, 2.25 Amp	each

► Paraffin Block Trimmer – Wax Trimmer

Our Wax Trimmer is an appliance for removing excess paraffin from embedding tissue cassettes.



It is compact, tabletop design fits easily in any histology lab. Melted paraffin is shaved away. Collection tray stays in place by magnetic contact with the unit. The convenient PE disposable tray liner allows easy disposal of the runoff wax. No need to scrape out the collection tray.

FEATURES:

- Multiple blocks may be trimmed simultaneously
- Grooved surface for proper wax drainage
- Two temperature settings – Low setting is approx. 80°F and high setting is 90°F
- UL listed power cord
- Includes 5 pieces disposable drip tray liner
- Dimensions: 11 1/4" (including tray) W x 5"D x 8"H (15x23x18 cm). 8 lbs (3.6kg)
- Electrical 115VAC, 50/60Hz, 4 Amp

EMS #	Description	Qty.
62850-10	Wax Trimmer, 115VAC	each
62850-50	Replacement Plastic Liner	50/pack
62850-51	Replacement Plastic Liner	6packs/cs

► Flotation Bath & Flotation Workstations – Made in the USA

Helps your tissue preparation easier, safer and more efficient.

The unit comes with conveniently removable glass dish, scratch and chemical resistant plastic housing, microprocessor controlled electronics and a high contrast background for optimum specimen viewing combined with the HISTO Orientator™ for flattening sections and a Slide Dryer, all in one compact unit. The systems are now available in Low Profile 8"x 8" x 2 ¼" deep dish versions as well as for those labs wanting to float larger ribbons, 8"x 11" x 2".

- Magnetic non-contact switch function for years flawlessly
- Microprocessor-controlled heating, ambient to 65°C
- Flat membrane switches for safety and simplicity
- Fluorescent white lighting positioned for improve tissue viewing glare-free

- Heat-resistant plastic housing maintains cosmetic appearance
- Removable glass dish for easy cleaning
- 2" x 6" or 2" x 8" Convection Slide dryer & 2" X 2" HISTO Orientator™ for eliminating wrinkles.

For those flotation bath applications not requiring the add convenience of Slide Dryer and HISTO Orientator™, the basic Flotation Bath provides all the functional need of the Flotation Workstation at the affordable price. The baths again come in two sizes , 8x8x2 ¼" or 8x11x2" .

The Flotation Bath and Flotation Workstation have been tested by a registered independent body to rigorous international quality and safety standards, and, have been found to be in compliance with UL, CSA and CE.



EMS #	Description	Qty.
63214-10	Flotation Workstation, 8 x 8 x 2 ¼" Deep Dish, 2 x 6" Slide Dryer, 120VAC	each
63214-11	Flotation Workstation, 8 x 11 x 2", Deep Dish, 2 x 8" Slide Dryer 120VAC	each
63214-20	Flotation Workstation, 8 x 8 x 2 ¼" Deep Dish, 2 x 6" Slide Dryer 220VAC	each
63214-21	Flotation Workstation, 8 x 11 x 2" Deep Dish, 2 x 8" Slide Dryer 220VAC	each
63213-10	Flotation Bath, 8 x 8 x 2 ¼" Deep Dish, 120VAC	each
63213-11	Flotation Bath, 8 x 11 x 2", 120VAC	each
63213-20	Flotation Bath, 8 x 8 x 2 ¼" Deep Dish , 220VAC	each
63213-21	Flotation Bath, 8 x 11 x 2", 220VAC	each
63214-50	Glass Dish Replacement, 8 x 8 x 2" (20 x 20 x 5mm)	each
63214-52	Glass Dish Replacement, 8 x 11 x 2" (20 x 28 x 6mm)	each

EMS #	Description	Qty.
63214-53	Slide Drying Rack, Front mounted, for 8 x 11 dishes holds 39 slides, a 13" x 1" space is available for placing blotting paper	each
63214-54	Slide Drying Rack, Front mounted, for 8 x 8 models, holds 39 slides, a 13" x 1" space is available for placing blotting paper	each
63214-55	Slide Drying Rack, Side mounted, for all 8 x 8 and 8 x 11 models; Can be mounted on left or right side, older models may require some assembly; holds 34 slides, a 13" x 1" space is available for placing blotting paper	each
63214-51	Fluorescent Light Bulb Replacement	2/pk

► SHUR/Dry™ Slide Dryer III– Forced Air



This is the most up-to-date technology apply to slide drying method. This new design allows users to increase their productivity while maintaining super results. Adjustable shelf accepts an assortment of slide racks with and/or without coverslipper adapters. Chamber dimensions: 19"W x 9"D x 14" H (48x23x36 cm). Overall dimension: 22"W 16"D x 20"H (56x41x51 cm)

- Temperature from ambient to 70°C ± 1°C
- Adjustable air flow
- 51 CFM of air flow
- Digital programming
- Microprocessor controlled
- Recessed 9 W fluorescent lighting
- Four 3,200 rpm fans

Cat. #	Description	Qty.
63224-10	SHUR/Dry Slide Dryer III, 100-120VAC, 50/60Hz, 2 Amp	each
63224-20	SHUR/Dry Slide Dryer III, 220-240VAC, 50/60Hz, 1 Amp	each
63224-50	Addition Shelf	each

► Forced Air Slide Dryer

The dryer is designed to rapidly dry slides by blowing warm air over the surface of the slides. The slide dryer accommodates two slide racks directly from a stainer and allows the slides to be stained in approximately 20-30 minutes.



FEATURES:

- A temperature control dial which allows the user to set the temperature from ambient to 75°C.
- A hinged lid made from durable stainless steel.
- A glass front for see-through viewing.
- A zinc coated steel casing with a stoved epoxy finish.
- A self-resetting thermal switch to protect the unit from electrical surges.

The unit measures: 11"(L) x 9¾"(W) x 5"(H) (27x25x 13cm)

Power: 110 VAC, 60 Hz, 2 Amps.

Cat. #	Description	Qty.
63223	Forced Air Slide Dryer	each
63223-20	Force Air Slide Dryer, 220-240VAC, 1 Amp	each

► Portable Slide Warmer

With precision temperature control and a PTFE coating on the surface for easy cleaning this rugged portable warmer is perfect for many applications .

Its design allows for slides, coverslips and glassware to keep them at the optimum temperature for motility testing. The aluminum heating surface measures 7" x 11" The unit features a simple solid state temperature control that is calibrated at 37°C (98°F) and it is housed in a durable plastic case with a great carrying handle. The hinged lid may be closed when not in use and the power cord is detachable and it stores in the box. The Slide warmer comes in 115 volt and 220 Volt .



Cat. #	Description	Qty.
71318-01	Slide Warmer, Portable Kit, 115 Volt	each
71308-02	Slide Warmer, Portable Kit, 220 Volt	each

► STEP UP™ SLIDE WARMER



Our Step Up™ Slide Warmer's unique patent pending design helps you save space while still meeting a busy lab's needs.

The Step Up™ holds twice as many slides as a flat unit of the same size and also makes retrieving your slides easier since the end of the slide is not on the flat surface.

Model XH-2003

- Anodized black surface provides contrast with samples
- Removable tray for easy cleaning
- Digital LED temperature display and temperature setting

Capacity40 3" x 1" slides
 Temperature rangeRoom temperature to 70°C ±1°
 Power requirements300W (110V, 60Hz)
 Overall size14" x 14" x 4"H
 Shipping Weight.....22 lbs.

Cat. #	Description	Qty.
71319-50	Step Up™ Slide Warmer, 115 Volt	each
71319-250	Step Up™ Slide Warmer, 220 Volt	each

► Covered Slide Warmer – with Hinged Lid

25 x 8 Surface

Ideal for use in the fields of cytology, histology, pathology, and biology for paraffin tissue section mounting. Thermal heater ensures even heat transfer. Anodized black surface provides contrast. LED temperature display. Size 25 x 8"

- Thermostatic heat control
- Anodized black surface provides contrast
- LED temperature display, both set temperature and display temperature
- Thermostat setting range from room temperature to 70°C

Cat. #	Description	Qty.
71321-10	for 115 Volt	each
71321-20	for 220 Volt	each



► Slide Warmers

These slide warmers are ideal for use in cytology, histology, pathology and biology for paraffin tissue section mounting. Available in two sizes.

- Thermostatic heat control
- Anodized black surface provides contrast
- LED temperature display, both set temperature and display temperature
- Thermostat setting range from room temperature to 70°C

Cat. #	Description	Qty.
71319-10	10¼" x 7" 115 Volt, Ambient to 70°C (26x18cm)	23 Slides
71319-220	10¼" x 7" 220 Volt, Ambient to 70°C (26x18cm)	23 Slides
71320-10	25" x 8" 115 Volt, Ambient to 70°C (63x20cm)	66 Slides
71320-220	25" x 8" 220 Volt, Ambient to 70°C (63x20cm)	66 Slides



► Slide Warmers

Our Large Size Economical Slide Warmer

- Temperature range from slightly above ambient to 65°C
- Two sizes – Accommodates up to 66 slides
- Large slide capacity with space-saving design
- 2 years warranty
- CE Certified

These Slide Warmers are designed for cytology, histology, pathology, and other biological applications in industrial and clinical lab environments.



- Uniform heat transfer over entire heating surface
- Black Anodized heavy gauge aluminum worktop for maximum specimen contrast.
- Model 26025 features LED display and a dust cover

- Model 26007 and 26022 are CE certified.
- Model MH6616: Temperature ranges slightly above ambient to 100°C, with dry slides across the drying bars, angled on the bar or lying flat without bars.

Cat.#	Model	Electrical, 50/60Hz		Overall Dimension W" x D" x H" (cm)	Slide Capacity	Qty.
		Volts	Watts			
71317-10	MH6616X1	120	150	15.5 x 7.12 x 3.5	50, 1" x 3" (25 x 76mm)	each
71317-20	MH6616	230	150	(39 x 18 x 9)	50, 1" x 3" (25 x 76mm)	each

► Oven/Incubator

This Oven/Incubator with an aluminum inner chamber, and venting is up to the task of providing many years of long service in busy labs. The cast aluminum chamber provides for dependable temperature uniformity and the vent efficiently expels moisture and vapors. The unit comes complete with a removable shelf.

FEATURES:

- A magnetic latch assures positive door closure.
- An aluminum chamber provides excellent temperature uniformity.
- A thermometer port at the top of the oven accommodates any partial immersion thermometer.
- The chamber is vented through the top to allow for the removal of moisture and other vapors.
- Heats up rapidly. (56°C in 9 minutes).

- The aluminum chamber is easy to clean and it provides excellent temperature uniformity.
- Oven works on the gravity convection heating method.
- The unit comes complete with one removable metal shelf, three-wire cord, and plug.

Ordering:

63230-10	Oven/Incubator, 120 Volts	each
63230-20	Oven/Incubator, 240 Volts	each



APPLICATIONS:

- General drying and incubation applications.
- Polymerization of resins.

SPECIFICATIONS:

Chamber Dimensions Inch (cm)			Overall Dimensions Inch (cm)			Weight Lb. (Kg) Ship	Electrical 50/60Hz Amps		Watts	Temp. Uniformity @100°C	Operating Temp. Range °C
W	H	D	W	H	D		Volts				
16.00 (41)	11.5 (29)	16.20 (41)	18.5 (47)	22.5 (57)	13.5 (34)	57 (26)	120 240	2.90	500	+/-5°C	+5°C - 210°C

For our Lynx Automated Tissue Processor see pages 987-989 >>>>>

PathScan Enabler IV

Low Cost Digital Histology Slide Scanner

Obtain ultra high resolution images from a glass tissue slide in about a minute without a microscope.

Overview

The PathScan Enabler IV, is designed to allow scanning of an entire whole mounted histology sample attached to standard 1 x 3 inch cover slipped glass slide. The PathScan Enabler IV solves low power, large field of view, high resolution imaging problems. This fourth generation histology scanner scans an area of 1.42 x 0.85 inches (36.14 x 21.59 mm), resulting in useable images up to 10,248 x 6,120 pixels, uninterpolated. File size can be as large as 188 megabytes. Produces image files which can be saved in a variety of formats including TIFF, PICT, BMP, GIF, etc. Compatible with PC Windows based computers.

Key Features

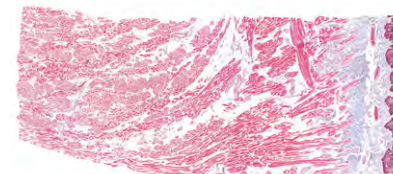
- Low cost histology slide scanner
- One button control, scans, saves and (if available) opens image in Adobe Photoshop
- Typical scan times is under a minute
- Holder accepts two 1 x 3" slides
- 7200 dpi resolution, 3.5 microns per pixel
- Single pass scan mode
- 16/8 bits per color sampling rate
- Dynamic range up to 4.2 O.D
- Real time sharpening, automatic color correction
- Rapid accurate fixed focus
- SilverFast Ai Studio Software
- USB2 interface
- Fourth generation, 1000's sold!

Images from the PathScan Enabler IV System

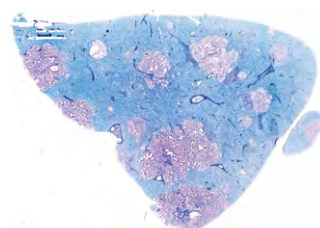
To view additional images at high resolution, please visit our web site at www.emsdiasum.com.



Rat Brain



Tongue



Lung



Bone

Ordering:

89010	Pathscan Enabler IV Slide Scanner	each
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► Storage

► Held Secure™ Slide/Cassette Storage System

A durable corrugated filing box kit for the proper filing, identification, and storage of glass slides or cassettes. The complete set comes unassembled in packages of 10.

- Designed to hold up to 2,000 slides or 500+ cassettes per box
 - Partitioned Drawers for easy retrieval
 - Double tabbed in back for additional safety
 - Printing on box front designed for easy inventory identification
 - Internal corrugated construction designed for multiple stacking
 - Sold in unassembled cases of 10 boxes
 - 50 In/Out Cards come with each
- Slide/Cassette case for slide retrieval documentation
 - 25 Index Cards come with each Slide Kit for slide retrieval documentation
 - Additional cards and removable tray labels available for bulk purchase
 - Internal corrugated construction supports up to 250 lbs and the tray remains easily accessible
 - Manufactured in the USA

63280-50	File System Set for Slides	10 bx	63280-53	Cassette In/Out cards	1000/cs
63280-51	File System for Cassettes	10 bx	63280-54	Slide Index Cards	500/cs
63280-52	Slide in/Out Cards	1000/cs	63280-55	Removable Tray Labels	500/roll

► Slide/Cassette Filing System

Our moisture resistant, plastic covered corrugated boxes interlock to stack ten high, each supporting up to 500 lbs of overhead cassette and slide weight. Each box accommodates 2000 slides or 500 tissue blocks to meet your varied storage requirements. Come unassembled; boxes require minimal storage space and can be easily assembled as needed

Slide storage File with four compartments, each has one drawer, drawer inside measures 10½"L x 2 "W x 1½"H (267 x 60 x 40mm), each drawer has one center divider, each division is 1½" wide, accommodates up to 250 slides or 500 slides per drawer, or 2000 slides per file, 10 stackable files per case or 20,000 slides.

When these boxes are used as a cassette storage file, each compartment has two drawers, one on top of the other. Four compartments or eight drawers, each drawer accommodates 63 cassettes or 500 cassettes per file. 10 stackable files per case or 1500 cassettes.

Overall dimension of each file is 11½"(L) x 12"(W) x 4"(H) (295 x 300 x 100mm)

Cat.#	Description	Pack
63280-10	Slide Storage File Box	10/cs
63280-20	Cassette Storage File Box	10/cs

► HistoPrep Modular File Drawers

Individually, self-contained, stackable drawers. They hold approximately 250 Histo cassettes or embedding rings. Supplied in economical two-drawer packages with interlocking ridges on the top and the bottom for easy stacking of as many cabinets as you want. Each drawer is encased in a rugged, high impact plastic sleeve, so your cassettes are completely enclosed and protected. They come with color decals which allow you to organize each by function. Cassettes are not included. The unit measures: 15¾"(L)x9"(W)x2"(H) (40x23x5cm).

63284	HistoPrep Modular File Drawers	2/pk
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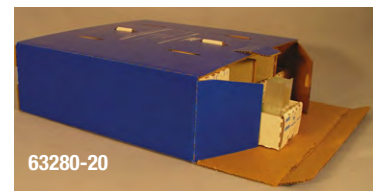
► Tissue File Cases

A histological embedment block cataloging and storage system. This file system incorporates the necessary features offering embedment block protection, simplified cataloging, reduction of filing error and facilitation of retrieval. All of this while conserving space and being very affordable. The tissue files come with 100 partitioned compartments arranged 10 deep and 10 across. By removing alternating partitions, each compartment can be doubled or quadrupled in size. For other storage needs, the partitions may also be removed. For cataloging, each compartment is numerically indexed on a permanent chart inside the lid which also provides space for detailed information.

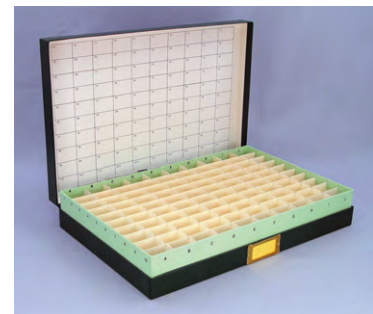
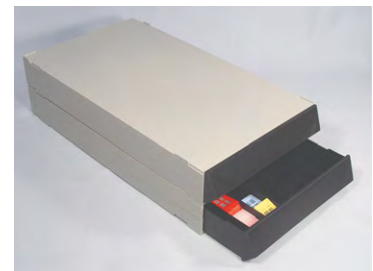
Tissue files are made from solid fiberboard with a protective, attractive, scuff-resistant exterior green covering. Its hinged lid lifts open and with a cloth stay support the lid can be kept in the open position.

Tissue File Specifications:

- Embedment Block Capacity: 100–200 per file.
- Compartments: 100 of 1½" x 1 x 2¼" (38 x 25 x 57mm)
- Compartment Arrangement: 10 across x 10 deep
- Dimensions: Outside: 15¾"x10½"x2½" (387x267x60mm) Inside: 14⅞"x9⅞"x2¼" (378x251x57mm)
- Approximate Shipping Weight: 2 lbs. (0.9Kg)



- Economical
- Durable
- Convenient
- Versatile



63286-01	Tissue File Case	each
63286-06	Tissue File Case	6/pk
63286-10	Tissue File Case	12/pk

► Storage (continued)

► Micro Slide Files

A prepared Microscope Slide Cataloging and Storage System. The slide files contain 48 partitioned compartments which will hold an estimated 10 of 1x3" glass slides per cell (480 slides per case) or 10 of 3x2" slides per cell (240 slides per case) by removing two alternate long partitions. A 3/8" (100mm) cushioning space surrounding the partitioned compartment serves as a protective barrier against damage to the stored slides. For other storage needs, all or alternate partitions are removed for conversion to larger size compartments.

For cataloging and slide retrieval, each compartment is numerically indexed to a permanent chart on the underside of the lid which also provides space for information.

The files are constructed from solid fiberboard with a protective and attractive, scuff-resistant green exterior. The reinforced hinged lid conveniently lifts open with a cloth stay support and keeps the lid in the open position for easy slide filing and retrieval.

Slide File Specifications:

■ **Microscope Slide Capacity:** 480 25x75mm (1x3") or 240 76x51mm (3x2") slides per Slide File

■ **Compartments:** 8 2.9x1.6x7.6cm (1 1/8x5/8x3")

■ **Compartment Arrangement:** 4 across x 12 deep
- Partitions are removable to enlarge each cell.

■ Dimensions:

Outside: 24.1x15.2x8.3cm (9 1/2x6x3 1/4")
Inside: 23x14.1x7.8cm (9 1/16x5 5/16x3 1/16")

■ **Approximate Shipping Weight:**
0.45kg (1 lb) per unit



63282-01	Slide File Case	each
63282-06	Slide File Case	6/pk
63282-12	Slide File Case	12/pk



► Space Saver - Steel File Cabinet System

1. Slide Cabinet System

■ **Store up to 54,000 slides in only 2 square feet of space.**

■ **Low cost slide storage.**

■ **Ideal for use in Pathology, Cytology, Hematology, Histology, Dermatology, Research, Education.**

■ **Sturdy - Built to last.**

Our newly introduced cabinets for filing 3x1" slides is the most effective system available to the ever-growing problem of slide storage and retrieval.

They are compact, sturdy and economical!!!

The cabinets are stackable and are secured by interlocks. The base (order separately) lifts the cabinets 4 3/4" off the floor. All units are constructed from heavy gauge reinforced cold rolled steel, electrostatically finished in dura-baked enamel in an attractive green color. Drawers are easily removable and interchangeable. They have rolled edges on each side for added strength. The riveted card holder on the front of the drawer speeds up slide retrieval.

Each cabinet has 6 drawers, with two compartments per row, so you can store as many as 750 slides per drawer. The outside walls and center divider are lower than the slides, allowing for easy removal of any slide.

Each drawer has an exclusive built-in hand grip at the rear and a full sized handle at the front which allows the drawers to be removed and used as trays.

Each cabinet comes with a package of **Memorandum Markers**, and a set of movable **Compressor Blocks**.

The cabinet measures: 15 1/2"(W)x18 3/4"(D)x4 3/4"(H)
(40x47x12cm)

74780-10	EMS Cabinet System Base	each
74780-20	EMS Micro-Slide Cabinet	each

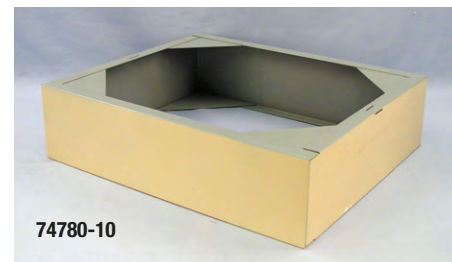
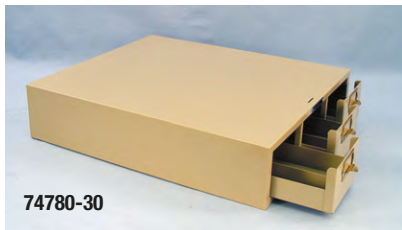
2. 35mm Slide Cabinets

For 2x2 Slides and Kodachrome Transparencies.

These slide cabinets have the same construction and features as our Micro-Slide Cabinet (Cat# 74780-20). Each file comes with three drawers and can store up to 2,250 slides.

35mm Slide Cabinets interlock with themselves and with Micro-Slide Cabinets, for total flexibility and storage convenience. The depth and width dimensions are the same as (Cat#74780-10) shown above; the height is about 1" (25cm) lower and uses the same base as our (Cat# 74780-10).

74780-30	EMS 35mm Slide Cabinet	each
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► Storage (continued)

► Tissue-Tek® Lab Aid®

► A. Slide Filing System

Allows for the convenient storage and retrieval of microscope slides or transparencies. Two different vertical filing drawer sections can be stacked in any combination. Each 1" drawer section has 14 drawers and holds 465 (1" x 3") slides per drawer. Each 2" drawer section has 7 drawers and holds 271 (3" x 2") slides or 271 (2" x 2") transparencies per drawer.

- Requires only 19 x 19" of floor space.
- Slide backstops easily attach inside drawers to hold slide in place.
- Constructed from welded steel for easy stacking and durability.
- Two colors choices: olive green or beige.



Cat.#	Tissue-Tek	Description	Color	Pack	Cat.#	Tissue-Tek	Description	Color	Pack
62650-10	4010	Floor Base	Green	each	62650-16	4016	Drawer Section 2" x 7	Green	each
62651-10	4011	Floor Base	Beige	each	62651-16	4017	Drawer Section 2" x 7	Beige	each
62650-12	4012	Top Cap Panel	Green	each	62651-19	4019	Slide Backstop	Beige	each
62651-12	4013	Top Cap Panel	Beige	each	62650-27	4027	Replacement 1" Drawer	Green	each
62650-14	4014	Drawer Section 1" x 14	Green	each	62650-01	4020	Slide Liner, Coil Spring	-----	each
62651-14	4015	Drawer Section 1" x 14	Beige	each					



► B. Block Filing Cabinet

Allows for the organized storage of blocks that have been embedded using: Tissue Cassettes, Biopsy Cassettes, Mesh Cassettes, Mega Cassettes, Processing/Embedding Cassettes and Embedding Rings

- One-piece construction eliminates hinges and doors for dust-free storage.
- Six impact-resistant plastic drawers feature generous space for identification.
- Compact in size (17" x 9½" x 15") and stackable.

Cat.#	Tissue-Tek	Description	Pack
62515-01	4192	Cabinet only	each
62516-10	4171-02	Cabinet with 1500 Uni-Cassettes® Color White #62500-W	each
62516-15	4189	Cabinet with 1500 #62520-W (white) Processing/Embedding Cassettes	each
62516-20	4190	Cabinet with 1500 #62520-C (clear) Processing/Embedding Cassettes	each
62516-25	4169	Cabinet with 1000 #62525-W White Embedding Rings	each



62653-01

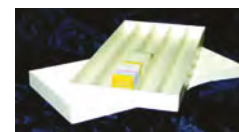
► C. Lab-Aid® Ultra™ Storage Cabinets

Safe, Secure, and Trusted

Security and capacity are the primary characteristics of the Lab Aid® Ultra™ Cabinet for slides or cassettes. This modernized system offers large capacity storage with integrated security features. A sturdy steel construction ensures long-term use and a drawer lock prevents tampering guaranteeing specimen safety. Each drawer front has a plastic covered labeling tab assuring positive identification. Inside, convenient removable slide and block trays accommodate up to 82,000 microscope slides or 21,000 tissue blocks. Coding strips can be used to separate slides or blocks by numbers. Filing cabinet can be bolted together and stacked two high for maximum storage capacity.



62653-11



62653-13

EMS #	Tissue-Tek	Description	Qty
62653-01	3991	Lab-Aid® ULTRA™ Cabinet for Slide System. Accommodate up to 82,000 Microscope Slides	Each
62653-02	3992	Lab-Aid® ULTRA™ Cabinet for Block System. Accommodate up to 21,000 tissue blocks	Each
62653-04	3985	Coding Strips, Green Color.	100/cs
62653-05	3986	Coding Strips, Yellow Color.	100/cs
62653-06	3987	Coding Strips, Blue Color.	100/cs
62653-07	3988	Coding Strips, Brown Color.	100/cs
62653-08	3993	Foam Inserts. To use as slide stopper	50/cs
62653-09	3994	Metal Hook for Slide Trays. For added safety, this hook can be used to assist in the removal of slide trays	1 each
62653-10	3995	Metal Hook for Slide Trays. For added safety, this hook can be used to assist in the removal of tissue block trays	1 each
62653-11	3996	Standard Slide Tray – 2 Rows. Made of sturdy plastic and features four compartments for storage of microscope slides. Each tray accommodates up to 512 slides	1 each
62653-12	3997	Large Slide Tray – 1 Row. The large tray features one row per tray, is available to accommodate large slides	1 each
62653-13	3998	Block Tray. Made of sturdy plastic and features 4 rows per tray accommodating 35 blocks in each row. Block Tray can be stacked 2-high in each drawer, enabling a total block capacity of 21,000	1 each
62653-14	3999	Lock Key. This key is used to lock and unlock the slide or block filling cabinet as necessary	1 each

► Storage (continued)

► Electropolished Stainless Steel Freezer Racks

*High Quality, Ultra-Durable Freezer Racks
for Long Term Sample Storage*

No Sharp Edges - All edges have been ground down to remove the sharp surfaces that plague standard freezer racks

Electropolished - This step cleans up all weld points that, over time, may be the starting points for corrosion.

Superior Construction - Superior construction and design have created a more sturdy rack than what is currently available on the market

Durable - Racks are designed and finished to last longer in the demanding freezer environment where samples are housed

Surgical Finish - Electropolishing leaves racks ultra-shiny and free from any surface contaminants

Multiple Sizes - Several vertical and horizontal options are available to fit a variety of freezer configurations

- A superior design was chosen to increase structural integrity.
- All weld points have been ground down to eliminate sharp points and areas where corrosion can occur.
- Structural edges and shelves have been ground and racks have been electropolished to remove sharp edges.

Cat. No.	Description	Dimensions	Qty
61615-25	4 x 4 Freezer Rack, holds (16) 3" boxes	22.125" L x 5.50" W x 12.625" H	1 Rack
61615-30	3 x 4 Freezer Rack, holds (12) 3" boxes	16.625" L x 5.50" W x 12.625" H	1 Rack
61615-35	3 x 3 Freezer Rack, holds (9) 3" boxes	16.625" L x 5.50" W x 9.625" H	1 Rack
61615-40	3 x 4 Freezer Rack, holds (12) 2" boxes	16.318" L x 5.50" W x 8.875" H	1 Rack
61615-45	4 x 4 Freezer Rack, holds (16) 2" boxes	21.625" L x 5.50" W x 8.875" H	1 Rack
61615-50	4 x 5 Freezer Rack, holds (20) 2" boxes	21.625" L x 5.50" W x 11.063" H	1 Rack
61615-55	1 x 9 Freezer Rack, holds (9) 3" boxes	5.63" L x 5.63" W x 28.875" H	1 Rack
61615-60	1 x 9 Freezer Rack, holds (9) 2" boxes	5.63" L x 5.63" W x 19.25" H	1 Rack

► Cardboard Freezer Boxes and Dividers

For Use With Stainless Steel Freezer Racks

Store cryogenic vials in liquid nitrogen or in mechanical freezers in our freezer storage boxes. Box footprint is 133 x 133 mm. Select a box and a partition that fit the size and number of vials for your needs. Cardboard boxes can be labelled with Cryo-Tags for easy identification. Both the boxes and dividers are available in packs of 12.



Cat. No.	Description	Dimensions	Qty
61615-65	2" Freezer Boxes	133mm x 133mm, 50mm	12/Pack
61615-70	3" Freezer Boxes	133mm x 133mm, 75mm	12/Pack
61615-75	Freezer Box Divider, 64 Hole	8 Columns, 8 Rows	12/Pack
61615-80	Freezer Box Divider, 81 Hole	9 Columns, 9 Rows	12/Pack
61615-85	Freezer Box Divider, 49 Hole	7 Columns, 7 Rows	12/Pack
61615-90	Freezer Box Divider, 100 Hole	10 Columns, 10 Rows	12/Pack



Racks For 3" Boxes — 61615-55 Racks For 2" Boxes — 61615-60



61615-50



61615-45



61615-40



61615-35



61615-30

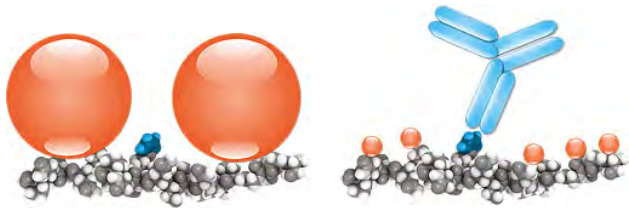
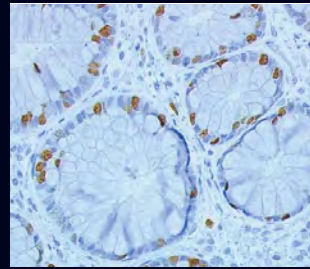


61615-25

- **Cryogenic Labels**
see pages 694-698 <<<<<<
- **Wet Grip Labels for Moist, Frosty or Frozen Tubes** see page 698 <<<<<<
- **Hi/Lo Write-On Temperature Tape**
see page 1140 <<<<<<

Antigen Retrieval

- The Retriever
- Retriever Slides
- Buffers
- Blocking Solutions
- Antibody Diluents
- Antigen Retrievers in IHC



**Electron
Microscopy
Sciences**

The Solution for Antigen Unmasking

► The Retriever

Our Unique Retriever solves the problem of staining formalin fixed tissues. This is an affordable solution to all known major problems with immunohistochemistry on paraffin sections. Ease of use combined with high reproducibility of the results will give you the best quality immunostaining.

The Retriever is a bench-top model for thermally processing slides of formalin-fixed, paraffin embedded tissues prior to immunostaining. The model has been designed to ensure identical processing of all the samples during a processing cycle, as well as the identical processing of the samples in individual sessions. The retriever preserves processed tissues.

Now you can:

- Run antigen unmasking in 6 various buffers at once.
- Perform gentle antigen retrieval that does not damage the tissue morphology.
- Get identical results every time.
- Compare series of slides treated in independent sessions.

How does the Retriever work?

Basically it is a pressure cooker. However, a pressure cooker specially designed to unmask the antigen on tissue sections. The core principle is heating of the chambers with the slides at high temperature (>120°C) and high pressure. Sensors control the heating profile for the temperature and pressure to be reached at certain pace and over certain time. We did a lot of tests to find the optimal settings. When the required temperature is reached, it will be kept for several minutes. After that the slides will be cooling over 2 hours. Specially designed thermal walls of the unit control the speed of cooling of the inner chamber and slides

Who would benefit from using our Retriever?

- Investigative Pathology, where the high quality of staining (a picture may be published!) is required.
- Any labs that is short on technical personnel: any student or post-doc can process slides for the staining without using much time
- Small routine pathology labs, where a limited number of slides should be processed daily
- Anyone who uses highly valuable samples, such as tissue arrays or unique tissue samples: Simplicity and reliability of the unit ensures the safety of your sample, and a high quality antigen unmasking



Slide Chamber

Chamber Rack

Technical Specifications of Retriever:

Height	335 mm
Capacity	9 litres
Max. Instrument length	228 mm
Width	340 mm
Net Weight	4.5 kilos
Internal Chamber Dimensions (d/h)	210/230 mm
Max. Load Weight	3.0kg

How To Use:

Step 1.

Deparaffinized sections on slides are placed into the Processing (Tissue Slide) Chambers. Retriever can accommodate simultaneously from 1 to 6 Chambers, which allows you to process a series of slides in up to 6 different antigen unmasking buffers within the same session. Fill the chambers with a buffer of your choice.

Step 2.

Place the Chambers into the Rack.

Fill the Retriever with 750 ml of deionized/distilled water. Place the Rack into Retriever.

Close the lid by a simple twist.



Step 3.

Push the Start button. The tissues will be processed automatically. In about two hours (depends on the load) you can open the lid and proceed immunostaining.



Other Specifications:

Fuses - Located under the control module, fuses F1 0A, 32 x 6.3mm, ceramic sand filled, Mains plug top fuse (User replaceable), F1 3A to BS1362 UK ONLY.

Rating - Models are rated continuously for intermittent use.

Body- Deep drawn aluminium. Lid - Aluminium.

Heater- Externally surface mounted mechanically fixed electric element.

Temperature Cut Out - Thermal fuse.

Pressure - Calibrated pressure release valve.

Max. Single Fault Temperature - 133.3°C

Environment Conditions - indoor use - temperature 5°C to 40°C - altitude up to 2000m - maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C. - mains supply voltage fluctuations not to exceed +10% of the nominal voltage

Input Connections - Mains inlet socket 'hot' format conforming to IEC 302.

Safety Shut Down - See "Temperature Cut Out".

Choosing A Buffer:

If you already know the buffer that can be used for Microwave treatments of sections in order to unmask you antigen of interest, the high chances are that the same buffer may be used in Retriever.

To improve the morphology of tissue of the processed sections, use one of our supplied ready-to-use buffers by choosing them according to pH.

We have commercially available the following buffers:

- R-Buffer A pH 6.0
- R-Buffer B pH 8.0
- R-Buffer C pH 4.5
- R-Buffer U pH 6.0
- G variants of the same buffers for a more gentle processing of the tissues.

To successfully retrieve the antigen of interest on fixed sections, please remember that two factors define the choice of buffer:

- The nature of the antigen/epitope and of the antibody used for its detection
- The fixative used and the degree of fixation.

Correction for Fixative & Degree of Fixation

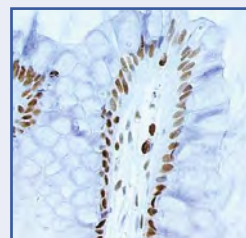
The suggested protocol for processing tissues is optimized for routinely formalin-fixed and paraffin embedded material. If the tissue used for sections was insufficiently fixed, overfixed (was left in formalin for too long), or other fixative was used, the protocol may require some modifications. The easiest correction is to use EMS's own specially formulated buffers for a gentle (G) tissue processing. Use them instead of the basic buffers. For overfixed material try using U buffer or run the additional cycle in the same buffer.

Fixative Used on Tissues	Buffer
Formalin, buffered	R-Buffer A, B, C or U
Formalin-Zn	R-Buffer A, B, C or U
Mirsky fixative	Under testing
Boonfix I	Under testing
Boonfix II	Under testing
PLP	R-buffer AG, BG, or CG

Examples of Staining

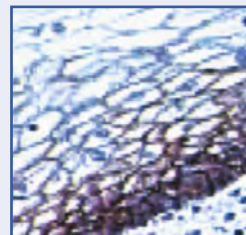
PCNA (Nuclear antigen)

Sections of formalin-fixed, paraffin embedded tissue of human duodenum were deparaffinized and processed in Retriever to unmask the antigen. We used one cycle in R-Buffer C (pH 6.0) with cooling of the slides overnight. Antibody PC-10 against proliferation marker PCNA (nuclear) was used together with R-Detect HRP detection system for immunostaining of sections.



E-cadherin (Membranous, extracellular domain)

Sections of formalin-fixed, paraffin embedded tissue of human cervix were deparaffinized and processed in Retriever to unmask the antigen. We used one cycle in R-Buffer C (pH 6.0) with cooling of the slides overnight. Antibody HECD-1 against cell adhesion molecule E-cadherin was used together with R-Detect HRP detection system for immunostaining of sections.



Choosing Buffer: Correction for the Nature of the Antigen and Epitope.

The choice of the buffer depends on the nature of the antigen and the location of the epitope of interest. We advise you to first run the test for the most appropriate buffer using the tissues where the expression of the antigen does occur. General guidelines for choosing the buffer:

Most of the nuclear antigens (apoptosis-related, survival-related, proliferation-related) R: Buffer A (or AG).

Cell adhesion molecules, cell membrane antigens (extracellular domain) R: Buffer A (or AG)

Cytoskeleton and cytoskeleton-associated molecules – R: Buffer A (or AG)

Intracellular domain of some adhesion molecules and surface receptors – R: Buffer B (or BG)

Intracellular domain of some adhesion molecules and surface receptors – R: Buffer C (or CG)

Most of antibodies raised against a linear peptide – R: Buffer U (or UG)

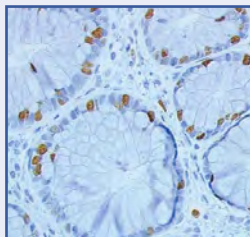
Ordering Information:

Cat.#	Description	Quantity
62700-20	Retriever 220 volt	each
62700-10	Retriever 115 volt	each
62706-10	R-Buffer A (10x)	250 ml
62706-11	R-Buffer B (10x)	250 ml
62706-12	R-Buffer C (10x)	250 ml
62706-13	R-Buffer U (10x)	250 ml
62707-10	R-Buffer AG (2x)	250 ml
62707-11	R-Buffer BG (2x)	250 ml
62707-12	R-Buffer CG (2x)	250 ml
62707-13	R-Buffer UG (2x)	250 ml
62705-01	Slide Chamber	3/pk
62705-02	Chamber Rack	each
62705-03	Lifting Device	each
62705-04	Cord Set (UK)	each
62705-05	Cord Set (Europe)	each
62705-06	Cord Set (US)	each
62705-07	Green Silicone Sealing Gasket	each

Examples of Staining

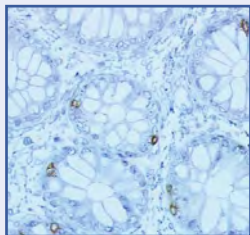
Ki-67 (Nuclear antigen)

Sections of formalin-fixed, paraffin embedded tissue of human sigmoid were deparaffinized and processed in Retriever to unmask the antigen. We used one cycle in R-Buffer C (pH 6.0) with cooling of the slides overnight. Antibody MIB-1 against proliferation marker Ki-67 (nuclear) was used together with R-Detect HRP detection system for immunostaining of sections.



CD8 (Membrane)

Sections of formalin-fixed, paraffin embedded tissue of human sigmoid were deparaffinized and processed in Retriever to unmask the antigen. We used one cycle in R-Buffer A (pH 8.1) with cooling of the slides overnight. Antibody #4B11 against T-cell marker CD8 (cell membrane) was used together with R-Detect HRP detection system for immunostaining of sections.



Retriever Tissue Slides

Retriever Tissue Slides are high adhesive glass microscope slides for paraffin-embedded tissue section, including tissue arrays. The slides were designed and optimized for the EMS Antigen Retriever (62700 series) to preserve the section attachment and tissue morphology during heat-induced epitope recovery in Retriever in pH6 (Low), pH9 (High), or Universal Retriever buffer.

Slides can also be successfully used in any other epitope-recovery technology (autoclave, microwave, proteolytic) and show superior performance over positively charged or polylysine-coated slides, especially in high pH buffers and recovery buffers containing EDTA.

General Properties

- Retriever Tissue Slides are made from soda lime glass
- Dimensions approximately 76 x 26mm, Thickness 1.0mm.
- 90° ground edges
- Colored or white marking area 20mm, at one end, on one side
- Pre-cleaned, ready for use
- Autoclavable
- Supplied in plastic boxes of 72 pieces (call for carton price, 20 boxes in a carton)
- Carry recommended best before date and batch number for comprehensive information and traceability

71880-50	Retriever Tissue Slides	72/pk
71880-50-CS	Retriever Tissue Slides	20/pk case

ImmunoSaver Antigen Retriever

ImmunoSaver allows for Immunostaining with quick and easy activation of cell membranes and the nucleus. Immunosaver provides efficient antigen retrieval for successful immunostaining of a wide variety of antigens under optimized conditions.

Protocols for both Light and Electron Microscopy may be found with this reagent.

64142	ImmunoSaver	100 ml
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R-UNIVERSAL Epitope Recovery Buffer (10x stock)

Why the Universal Buffer?

Epitope recovery on formalin-fixed, paraffin embedded tissue sections, requires heat-induced treatment in buffer or, sometimes, proteolytic treatment of the deparaffinized tissue section. Which buffer to use, greatly depends on the exact antibody and the properties of the recognized epitope, therefore, one can find in literature and practice use of many buffers, including Citrate pH 3.4, Citrate 6.0, EDTA 8.0, Tris 9.0- 10.0, Tris-EDTA, etc.

Moreover, for individual antigens also the time of recovery in the individual buffer should be defined, as this may be different, and the treatment often destroys the epitope.

EMS offers a novel (patent-pending) technology for epitope recovery, primarily based on reversing the fixation effects of formaldehyde, which created links primarily between μ -amino groups of lysine and other amino-groups.

The buffer was extensively tested in pathology Departments in United Kingdom, and has shown excellent results when used with different antibodies, including those that normally require for successful staining treatment only in Low, or only High pH buffers, or require proteolytic treatment.

The EMS Universal Buffer may be used in any heat-induced epitope recovery system (the time and temperature of treatment should be tested), but was specifically adjusted for tissue sections processing in our Antigen Retriever (62700 Series).

Using our Universal Buffer in our Retriever guarantees the highest rate of success in recovering epitope for any antibody, especially one that was never previously used on formalin-fixed sections.

Properties

Clear, non-toxic solution.

Presentation

R-Universal Buffer is supplied as 10x concentrate. For epitope recovery dilute 1 part of stock with 9 parts of deionized water.

Application

For epitope recovery dilute 1 part of stock with 9 parts of deionized water.

Stability and Storage

The preparation is stable for 1 year when stored unopened at +4°C. Every lot is issued with a certificate indicating the expiry date.

After opening, store at +4°C in the refrigerator and use within 6 months.

Certification

Each lot is certified for compliance to specifications. The product is produced under DIN EN ISO 9001 :2008 Quality Management system for the products in Immunoassay Development and Measurement, Products for Bioanalytics and Immunoassays.

Ordering Information

0-4°C	62719-10	R-UNIVERSAL Epitope Recovery Buffer (10x stock)	125 ml
0-4°C	62719-20	R-UNIVERSAL Epitope Recovery Buffer (10x stock)	500 ml

Reduce The Background, Not The Specific Staining

Reliable time tested solution to unmask antigen on formalin-fixed sections

Any antibody preparation has some potential to produce non-specific reaction in the assay. This originates from:



- non-specific antibodies that are present in some proportion in any polyclonal antibody preparation, including affinity purified ones (often "affinity purified" means only isolation of IgG fraction on Prot A/G column, not the purification on the antigen column under very stringent conditions)
- low specificity antibodies among specific ones in polyclonal
- fragments of fallen apart IgGs in stored preparations, including monoclonal
- separate heavy and light chains of specific antibodies, produced by most hybridomas

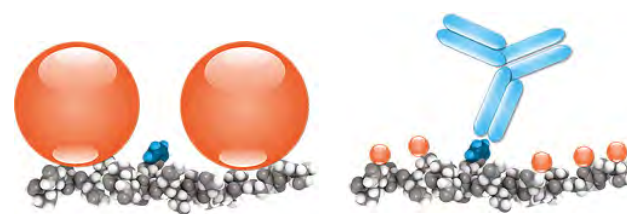
All these are capable of binding non-specifically to molecules on tissue sections, blots, fixed cells and other objects for immune detection. In case of retrieved formalin sections the risk of non-specific reaction is even increased, since to active the epitope recovery the proteins comprising the tissue sections are denatured during HIER, thus making accessible many domains that are charged and are capable of binding the test immunoglobulins on non-specific manner.

The standard means to block non-specific binding of specific antibody preparation is to add some irrelevant protein, such as BSA, other serum, casein, etc. However, everyone who tried to do this knows that increasing (for effective blocking) concentration of such blocking agent leads to a great reduction of specific reaction as well. This is due to large blocking molecules binding to accessible sites on section and thus sterically blocking access of specific antibodies to epitopes of interest (schematically represented in the figure on the left, top). All our buffers developed for immune assays contain instead short (0.6-2 kD) peptides that are capable of block effectively non-specific reaction while not affecting the specific binding of antibody.

The presented collection of Immunohistochemistry buffers has also some other benefits (see below) and allows you to achieve the best quality IHC result without compromising the antigen detection. The buffers can also be used in other immune assays, such as immunofluorescence on sections, flow cytometry on fixed cells, western blot, hybridization of sections with antibody detection.

The Retriever IHC buffers empower you to control non-specific staining on every step of immunohistochemistry. They are especially highly recommended for research pathology where, in contrast to diagnostics, many polyclonal and/or low-affinity antibodies are used.

All buffers available in 50 ml, 125 ml and 500 ml package. Ready to use.



➤ Section Block

A new class of blocking solutions based on chemically modified and fragmented ultra-pure casein. Effectively reduces unwanted binding of primary antibody and conjugates you use to charged surface of the slide and tissue section. Greatly reduces non-specific binding while preserving the specific reaction, by saturating potential non-specific protein-protein interactions. Moreover, in contrast to BSA-based, IgGm casein or serum-based blocking solutions there is no interaction of specific antibody and blocking protein itself. or oth ls not comparable to other commercially available or home-made blocking solutions. Recommended for research and diagnostic pathology, especially for retrieved sections and polyclonal antibodies..

➤ Antibody Diluent

Buffer for diluting your primary and secondary antibodies, especially if they were stored for a while, even at -20 in glycerol, or in refrigerator. Nonspecific binding of the antibodies, negative effects of disturbing substances and low or medium affinity cross-reactivities of the antibodies will be minimized, making your result more reliable. Excellent for IHC (frozen and formalin sections), flow cytometry on fixed cells, Western Blot and other immune assays.

When used in pathology, in also greatly reduces non-specific reactivity of human serum components and immunoglobulins in tissue, vessels and cells with mouse antibodies used on section.

For especially "trouble"-giving antibodies, as well as for in situ PCR applications, this diluent may also be used as a washing buffer, preventing secondary binding of your analystes during washing.

➤ HRP-Conjugate Diluent

Specifically designed for preparing solution of your HRP-conjugate used as the detection reagent. It is the Antibody-diluent buffer with additional component for stabilizing your HRP-conjugate. Allows you to further standardize the assay preparing ready-to-use conjugate solutions in advance and store them in refrigerator without loss of activity.

Ordering Information

Cat. #	Description	Qty.
62710	Section Block	50 ml
62711	Section Block	125 ml
62712	Section Block	500 ml
62713	Antibody Diluent	50ml
62714	Antibody Diluent	125ml
62715	Antibody Diluent	500ml
62713-01	Antibody Diluent for Frozen Sections	50ml
62714-01	Antibody Diluent for Frozen Sections	125ml
62715-01	Antibody Diluent for Frozen Sections	500ml
62716	HRP Conjugate Diluent	50 ml
62717	HRP Conjugate Diluent	125ml
62718	HRP Conjugate Diluent	500 ml
62718-15	Slide Washing Buffer 10 X	500 ml

EMS is proud to introduce a broad selection of Antigen Retrievers in IHC...

► I. Trypsin Reagent

Description: Trypsin is used for proteolytic digestion of formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. In IHC most commonly used fixative like formalin; mask tissue antigens (cellular, membrane and nuclear) by cross-linking process, this results in poor or no staining in IHC. Trypsin digestion improves immunoreactivity of some antigens in FFPE tissue sections. For cytokeratin clone AE3 and AE1/AE3, this enzyme works much better than boiling the tissue with citrate buffer.

Storage: 2–8°C. **DO NOT FREEZE**

Intended Use: Use as antigen retriever for some antibodies in IHC. Please refer to primary antibody protocol for IHC.

Reagent: This enzyme is supplied as concentrated form along with buffer. The kit comes in 2 sizes. Small: Reagent B (Buffer) is 15 ml and the Reagent E (Enzyme) is 2 ml

Large: Reagent B (Buffer) is 100 ml and the Reagent E (Enzyme) is 10 ml

Cat. #	Description	Qty.
64142-01	Trypsin Kit Small	Kit
62142-02	Trypsin Kit Large	Kit

► II. Pronase Reagent, Ready To Use

Description: Pronase is used for proteolytic digestion of formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. In IHC most commonly used fixative like formalin mask tissue antigens (cellular, membrane and nuclear) by cross-linking process, this results in poor or no staining in IHC. Pronase digestion of FFPE tissue section improves accessibility of antibodies to tissue antigens.

Storage: 2–8°C. **DO NOT FREEZE**

Intended Use: Use as antigen retriever for some antibodies in IHC. Please refer to primary antibody protocol for IHC.

Reagent: Ready-to-use Pronase reagent available in 2 sizes: 15 and 100 ml.

Cat. #	Description	Qty.
64142-03	Pronase Reagent	15 ml
62142-04	Pronase Reagent	100 ml

► III. Pepsin Reagent, Ready To Use

Description: Pepsin is used for proteolytic digestion of formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. In IHC most commonly used fixative like formalin mask tissue antigens (cellular, membrane and nuclear) by cross-linking process, this results in poor or no staining in IHC. Pepsin digestion of FFPE tissue section improves accessibility of antibodies to tissue antigens.

Storage: 2–8°C. **DO NOT FREEZE**

Intended Use: Use as antigen retriever for some antibodies in IHC. Please refer to primary antibody protocol for IHC.

Reagent: Ready-to-use Pepsin reagent available in 2 sizes: 15 and 100 ml

Cat. #	Description	Qty.
64142-05	Pepsin Reagent	15 ml
62142-06	Pepsin Reagent	100 ml

► IV. Citrate Buffer pH 6.0 (10x)

Description: This buffer is intended for heat-induced antigen retriever on formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. In IHC most commonly used fixative like formalin mask tissue antigens (cellular, membrane and nuclear) by cross-linking process, this results in poor or no staining in IHC. The use of this buffer on FFPE tissue section improves accessibility of antibodies to tissue antigens.

Storage: 2–8°C. **DO NOT FREEZE**

Intended Use: 1X buffer solution is intended for heat-induced antigen

► IV. Citrate Buffer pH 6.0 (10x) (continued)

retriever in IHC. Please refer to primary antibody protocol.

Reagent: 10 X, pH 6 antigen retriever solution.

Preparation of Working Solution: Dilute this 10X buffer as needed (e.g. 90 ml of deionized or distilled water + 10 ml of this buffer), mix well, 1X buffer can be stored at 2–8°C

Cat. #	Description	Qty.
64142-07	Citrate Buffer pH 6.0	100 ml
62142-08	Citrate Buffer pH 6.0	1000 ml

► V. EDTA Buffer pH 8.5 (10x)

Description: This buffer is intended for heat-induced antigen retriever on formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. In IHC most commonly used fixative like formalin mask tissue antigens (cellular, membrane and nuclear) by cross-linking process, this results in poor or no staining in IHC. The use of this buffer on FFPE tissue section improves accessibility of antibodies to tissue antigens.

Storage: 2–8°C. **DO NOT FREEZE**

Intended Use: 1X buffer solution is intended for heat-induced antigen retriever in IHC. Please refer to primary antibody protocol.

Reagent: 10 X, pH 8.5 antigen retriever solution.

Preparation of Working Solution: Dilute this 10X buffer as needed (e.g. 90 ml of deionized or distilled water + 10 ml of this buffer), mix well, 1X buffer can be stored at 2–8°C

Cat. #	Description	Qty.
64142-09	EDTA Buffer pH 8.5	100 ml
62142-10	EDTA Buffer pH 8.50	1000 ml

► VI. Tris Buffer pH 10.0 (10x)

Description: This buffer is intended for heat-induced antigen retriever on formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. In IHC most commonly used fixative like formalin mask tissue antigens (cellular, membrane and nuclear) by cross-linking process, this results in poor or no staining in IHC. The use of this buffer on FFPE tissue section improves accessibility of antibodies to tissue antigens.

Storage: 2–8°C. **DO NOT FREEZE**

Intended Use: 1X buffer solution is intended for heat-induced antigen retriever in IHC. Please refer to primary antibody protocol.

Reagent: 10 X, pH 10 antigen retriever solution.

Preparation of Working Solution: Dilute this 10X buffer as needed (e.g. 90 ml of deionized or distilled water + 10 ml of this buffer), mix well, 1X buffer can be stored at 2–8°C

Cat. #	Description	Qty.
64142-11	Tris Buffer pH 10.0	100 ml
62142-12	Tris Buffer pH 10.0	1000 ml

► VII. ImmunoHistoZyme™, Ready-to-Use

Description: ImmunoHistoZyme is used for proteolytic digestion of formalin-fixed paraffin-embedded (FFPE) tissue sections prior to application of antibodies. In IHC most commonly used fixative like formalin mask tissue antigens (cellular, membrane and nuclear) by cross-linking process, this results in poor or no staining in IHC. ImmunoHistoZyme digestion of FFPE tissue section improves accessibility of antibodies to tissue antigens.

Storage: 2–8°C. **DO NOT FREEZE**

Intended Use: Use as antigen retriever for some antibodies in IHC. Please refer to primary antibody protocol for IHC.

Reagent: Ready-to-use ImmunoHistoZyme Reagent.

Cat. #	Description	Qty.
64142-13	ImmunoHistoZyme	15 ml
62142-14	ImmunoHistoZyme	100 ml

SECTION 16

Scanning Electron Microscope Supplies

Scintillators

Specimen Mounts

SEM Specimen and FIB and STEM Sample Holders

Portable Storage Containers and Mount Storage Boxes

Colloidal Compounds and Conductive Adhesives

Conductive Adhesives Tabs, Tapes, and Sheets

WETSEM® Capsules for Hydrated SEM Samples

- Quantomix WETSEM®

- Product Listings

- WETSEM® Applications

- WETSEM® Gallery

- FAQs

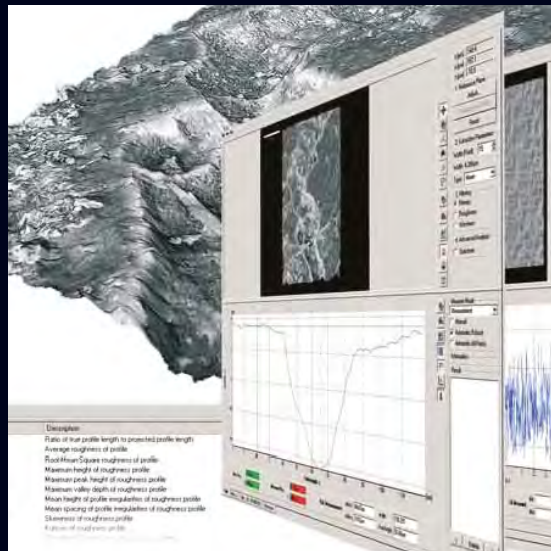
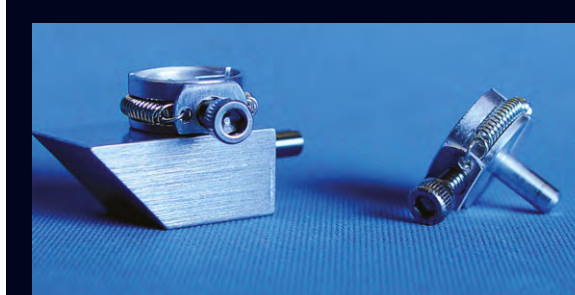
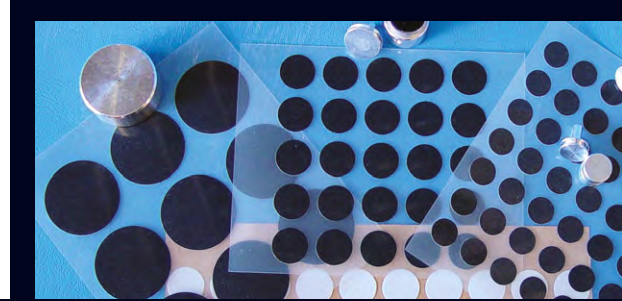
- Publications

- Request a Feasibility Study

SPM, AFM, SEM Calibration Standards

Scanning Electron Microscope Digital Images

MeX 3D Scanning Electron Microscope



**Electron
Microscopy
Sciences**



► Scintillators

► P47 Scintillators

They are coated with a thin layer of well selected P47 phosphor ($Y_2Si_2O_7:Ce^{3+}$; yttrium silicate activated with cerium), and have a high signal output and a good working life. They need not be coated with aluminum prior to use unless cathodoluminescence studies are required.

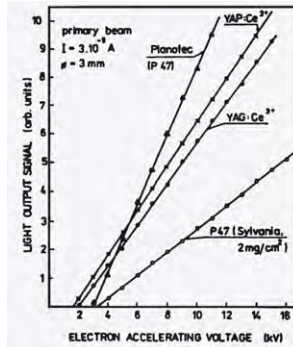


► YAG Single Crystal Scintillator Discs

ADVANTAGES:

- Low Phosphor Noise.
- High Resistance to Radiation Damage.
- Long Working Life.
- Possible Application in Ultrahigh Vacuum Conditions.

YAG (Yttrium Aluminum Garnet activated by Ce^{3+}) has a very fast response time of 50-60ns and they do withstand well to the bombardment by electrons or ions far



better than plastic or phosphor scintillators. Light emission peaks at about 560nm which means that S20 photocathodes are most suitable for detecting the emission. YAG is suited for high current operations. The response is better than for the P47 discs below 5kV and again at higher accelerating voltages, where the performance of powder scintillators fall off while the response of the YAG continues to increase linearly. The crystal should be coated with 50nm of aluminum prior to use. If the layer becomes damaged it can be removed with sodium hydroxide. The crystals are mounted with the matt surface in contact with the light pipe as this has shown to increase the efficiency.

► YAP Single Crystal Scintillator Discs

YAP (Yttrium Aluminum Perovskite activated by Ce^{3+}) shares the same advantages as YAG but is more efficient in terms of light output than YAG crystals. As well, the emission spectrum peaks at about 378nm, and this corresponds closely to the maximum sensitivity of the S11 photocathode which in general is used in most scanning electron microscopes. (There would be more improvement in signal by using a YAP crystal rather than YAG in these microscopes). The decay time of YAP (40ns) is faster than YAG (80ns) so its overall performance is superior to YAG. YAP crystals should be coated with 50nm of aluminum prior to use.

Dia.(mm) xThick(mm)	Instrument	Cat.# P-47	Cat.# YAG	Cat.# YAP
6.2x1	Phillip Quad Detector	82010	82040	82070
7.5x1	ISI Mini-SEM	82012	82042	82072
8.8x2	Jeol JSM T20, T200, T300, 340	82013	82043	82073
9.0x3	ETEC	82014	82044	82074
10.0x1	Cambridge except S600, AMRAY 1200	82016	82046	82076
12.0x1	Cambridge S600	82017	82047	82077
12.0x.17	Zeiss SEM	82018	82048	82078
12.4x3.2	Cameca	82020	82050	82080
13.7x1	ISI Mini-SEM, Jeol	82021	82051	82081
16.4x.17	Novascan, SEMCO/Zeiss	82022	82052	82082
18.0x1	Camscan, Balscan, Cambridge S-4	82024	82054	82084
19.0x1	Jeol U3, JSM2	82026	82056	82086
19.0x7.3	ARL SEMQ	82028	82058	82088
19.8x1	Hitachi w/metal ring.	82029	82059	82089
20.0x1	AMRAY except 1200, Jeol 50A, 35, Hitachi	82030	82060	82090
20.0x2	Phillips SEM	82032	82062	82092

Note: P-47 is usually in-stock. YAG and YAP delivery time is 6-8 weeks.

► Light Pipe Scintillators

The light pipe is the connection between the scintillator and the phosphor multiplier tube (PMT). It transfers the photons produced by the scintillator for detection by the PMT. We coat the scintillator material directly on the light pipe which improves the signal. Light Pipes are available in optical quality quartz and optical grade acrylic. Cambridge reduced-tip models are only available in acrylic. High voltage wire and corona ring are included. JEOL pipes include a flange. Price includes one Re-coating Certificate. Re-coating is typically needed twice per year.



P47P Light Pipes

Microscope	Substrate	Style	Length	Cat. No.
Cambridge	Quartz	Angled	—	82000-10
Cambridge	Quartz	Straight	74mm	82000-74
Cambridge	Quartz	Straight	89mm	82000-89
Cambridge	Quartz	Straight	104mm	82000-104
Cambridge	Quartz	Straight	Up to 200mm	82000-x *
Cambridge	Acrylic	Reduced Tip	88mm	82001-88
Cambridge	Acrylic	Reduced Tip	100mm	82001-100
Cambridge	Acrylic	Reduced Tip	120mm	82001-120
Cambridge	Acrylic	Reduced Tip	Any	82001-x*
JEOL U-2, U-3	Quartz	1/4" Collar	60mm	82004-60
JEOL JSM-35	Quartz	1/2" Collar	60mm	82005-60
Re-coating Service	—	Various	—	82008-RS

* Replace the asterisk by the length of the Light Pipe

► Specimen Mounts

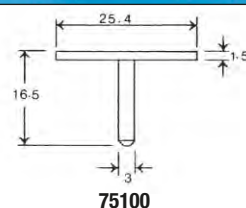
We have now expanded our Specimen Mount section due to the increased demand for us to offer more of a variety. To make your SEM work easier and save you a great deal of time searching for the right mount, we now offer you a complete line of specimen mounts.

Aluminum Mounts - Made from ultra-pure aluminum. The more popular mounts are available in two grades of finish: standard and polished (luster). Standard finish: lathe finish; economically priced. Polished finish: A cloth polished finish which produces a smooth and luster surface.

Carbon Mounts - Spectroscopically pure.

► AMRAY 1000/1200

Head: 1" dia. (25.4mm),
pin 1/8" dia. (3.1mm)

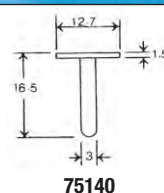


Aluminum: Standard

75100	10/pk
75110	50/pk
75120	100/pk

► AMRAY 1000/1200/1400

Head: 1/2" dia. (12.7mm),
pin 1/8" dia. (3.1mm)



Aluminum: Standard

75140	10/pk
75150	50/pk
75160	100/pk

Polished

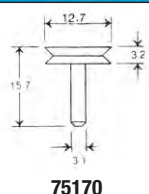
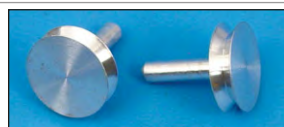
75165	10/pk
75166	50/pk
75167	100/pk

Carbon (Spectro-pure): Standard

76140	10/pk
76150	50/pk
76160	100/pk

► AMRAY 1400

Slotted Head 1/2" dia. (12.7mm),
pin 1/8" dia. (3.1mm)



Aluminum: Standard

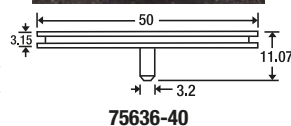
75170	10/pk
75172	50/pk
75174	100/pk

Carbon (Spectro-pure): Standard

76170	10/pk
76171	50/pk

► AMRAY, Cambridge, Leica, ZEISS/LEO, FEI/Philips, CamScan, Tescan Slotted HEAd

Head: 2" dia. (50 mm),
pin 1/8" dia. (3.2mm)

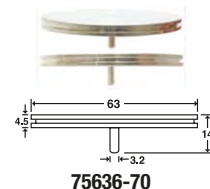


Aluminum: Standard

75636-40	10/pk
75636-50	50/pk
75636-60	100/pk

► AMRAY, Cambridge, Leica, ZEISS/LEO, FEI/Philips, CamScan, Tescan, aluminum, Slotted Head

Head: 2.48" dia. (63 mm),
pin 1/8" dia. (3.2mm)

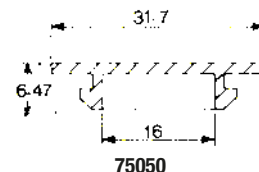


Aluminum: Standard

75636-70	10/pk
75636-80	50/pk
75636-90	100/pk

► Cambridge S-4, Mark II, S-410...

Head: 1 1/4" dia. (31.7mm)
x 3/16" H (6.4mm)



Aluminum: Standard

75050	10/pk
75060	50/pk
75070	100/pk

Carbon (Spectro-pure): Standard

76180	10/pk
76181	50/pk

► Cambridge, Leica, LEO, ZEISS, Philips, FEI, CamScan, Tescan, ETEC

Slotted Head, numbered 1-alpha/4-numeric.*
Head: 1/2" (12.7mm), pin 1/8" dia. (3.2mm)
Pin Height: 8mm



Aluminum: Standard

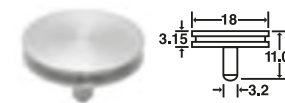
75220-12	500/pk
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75220-12

* Designate number sequence when ordering

► Cambridge, Leica, ZEISS/LEO, FEI/Philips, PHENOM, CamScan, Tescan Slotted Head

Head: 18 mm, pin 1/8" dia. (3.2mm)
Pin Height: 8mm



Aluminum: Standard

75636-10	10/pk
75636-20	50/pk
75636-30	100/pk

75636-10

► Cambridge, Leica, ZEISS/LEO, FEI/Philips, PHENOM, CamScan, Tescan, ETEC and Amray, Mini

Head: 6.6 x 1.3mm
Pin Height: 9.5 mm



Aluminum: Standard

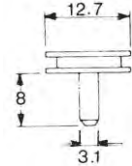
75638-10	10/pk
75638-20	50/pk
75638-30	100/pk

75638-10

► Specimen Mounts (continued)

► Cambridge, Phillips, Camscan, PHENOM, B&L, Etec, Zeiss, etc.

Tapered end pin, Slotted head $\frac{1}{2}$ " dia. (12.7mm), pin $\frac{1}{8}$ " dia. (3.1mm)



75200

Aluminum: Standard

75200	10/pk
75210	50/pk
75220	100/pk
75230	500/pk

Polished

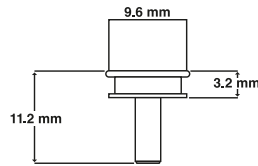
75235	10/pk
75236	50/pk
75237	100/pk
75238	500/pk

Carbon (Spectro-pure): Standard

76200	10/pk
76210	50/pk
76220	100/pk

► Cambridge, Leo, Phillips 500, Cameca etc.

Aluminum small, slotted head
Head: $\frac{3}{8}$ " (9.6 mm) x $\frac{1}{8}$ " (11.2 mm) H,
Pin: $\frac{1}{8}$ " (3.1 mm)

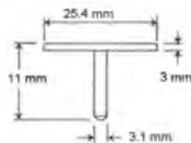


75180

75180	100/pk
75181	500/pk

► Cambridge, Leo, Philips 500, Cameca etc.

Aluminum, non-slotted head. Head 1" (25.4 mm), pin 3.1 mm x 11 mm long total (or 8 mm pin only)



75186

75186	100/pk
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► FEI/Philips, ZEISS/LEO, Cambridge, Leica, Amray, Tescan and Camscan, PHENOM, SEMS

3-Divisions

Head: $\frac{1}{2}$ " dia. (12.7 mm)
Pin Height: 9.0 mm
Pin: $\frac{1}{8}$ " (3.2mm)



75183-10

Aluminum: Standard

75183-10	10/pk
75183-20	50/pk
75183-30	100/pk

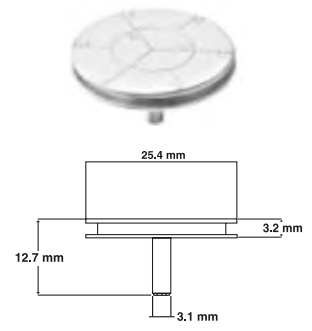
► FEI/Philips, ZEISS/LEO, Cambridge, Leica, Amray, Tescan and Camscan SEMS

9 Divisions

Head: 1" dia. (25mm)
Pin Height: 9.0mm
Pin: $\frac{1}{8}$ " dia. (3.2mm)

Aluminum: Standard

75183-40	10/pk
75183-50	50/pk
75183-60	100/pk

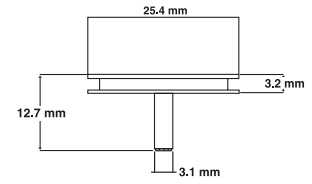


75183

► Leica, Cambridge, Leo, FEI, Phillips, PHENOM, Zeiss, Camscan etc.

Aluminum slotted head.

Head: 1" (25.4mm) x $\frac{1}{2}$ " (12.7mm) H,
Pin: $\frac{1}{8}$ " dia. (3.1 mm)



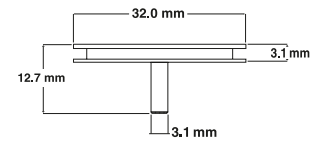
75183

75183	10/pk
75184	50/pk
75185	100/pk

► Leica, Cambridge, Leo, FEI, Phillips, Zeiss, Camscan etc.

Aluminum large slotted head.

Head: 1 $\frac{1}{4}$ " (32mm) x $\frac{1}{2}$ " (12.7mm) H,
Pin: $\frac{1}{8}$ " dia. (3.1 mm)



75187

75187	10/pk
75188	50/pk
75189	100/pk

► Hitachi

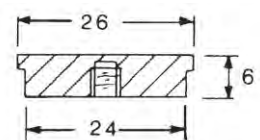
M4 Tapered hole, female thread

Head: 1" dia. (26mm),
Height: $\frac{1}{4}$ " (6mm)

Comes either plain or with 9 divisions.

Aluminum: Standard

75621	10/pk
75622	50/pk
75623	100/pk
75621-d	10/pk
75622-d	50/pk
75623-d	100/pk



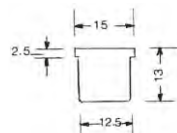
75621

75621-d
(9 divisions)

► Specimen Mounts (continued)

► Hitachi

Head: 5/8" dia. (15mm)
Height: 1/2" (13mm)



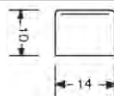
75630

Aluminum: Standard

75630	10/pk
75631	50/pk
75632	100/pk

► Hitachi

Head: 5/8" (14mm),
Height: 3/8" (10mm)



75650

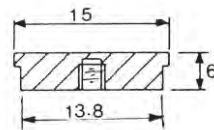
Aluminum: Standard

75650	10/pk
75651	50/pk
75652	100/pk

► Hitachi S-450

M4 Tapered hole, female thread
Head: 5/8" (15mm),
Height: 1/4" (6mm)

Comes plain or with 3 divisions



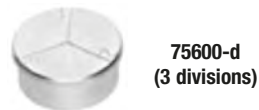
75600

Aluminum: Standard

75600	10/pk
75610	50/pk
75620	100/pk
75600-d	10/pk
75610-d	50/pk
75620-d	100/pk

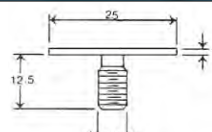
Carbon (Spectro-pure): Standard

76470	10/pk
76471	50/pk



► Hitachi S-500

Threaded pin
Head: 1" dia. (25mm),
pin: 1/4" dia. (6mm)



75640

75640	10/pk
75642	50/pk
75644	100/pk

► Hitachi, M4

Head: 1 1/4" (32mm)
Height: 1/4" (6mm)



75660

Aluminum: Standard

75660	10/pk
75661	50/pk
75662	100/pk



► Hitachi M4 Thread

Head: 1 1/4" (32mm)
Height: 1/4" (6.0mm)



75635-70

Aluminum: Standard

75635-70	10/pk
75635-80	50/pk
75635-90	100/pk

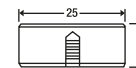
Same as above but with 12 divisions

75635-70D	10/pk
75635-80D	50/pk
75635-90D	100/pk



► Hitachi M4 Thread

Head: 1" dia. (25mm)
Height: 3/8" (10mm)



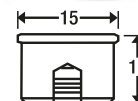
75635-40

Aluminum: Standard

75635-40	10/pk
75635-50	50/pk
75635-60	100/pk

► Hitachi M4 Thread

Head: 5/8" dia. (15mm)
Height: 3/8" (10mm)



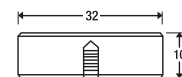
75635-10

Aluminum: Standard

75635-10	10/pk
75635-20	50/pk
75635-30	100/pk

► Hitachi M4 Thread

Head: 1 1/4" (32mm)
Height: 3/8" (10mm)



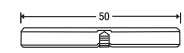
75635-75

Aluminum: Standard

75635-75	10/pk
75635-85	50/pk
75635-95	100/pk

► Hitachi M4 Thread

Head: 2" (50mm)
Height: 1/4" (6.0mm)



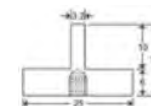
75635-77

Aluminum: Standard

75635-77	10/pk
75635-87	50/pk
75635-97	100/pk

► Hitachi M4

Surface: 1" (25mm),
Height: 5/8" (16mm)



75662-10

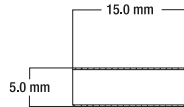
Aluminum: Standard

75662-10	10/pk
75662-20	50/pk
75662-30	100/pk

► Specimen Mounts (continued)

► ISI, ABT, Topcon, Aluminum

Head: $\frac{5}{8}$ " (15mm) x $\frac{1}{4}$ " (5mm) H

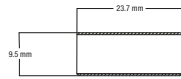


75433

75433	50/pk
75434	100/pk

► ISI, ABT, Topcon, Aluminum

Head: 0.93" dia. (23.7mm)
Height: $\frac{3}{8}$ " (9.5mm)

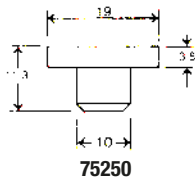


75436

75436	10/pk
75437	50/pk
75438	100/pk

► Coates & Welter

Head: $\frac{3}{8}$ " dia. (19mm)
Pin: $\frac{3}{8}$ " dia. (9.6mm)



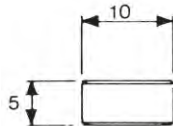
75250

Aluminum: Standard

75250	10/pk
75252	50/pk
75254	100/pk

► JEOL

Head: $\frac{3}{8}$ " dia. (10mm)
Height: $\frac{3}{16}$ " (5mm)



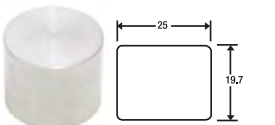
75350

Aluminum: Standard

75350	50/pk
75360	100/pk
75370	500/pk

► JEOL

Head: 1" dia. (25mm)
Height: $\frac{13}{16}$ " (20mm)



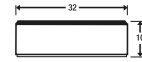
75830-10

Aluminum: Standard

75830-10	10/pk
75830-20	50/pk
75830-30	100/pk

► JEOL

Head: $\frac{1}{4}$ " dia. (32mm)
Height: $\frac{3}{8}$ " (10mm)



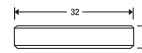
75830-70

Aluminum: Standard

75830-70	10/pk
75830-80	50/pk
75830-90	100/pk

► JEOL

Head: $\frac{1}{4}$ " dia. (32mm)
Height: $\frac{3}{16}$ " (5mm)



75830-40

Aluminum: Standard

75830-40	10/pk
75830-50	50/pk
75830-60	100/pk

► JEOL, Aluminum

Head: $\frac{1}{4}$ " dia. (32mm)
Height: $\frac{3}{8}$ " (10mm)

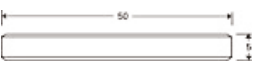


75702

75702	10/pk
75703	50/pk
75704	100/pk

► JEOL, Aluminum

Head: 2" dia. 50mm
Height: $\frac{3}{16}$ " (5mm)



75705

75705	10/pk
75706	100/pk

► JEOL, Aluminum

Head: 2" dia. 50mm
Height: $\frac{3}{8}$ " (10mm)

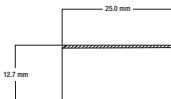


75705

75707	10/pk
75708	100/pk

► JEOL, Aluminum

Head: 1" dia. (25mm)
Height: $\frac{1}{2}$ " (12.7mm)



75690

75690	10/pk
75691	50/pk
75692	100/pk

► Specimen Mounts (continued)

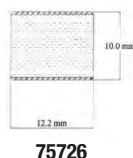
► JEOL, Aluminum

Head: 12.2mm x 10mm H

75726	50/pk
75727	100/pk
75726-d	50/pk
75727-d	100/pk



75726-d
(3 divisions)



75726

► JEOL

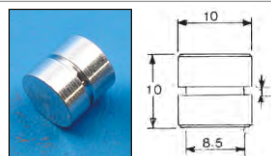
Head: 3/8" dia. (10mm),
Height: 3/8" (10mm)

Aluminum: Standard

75300	10/pk
75310	50/pk
75320	100/pk
75330	50/pk0

Carbon (Spectro-pure): Standard

76300	10/pk
76310	50/pk
76320	100/pk



75300

► JEOL, ISI

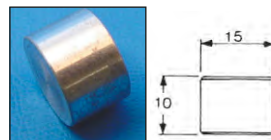
Head: 5/8" dia. (15mm),
Height: 3/8" (10mm)

Aluminum: Standard

75440	10/pk
75450	50/pk
75460	100/pk
75470	50/pk0

Carbon (Spectro-pure): Standard

76440	10/pk
76450	50/pk
76460	100/pk



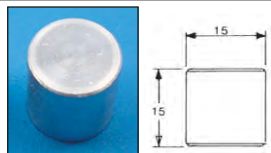
75440

► JEOL, ISI

Head: 5/8" dia. (15mm),
Height: 5/8" (15mm)

Aluminum: Standard

75400	10/pk
75410	50/pk
75420	100/pk
75430	50/pk0



75400

► JEOL JSM 840

Head: 1/2" dia. (12.5mm),
Height: 3/8" (10mm)

Aluminum: Standard

75730	50/pk
75732	100/pk
75734	pk/250



75730

► JEOL JSM 840

Head: 1/2" dia. (12.5mm)
Height: 1/4" (5mm)

Aluminum: Standard

75740	50/pk
75742	100/pk
75744	pk/250

Carbon (Spectro-pure): Standard

76330	10/pk
76331	50/pk



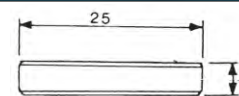
75740

► JEOL JSM 840

Head: 1" Dia (25mm),
Height: 1/4" (5mm)

Aluminum: Standard

75700	10/pk
75710	50/pk
75720	100/pk



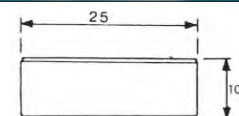
75700

► JEOL JSM 840

Head: 1" Dia (25mm),
Height: 3/8" (10mm)

Aluminum: Standard

75721	10/pk
75722	50/pk
75723	100/pk



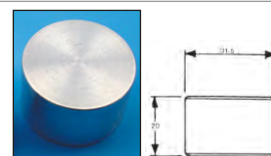
75721

► JEOL JSM 840

Head: 1 1/4" dia. (31.5mm),
Height: 1 3/16" (20mm)

Aluminum: Standard

75800	10/pk
75810	50/pk
75820	100/pk



75800

► LEO Microscope

Tapered end pin. Slotted head 1/2" dia.
(12.7mm), pin 1/8" Dia (3.1mm)
x 5mm Length

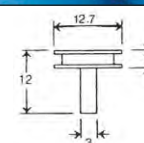
75190	50/pk
75191	100/pk
75192	50/pk0



Zeiss

Flat End Pin Head: 1/2" dia. (12.7mm)
Slotted Head, 1/8" dia. (3.1mm) Pin

75500	50/pk
75510	100/pk
75520	500/pk



75500

► 45° Angle SEM Aluminum

1) Head: ½" dia. (12.7mm),
⅜" (3.1mm) pin

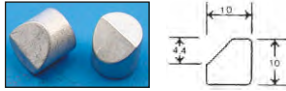
75240 10/pk
75242 50/pk



75240

2) Head: ⅜" dia. (10mm),
Height: ⅜" (10mm)

75340 10/pk
75342 50/pk



75340

3) Head: ⅝" dia. (15mm)
Height: ⅜" (10.0mm)

Aluminum: Standard

75241-10 10/pk
75241-20 50/pk
75241-30 100/pk

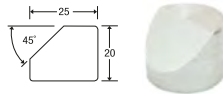


75241

4) Head: 1" dia. (25mm)
Height: 13/16" (20mm)

Aluminum: Standard

75241-40 10/pk
75241-50 50/pk
75241-60 100/pk

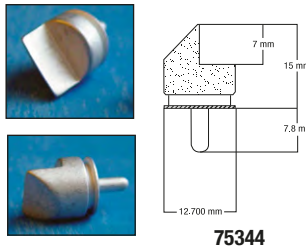


75241

► Combination 45° – 90° SEM

Aluminum slotted head with 3.1mm diameter pin, fits most SEMs

75344 each



75344

► Combination 45° – 90° SEM, For Hitachi

Aluminum slotted head.

Head: 15mm x M4
Height: 10mm

75344-H each



75344-H

► Double 45°, For Hitachi

Aluminum

Head: 25mm x M4
Height: 4mm

75346-H each



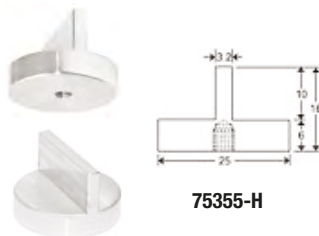
75346-H

► Double 90°, For Hitachi

Aluminum

Head: 25mm x M4
Height: 16mm

75355-H each



75355-H

► Specimen Mount Tweezers:

Dumont Specimen mount Tweezers, the finest tweezers available. Choose the one that best suits your needs.



76800



76802



76804

Polished Dumoxel Antimagnetic Steel:

76800 Tweezers 2E½ (0=12.7mm) each
76802 Tweezers 2E¼ (0=6.4mm) each
76804 Tweezers 2E½ (0=3.2mm) each

► SEM Mount Forceps



Made from stainless steel with a serrated handle and a guide pin. The tip is bent at a 45 degree and formed into a ring, which has a diameter of 10mm when fully closed. 150mm long.

76805 SEM Mount Forceps each

► Unique Uni-Band Gripper

NEW!



Unique Uni-Band Gripper - Made of 300 Series Memory Stainless Steel which is harder than titanium. Perfect gripper for handling specimen mount stubs.

76806 Unique Uni-Band Gripper each

► Carbon Planchet for SEM

1) ½" (12.7mm) surface ⅙" (1.6mm) height

76250	10/pk
76252	50/pk
76254	100/pk



76250

2) 1" (25.4mm) surface ⅙" (1.6mm) height

76270	10/pk
76272	50/pk
76274	100/pk



76270

► Carbon Planchet Holder

Two configurations are offered: ½" dia. (12.7mm) and 1" dia. (25mm) with ⅙" (3.1mm) pin.

76284 Carbon Planchet Holder, ½" each



► Pyrolytic Graphite Planchet for SEM

Surface polish to 1 μm glassy finish



EMS \$	Planchet Size, Dia x Thickness, mm	Qty
76290-32	Pyrolytic Graphite Planchet, 25.4 x 3.2	each
76290-16	Pyrolytic Graphite Planchet, 25.4 x 1.6	each
76291-32	Pyrolytic Graphite Planchet, 13.7 x 3.2	each
76291-16	Pyrolytic Graphite Planchet, 13.7 x 1.6	each

► PYROID® Pyrolytic Graphite Product Line – Vitreous Carbon Substrate

Our PYROID® pyrolytic graphite is a very light weight, 5'9's pure, solid crystal composition, with no granular components, extremely smooth surface, capable of withstanding cryogenic temperatures as well as temperatures in excess of 3000°C

The material is extremely anisotropic, meaning it conducts heat and electricity in the a-b plane like cooper but acts like a ceramic in the normal direction. In an annealed state, the thermal and conduction properties increase up to four to eight times that of aluminum and cooper respectively.

The material has zero porosity making it extremely stable and exhibits no outgassing. It is ideal for use in corrosive environments including acids and chlorine, and is highly transparent to organic samples and electrons, for analytical work, such as x-ray investigation, metallurgical, crystal growth, medical imaging technology etc.

Pyroid® is trade mark name of MINTEQ

Physical Properties of PYROID® Pyrolytic Graphite

Property	Direction*	Metric Units	English Units
Density	----	2.22 g/cc	1.37 lb/ft³
Flexual Strength			
Room Temperature	a	840 kg/cm²	12,000 psi
2750°C	a	3,500 kg/cm²	50,000 psi
Compressive Strength			
Room Temperature	a	1,050 kg/cm²	15,00 psi
	c	1,750 kg/cm²	25,000 psi
Shear Strength			
Room Temperature	a	70 kg/cm²	1,000psi
Coefficient Thermal Expansion			
Room Temperature	a	.60 x 10 ⁻⁶ cm/cm°C	1.0 x 10 ⁻⁶ in/in°F
2200°C	a	.68 x 10 ⁻⁶ cm/cm°C	1.2 x 10 ⁻⁶ in/in°F
Room Temperature	c	6.8 x 10 ⁻⁶ cm/cm°C	12.0 x 10 ⁻⁶ in/in°F
2200°C	c	8.0 x 10 ⁻⁶ cm/cm°C	14.7 x 10 ⁻⁶ in/in°F
Thermal Conductivity			
Room Temperature	a	345 W/m²K	200 BTU/(hr ft²)(°F/ft)
1650°C	a	114 W/m²K	66 BTU/(hr ft²)(°F/ft)
Room Temperature	c	1.73 W/m²K	1.00 BTU/(hr ft²)(°F/ft)
3000°F	c	1.30 W/m²K	0.75 BTU/(hr ft²)(°F/ft)
Electric Resistivity			
Room Temperature	a	500 μΩcm	
1650°C	a	200 μΩcm	
Room Temperature	c	0.6 Ωcm	
1650°C	c	0.22 Ωcm	
Scleroscope Hardness			
	a	103	103
	c	68	68
Oxidation Threshold			
Permeability		650°C	1200°F
		Helium Leak Tight at 10 – 6 mmHg	

► Sample Stub Vacuum Desiccators

Precision machined from a block of aluminum – anodized black - this Sample Stub Vacuum Desiccators accommodates 18 SEM Mounted Sample Stubs, pin style, under vacuum for year long.

- Compact and sturdy – will last as long as you own them
- Prevents oxidation from occurring to the sample during long term storage
- All pin stubs are kept secure inside the chamber by a built in "O" ring in each position
- Very simple to use - Just need small vacuum pump to evacuate air out of the chamber

- Acrylic Clear top for easy viewing the contents
- Interlock when stack together to safe space
- Ideal for transport and storage samples for SEM, TEM, FIB, AFM, etc.

Measures: 13 cm x 13cm x 4.5cm High. Chamber cavity is 10.4cm diameter x 18mm deep. Lid is made with 10mm thick clear acrylic.



76550 SEM Stub Vacuum Desiccator each

SEM for Forensics (continued)

EMS is pleased to now offer these specialized products for forensic investigation.

► Forensic Gunshot Residue Field Kits

Our comprehensive line of high-quality GSR field sampling kits includes certified SEM pin stubs with double-coated adhesive carbon tabs in plastic tubes. The certified SEM pin stubs have very low amounts of Pb, Sb and Ba, not detectable by SEM/EDX. The caps securely hold the GSR sample disc for easy GSR collection. Pre-labeled discs and tubes are both ready-for-sampling. A sturdy, sealed tamper evident transport box is also included.



Kit contents:

- Certified SEM pin mounts with adhesive carbon discs in pre-labeled tubes
- Powder-free nitrile gloves
- Evidence label
- Chain of custody label on box
- Tamper-evident cardboard transport box (4-1/2"W x 3-3/4"D x 3"H)
- Tamper evident seal
- Instruction sheet

Product Details

- 3-Disc GSR Field Kit**, with two sampling discs plus a control disc to enhance certainty of the analysis.
- 4-Disc GSR Field Kit**, is useful for sampling palm and back separately on both hands.
- 5-Disc GSR Field Kit**, is compatible with FBI requirements, with four discs plus a control disc.

Cat. #	Description	Qty.
76480-11	3 Disc Forensic Gunshot Residue Field Kit	kit
76480-13	4 Disc Forensic Gunshot Residue Field Kit	kit
76480-15	5 Disc Forensic Gunshot Residue Field Kit	kit

► Forensic Collection Kit

These kits are suitable for field work and gunshot residue in the lab or out. Manufactured from a special – certified aluminum alloy, containing only trace amounts of Barium (~0.00010%), Copper (~0.0139%), Zinc (~0.0094%), Nickel (~0.00309%), and Antimony (~0.00080%). These sample mounts are suitable for typical forensic sample studies. The kit consists of 10 pin mounts (12.74mm diameter) 10 carbon adhesive tabs, 10 storage vials, and one plastic tweezer. Two styles of glass vials are available as well as one in plastic.



Cat. #	Description	Pack
76480-01	Kit with Glass Shell Vial, size 23.7mm Dia x 37mmH	kit
76480-02	Kit with Glass Shell Vial, size 23.5mm Dia x 74mmH	kit
76480-03	Kit with Plastic Vial, size 23.5mm Dia x 52.5mmH	kit

► Numbered Gunshot Residue Sampler

Numbered, certified aluminum mount with a double-coated adhesive carbon tab applied to secure the sample in a clean, glass vial 25mm OD x 55mm high (1" x 2.17"). Packaged in a box of 100. Numbers can be specified as 100 consecutive numbers between 0 and 9999 (greatest numbers). Please inform customer service about the numbering sequence when ordering this product.



Cat. #	Description	Qty.
76480-16	Numbered Gunshot Residue Sampler	100/pk

► Forensic Gunshot Residue Lab Kit

Includes ten 12.7mm SEM pin mounts in clean, glass storage tubes (25mm OD x 55mm high) secured in a compact transport box with labels. This Kit is designed to avoid any contamination of GSR samples. Choose from either standard 12.7mm pin mounts with 8mm pins or with shorter 6mm pins. Also available as a sample kit without mounts and tabs.



Cat. #	Description	Qty.
76480-18	Forensic Gunshot Residue Lab Kit: 10 each 12.7mm SEM pin mounts (8mm pin), with mounted carbon tabs (12mm; 0.47 dia.) in capped glass tubes, 12 blank labels	kit
76480-19	Forensic Gunshot Residue Lab Kit: 10 each 12.7mm SEM short pin mounts (6mm pin for ZEISS/LEO), with mounted carbon tabs (12mm; 0.47 dia.) in capped glass tubes, 12 blank labels	kit

Sample Kit without pin mounts and tabs:

76480-22	Forensic Sample Kit: 10 capped glass sample tubes, 12 blank labels	kit
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► Forensic Field Sampler

Glass specimen vial (25mm OD x 55mm high) with a high-purity certified 12.7mm SEM pin stub specimen mount (see below), both with and without an adhesive carbon conductive tab, mounted into the plastic cap. Our Forensic Field Sampler has been designed to collect forensic evidence with minimum interference and/or contamination from the sampler. Three versions are available: without adhesive carbon tab, with ready-to-use adhesive carbon tab, or with covered carbon tab (plastic cover needs to be removed prior to use). Choice of standard 12.7mm SEM pin mount with 8mm pin or 12.7mm SEM pin mount with shorter 6mm pin (ZEISS/LEO)



Investigation Applications for SEM or Light Microscopy:

- Gunshot residue (GSR)
- Powder samples
- Fiber samples
- Paint chips
- Particle sampling
- Glass fragments

Ideal for SEM specimen preparation on the most frequently used SEM pin stubs, facilitating easy carbon coating for SEM/EDX investigation.

The Forensic Field Sampler can be securely stored in the glass specimen vial and easily shipped with the cap holding the sampler stub in place. Adhesive carbon tabs secure the evidence material.

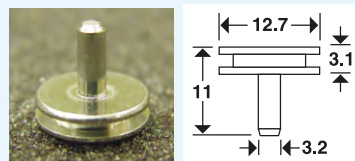
Cat. #	Description	Qty.
76480-31	Forensic Field Sampler without Adhesive Carbon Tab	100/pk
76480-32	Forensic Field Sampler with Adhesive Carbon Tab, ready to use	100/pk
76480-33	Forensic Field Sampler with Adhesive Carbon Tab, and clear plastic cover	100/pk
76480-34	Forensic Field Sampler without Adhesive Carbon Tab, Short Pin	100/pk
76480-35	Forensic Field Sampler with Adhesive Carbon Tab, ready to use, Short Pin	100/pk
76480-36	Forensic Field Sampler with Adhesive Carbon Tab, and clear plastic cover, Short Pin	100/pk

SEM for Forensics (continued)

EMS is pleased to now offer these specialized products for forensic investigation.

Forensic Certified Mounts

This mount is made from a special certified Aluminum alloy which does not contain any of the objectionable elements that may interfere with samples collected for GSR. These mounts are available with an 8mm pin, or 6mm pin.



Cat. #	Description	Qty.
76475-05	Forensic Certified Mount, with 8mm Pin	10/pack
76475-10	Forensic Certified Mount, with 8mm Pin	100/pack
76475-50	Forensic Certified Mount, with 8mm Pin	500/pack
76475-52	Forensic Certified Mount, with 6mm Pin	10/pack
76475-53	Forensic Certified Mount, with 6mm Pin	100/pack
76475-54	Forensic Certified Mount, with 6mm Pin	500/pack

SEM Single Mount Storage Tube

A plastic tube and plug. The pin mount 1/8" (3.1mm) in diameter is inserted securely to the plug and protected by the tube. Ideal for storage or mailing.



76530-01	SEM Single Mount Storage Tube	10/pk
76530-05	SEM Single Mount Storage Tube	50/pk
76530-10	SEM Single Mount Storage Tube	100/pk

SEM Single Mount Storage Tube and Mailer, for Hitachi

A plastic tube and plug for M4 threaded Hitachi mounts. 15mm in diameter Tube. A 15 mm Hitachi mount can be inserted securely to the plug and then protected by the tube. Ideal for storage as well as mailing.



The internal diameter of the tube is 0.83" (21mm). The Outer measurements of the tube are: 0.9" (23mm) x 2.05" H (52mm)

76535-01	SEM Hitachi Single Mount Storage Tube	10/pack
76531-05	SEM Hitachi Single Mount Storage Tube	50/Pack
76531-10	SEM Hitachi Single Mount Storage Tube	100/Pack

SEM Mount Forceps



Made from stainless steel with a serrated handle and a guide pin. The tip is bent at a 45 degree and formed into a ring, which has a diameter of 10mm when fully closed. 150mm long.

76805	SEM Mount Forceps	each
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Gunshot Residue Tweezers

Dumont Gunshot Residue Tweezers, the finest tweezers available. Choose the one that best suits your needs.



76800



76802



76804

Polished Dumoxel Antimagnetic Steel

Cat. #	Description	Qty.
76800-GS	Gunshot Residue Tweezers 2E1/2 (0=12.7mm)	each
76802-GS	Gunshot Residue Tweezers 2E1/4 (0=6.4mm)	each
76804-GS	Gunshot Residue Tweezers 2E1/8 (0=3.2mm)	each

Circular Cover Glass – GOLD SEAL®

GOLD SEAL® cover glass is made from pre-selected, pre-cleaned silicate glass. It is packaged with desiccants in a lint free box. Both cover glass cases and slide boxes convert to convenient slide storage files.

Cat. #	Dia.	Thickness	Pieces/oz	Pack
72231-01	12 mm	#1 (.13-.17 mm)	692	1 oz.
72231-10	12 mm	#1 (.13-.17 mm)	692	10 oz.
72228-01	15 mm	#1 (.13-.17 mm)	443	1 oz.
72228-10	15 mm	#1 (.13-.17 mm)	443	10 oz.
72229-01	18 mm	#1 (.13-.17 mm)	308	1 oz.
72229-10	18 mm	#1 (.13-.17 mm)	308	10 oz.
72221-01	22 mm	#1 (.13-.17 mm)	206	1 oz.
72221-10	22 mm	#1 (.13-.17 mm)	206	10 oz.
72223-01	25 mm	#1 (.13-.17 mm)	159	1 oz.
72223-10	25 mm	#1 (.13-.17 mm)	159	10oz.t
72230-01	12 mm	#1 1/2 (.16-.19 mm)	597	1 oz.
72230-10	12 mm	#1 1/2 (.16-.19 mm)	597	10 oz.
72222-01	18 mm	#1 1/2 (.16-.19 mm)	266	1 oz.
72222-10	18 mm	#1 1/2 (.16-.19 mm)	266	10 oz.t
72224-01	22 mm	#1 1/2 (.16-.19 mm)	178	1 oz.
72224-10	22 mm	#1 1/2 (.16-.19 mm)	178	10 oz.
72225-01	25 mm	#1 1/2 (.16-.19 mm)	137	1 oz.
72225-10	25 mm	#1 1/2 (.16-.19 mm)	137	10 oz.

Metal Specimen Discs for use with the Atomic Force Microscope



These are high quality metal discs with smooth edges and flat surfaces for use in Atomic force Microscopy.

Cat. #	Description	Qty
75010-10	10 mm Specimen Metal Discs for AFM	50/pk
75010-12	12 mm Specimen Metal Discs for AFM	50/pk
75010-15	15 mm Specimen Metal Discs for AFM	50/pk
75010-20	20 mm Specimen Metal Discs for AFM	50/pk

SEM for Forensics (continued)

EMS is pleased to now offer these specialized products for forensic investigation.

► Mica Sheets and Disks

The Highest Quality (V-1 or V-2) for AFM Applications to the Medium Quality (V4 to V-6) for Replication, Thin Film Deposition

EMS Mica Sheets offer a clean surface for E.M. applications, carbon filming and particle spraying, as well as for AFM applications.

There are two types of mica: muscovite and phlogopite. Generally, one differs from the other by color (Muscovite is Ruby, Green or White; Phlogopite is Amber, Yellow, or Silver) The maximum operating temperature for Muscovite is about 500 – 600°C and for Phlogopite is about 800 – 900°C.

Our line consists of High Quality Muscovite Mica. This mica peels off very thin up to 0.0001" uniform layers, exposing "virgin" mica upon splitting.

For more information on our Mica Sheets and Disks, please see page 284-285.



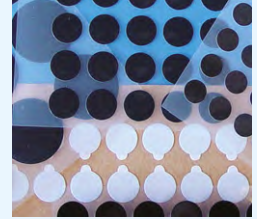
► Conductive Carbon Adhesive Tabs

Standard Carbon Conductive Adhesive Tabs – Tabs are formed by two sides of thick conductive adhesive (45 µm on each side) with the center conductive core film (35 µm). With the total thickness of 125

µm, these tabs will offer reasonably firm, smooth surfaces for a variety SEM applications, including gunshot residue analysis. Tabs are protected by white liners, which do not have to be removed when samples are ready to be mounted.

- No out-gassing
- Conductive adhesive is carbon filled acrylic glue
- Solvent free
- Adhesive can be removed by ethyl acetate, ethanol, isopropyl alcohol or alcohols
- Service temperature is up to 60°C (140°F)

Tabs contain some traces of Si, Sb, S, Fe, Mg, Na.



Thick Carbon Conductive Tabs or Image Tabs – The stiff and smooth surface conductive tabs are 260 µm thick, including 200 µm thick conductive carbonate base, coated 30 µm thick on each side with conductive adhesive. However, these tabs are not as conductive and sticky as the Standard Carbon Conductive Tabs. Thick Carbon Conductive Tabs are used for photographic background as well as for Jet Scan applications, where the tabs must be removed and filed away.

Ultra-Thin Carbon Conductive Adhesive Tabs – These tabs have Core material which is nonconductive cloth (70 µm) with Carbon Filler Conductive Adhesive (2 x 45µm). Total thickness is 160 µm.

Spectro Grade Carbon Adhesive Tabs – High purity conductive carbons for less interference signals, such as X-Ray analysis.

Ultra-Smooth Carbon Adhesive Tabs – Carbon adhesive tabs that eliminate issues with rough surfaces, insufficient tackiness, and hardness with significantly lower contaminant levels under EDS. Tabs are made in USA and very popular, and may be used in place of other conductive adhesive in many applications in conventional and field emission microscopes. They are also widely used in forensic laboratories for study of gunshots residues. Without the addition of conductive coating, small nonconductive particles can often be imaged and X-Ray analyzed, cutting down your analysis time. These tabs are composed of a thin film of strong adhesive approximately 1/2" diameter. Over 99% transparent to EDS, with a very small amount of nickel (0.6%) and copper (< 0.3%).

Refrigeration will increase shelf life but tabs need to be warmed up to room temperature before use (usually more than one hour)

Muscovite Mica V-1 Quality:

Cat.#	Mica Size	Quality	Thickness (mm)	Pack
71855-01	50 x 75mm	V-1	0.15 – 0.21	each
71855-05	25 x 75 mm	V-1	0.26 – 0.31	each
71855-10	25 x 25 mm	V-1	0.15 – 0.21	10/pk
71855-11	25 x 25 mm	V-1	0.26 – 0.31	10/pk
71855-15	15 x 15 mm	V-1	0.15 – 0.21	10/pk
71856-01	9.5 mm Diameter	V-1	0.15 – 0.21	10/pk
71856-02	12 mm Diameter	V-1	0.15 – 0.21	10/pk
71856-03	15 mm Diameter	V-1	0.15 – 0.21	10/pk
71856-04	20 mm Diameter	V-1	0.15 – 0.21	10/pk

Muscovite Mica V2 Quality:

Cat.#	Mica Size	Quality	Thickness (mm)	Pack
71857-01	50 x 75mm	V-2	0.15 – 0.21	each
71857-05	25 x 75 mm	V-2	0.26 – 0.31	each
71857-10	25 x 25 mm	V-2	0.15 – 0.21	10/pk
71857-11	25 x 25 mm	V-2	0.26 – 0.31	10/pk
71857-15	15 x 15 mm	V-2	0.15 – 0.21	10/pk
71858-01	9.5 mm Diameter	V-2	0.15 – 0.21	10/pk

Muscovite Mica V4 Quality:

Cat.#	Mica Size	Quality	Thickness (mm)	Pack
71853-01	50mm x 75 mm	V-4	0.26 – 0.31	10/pk
71853-05	25mm x 75mm	V-4	0.26 – 0.31	10/pk
71853-10	25mm x 25mm	V-4	0.15 – 0.21	10/pk
71853-11	25mm x 25mm	V-4	0.26 – 0.31	10/pk
71853-15	15mm x 15mm	V-4	0.15 – 0.21	10/pk
71854-01	9.5mm Diameter	V-4	0.15 – 0.21	10/pk
71854-15	12.7mm Diameter	V-4	0.15 – 0.21	10/pk

Muscovite Mica V5 Quality:

Cat.#	Mica Size	Quality	Thickness (mm)	Pack
71850-01	50mm x 75 mm	V-5	0.15 – 0.21	10/pk
71851-05	25mm x 75mm	V-5	0.26 – 0.31	10/pk
71850-10	25mm x 25mm	V-5	0.15 – 0.21	10/pk
71850-11	25mm x 25mm	V-5	0.26 – 0.31	10/pk
71850-15	15mm x 15mm	V-5	0.15 – 0.21	10/pk
71852-01	9.5mm Diameter	V-5	0.15 – 0.21	10/pk

Cat. #	Description	Qty.
77825-06	Standard Carbon Adhesive Tabs, 6mm Dia.	100/pk.
77825-09	Standard Carbon Adhesive Tabs, 9mm Dia.	98/pk.
77825-12	Standard Carbon Adhesive Tabs, 12mm Dia.	100/pk.
77825-25	Standard Carbon Adhesive Tabs, 25mm Dia.	54/pk.
77824-12	Thick Carbon Conductive Tabs, 12mm Dia.	100/pk.
77825-12-SP	Ultra Thin Carbon Adhesive Tabs, 12mm Dia.	200/pk.
77826-12	Spectro Grade Carbon Adhesive Tabs, 12mm Dia.	120/pk.
77827-12	Ultra-Smooth Carbon Adhesive Tabs, 12mm	100/pk.
77827-25	Ultra-Smooth Carbon Adhesive Tabs, 25mm	50/pk.

► Specially Designed Specimen Holders for SEM

Our specimen holders are designed to improve your productivity and allow you to view more than one sample at a time. You will save pump down time, keep your chamber cleaner and get more work done. All mounts are machined from solid aluminum and come with spring clips/or set-screws to hold your specimens securely. All mounts are made to fit onto your stage and are designed to fit through all standard specimen exchange ports, and have a center-threaded port to accept the Adapter Pins. Be sure to order the Adapter Pin that fits your instrument. For this reason, we offer three different types of pin adapters, which are threaded and ready to screw on to the base of the holders.

Adapter A: Overall measurement: 28mm long x 3.1mm diameter (step-up portion is 6.25mm L x 4.8mm diameter),

Adapter B: Overall measurement: 28mm long x 6mm diameter,

Adapter C: Overall measurement: 34.5mm long x 16mm diameter
All adapters have a threaded portion 5mm in length.

► 1/ Universal SEM Sample Holder



Adapter Pins



75910

This holder will hold almost any sample from 3mm to 29mm in diameter plus various odd shaped samples, which one of their dimensions is not greater than 29mm. The samples are easily inserted or removed from the holder. The holder is made from aluminum and is supplied with four removable sample arms so that it can hold very small samples as well, and it provides good electrical contact to the stage. The AMRAY base is the standard base and it measures: 48mm x 42mm x 12mm Thick

For all other makes and models you can choose an Adapter Pin to screw on to the AMRAY base holder.

Cat. #	Description	Qty
75910	Universal SEM Holder – AMRAY Base	each
75910-01	Universal SEM Holder – AMRAY Base with Pin A	each
75910-02	Universal SEM Holder – AMRAY Base with Pin B	each
75910-03	Universal SEM Holder – AMRAY Base with Pin C	each

► 2/ Vertical Mounts for Thin Samples

This holder is designed to hold thin samples vertically in the SEM or any microscope. It is 25mm in diameter and 10mm thick. Each of the two jaws can hold up to 3mm thick samples. The spring loader is gentle and strong enough to keep thin and fragile samples vertical so that cross sections can be studied. This holder is very useful for cross sections of silicone wafers or multiplayer capacitors.

This holder can be adapted to any adapter pin listed above to accommodate your instrument.



75915

Cat. #	Description	Qty
75915	Thin Sample/Vertical Mount Holder, Flat Base	each
75915-01	Thin Sample/Vertical Mount Holder, with Adapter Pin A	each
75915-02	Thin Sample/Vertical Mount Holder, with Adapter Pin B	each
75915-03	Thin Sample/Vertical Mount Holder, with Adapter Pin C	each

► 3/ Multi Pin Holder

The multi Pin Holder is designed to save time. It accommodates 3 or 5 of 1/2" (12.5mm) diameter surface, 1/8" (3.1mm) diameter pin.



75920

Cat. #	Description	Qty
75920	3-Pin Holder, 25mm Dia x 10mm H, Flat Base	each
75920-01	3-Pin Holder, 25mm Dia x 10mm H, with Adapter Pin A	each
75920-02	3-Pin Holder, 25mm Dia x 10mm H, with Adapter Pin B	each
75920-03	3-Pin Holder, 25mm Dia x 10mm H, with Adapter Pin C	each
75921	5-Pin Holder, 32mm Dia x 10mm H, Flat Base	each
75921-01	5-Pin Holder, 32mm Dia x 10mm H, with Adapter Pin A	each
75921-02	5-Pin Holder, 32mm Dia x 10mm H, with Adapter Pin B	each
75921-03	5-Pin Holder, 32mm Dia x 10mm H, with Adapter Pin C	each

► 4/ ISI DS 130 and 150 First Stage Sample Mounts

This is a 10mm in diameter, 5mm high, copper sample holder to fit the stage of the ISI DS 130 and 150 SEM's. The inner cylinder is height adjustable so that you can adjust the sample to the correct working distance



79525

75925	ISI First Stage Holder	each
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► SEM Sample Holders Set

For your convenience, we now offer a SEM Sample Holder Set for the above SEM Holders in a solid wooden box and finely finished. Set consists of one Universal Holder, one Thin Sample/Vertical Mount Holder, one each 3-Pin and 5-Pin Holders with a hex key and Adapter Pin A.



75930	SEM Sample Holder Set	each
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► Pin Mount Stub Adapters

Made from aluminum, used to adapt 1/8" (3.1mm) pin diameter SEM stubs. Available in 10, 15 and 16mm diameters.

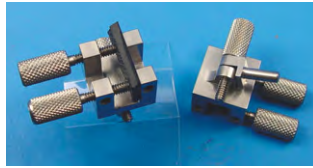


75940-10	Pin Stub Adapter 10mm(H)x10mm(D)	each
75940-11	Pin Stub Adapter 15mm(H)x10mm(D) with M4 Tapered hole on one side	each
75940-15	Pin Stub Adapter 38mm(H)x15mm(D) with M4 Tapered hole on one side	each
75940-16	Pin Stub Adapter 38mm(H)x16mm(D)	each

► Specially Designed Specimen Holders for SEM (continued)

► Cross Sectional Holder

Made from non-magnetic stainless steel with 3.1mm (1/8") diameter pin and adjustable angle turn-screw. Just insert specimens edge-on and observe the cross section directly.



75942-01 Cross Sectional Holder

each

► Four-Pin Stub Holder

It accommodates four pin types, up to 12.5 (1/2") surface specimen stubs, with 1/8" (3.1mm) diameter pin.

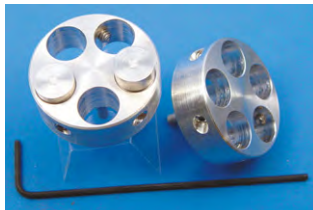


75944-04 Four-Pin Stub Holder

each

► Five 10mm Stub Holder

Accommodates five 10mm diameter specimen stubs, with 1/8" (3.1mm) diameter pin.



75945-05 Five 10mm Stub Holder

each

► Thin Sample Holder

Ideal for the examination of cross sections of thin samples, such as wafers, multi-layer of capacitors, plastics, metals, etc.



1. For most AMRAY: 1/2"

diameter (12.7mm), 1/8" (3.1mm) diameter pin (3.1mm) with split openings up to 1/4" (6.4mm). Available with either 8mm (5/16") pin height or 15mm (9/16") pin height.

2. For ISI, JEOL, TOPCON:

Double set screw for a secure holding of the specimen during observation. 15mm(9/16") (dia). x 10mm(3/8") (H), 6.4mm (1/4") split.

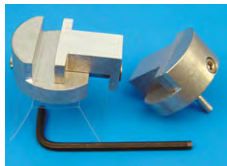
75948-08 Thin Film Holder, 8mm(L) Pin each

75948-15 Thin Film Holder, 15mm (L) Pin each

75948-10 Thin Film Holder, 15x10mm Stub each

► Universal Vise

A single set screw loading vise for fast and easy to hold specimens for SEM. The jaws are 1" (25mm) long, 1/16" (1.1mm) wide and 3/16" (8mm) high. 1/8" (3.1mm) pin.



75950-01 Universal Vise each

► Metallurgical Mount

Accommodates up to 31.8 mm (1 1/4") diameter of a metallurgical specimen with at least 0.8 mm (1/16") clearance. Pin 3.1 mm (1/8"), depth is 8 mm (5/16").



75952-01 Metallurgical Mount each

► Variable Tilt Mount

This mount which is made from aluminum is used for the mounting and tilting of samples from 0° – 90° as well as for SEM investigation with small working distances. The mount is marked for 30°, 45°, 70° and 90°. The table measures 11 x 11mm (0.46" x 0.46") and the overall size is 14 x 14 x 12.7mm (0.55" x 0.55" x 0.5").



75952-05 Variable Tilt Mount holder, For Pin each

75952-05H Variable Tilt Mount, M4 Hitachi Each

► TEM Grid Holder on a Pin

This EMS new release allows for the holding of up to 4 grids. Made from Aluminum with a brass Screw this holder allows you to image and analyze specimens on TEM Grids in the SEM. The Overall diameter of the holder is 1" (25mm) with a 1/8" Pin (3.2mm) and a longer pin 0.6" (15mm). The Grid locations are all numbered



75949-03 TEM Grid Holder on Pin each

► Multi Holder for 4 Pin Stubs

This multi pin stub adapter for JEOL 32x11mm is designed to save time It is made from vacuum aluminum with stainless steel set screws. It accommodates up to four standard 12.7mm (1/2") pin stubs with 3.2mm (1/8") pin.



75953-02J Multi Pin Stub Adapter, Jeol each

► Multi Holder for 6 Pin Stubs

This 42mm in diameter multi pin holder is designed to save time It is made from machined aluminum with stainless steel set screws. It accommodates up to six standard 12.7mm (1/2") pin stubs with 3.2mm (1/8") pin.



75953-25h Multi Holder for 6 Pin Stubs, Hitachi, M4 each

► Multi Pin Holder for 8 Pin Stubs



This 50mm in diameter multi pin holder is designed to save time It is made from machined aluminum with stainless steel Allen wrench screws. It accommodates up to eight standard 12.7mm (1/2") pin stubs.

75952-08	Multi Pin Holder for 8 Pin Stubs, 3.2mm (1/8")	each
75952-08H	Multiple Holder for 8 Pins Hitachi, M4	each

► Multi Pin Holder for 12 Pin Stubs



This 62 mm in diameter multi pin holder is designed to save time It is made from machined aluminum with stainless steel Allen wrench screws. It accommodates up to twelve standard 12.7mm (1/2") pin stubs

75952-12	Multi Pin Holder for 12 pin stubs, 3.2mm(1/8")	each
75952-12H	Multi Holder for 12 Pin Stubs, Hitachi, M4	each

► Multi Holder for 29 Pin Stubs



This 90 mm in diameter multi pin holder is designed to save time It is made from machined aluminum with 302 stainless steel springs that hold the pin stubs in place. It accommodates up to twenty nine standard 12.7mm (1/2") pin stubs

75952-29	Multi Holder for 29 pin Stubs, Hitachi, M4	each
75952-29H	Multi Pin Holder for 29 pin stubs, 3.2mm (1/8")	each

► Multi Holder for 49 Pin Stubs

This 117 mm in diameter multi pin holder is designed to save time It is made from machined aluminum with 302 stainless steel springs that hold the pin stubs in place. It accommodates up to forty nine standard 12.7mm (1/2") pin stubs



75952-29	Multi Holder for 29 pin Stubs, Hitachi, M4	each
75952-29H	Multi Pin Holder for 29 pin stubs, 3.2mm (1/8")	each

► 45° Pin Stub Holder

This 45 degree pin stub holder allows for a higher SE signal without having to tilt the specimen stage and it accommodates any standard 12.7mm (1/2") pin stubs with 3.2mm (1/8") pin.. Grooved aluminum with stainless steel Allen set screw.



75952-45	45° Pin Stub Holder, 3.2mm (1/8") pin	each
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► 45° Multi Holder for 3 Pin Stubs

This 25.4 mm in diameter 45 Degree multi pin holder is designed to save time. It allows for a higher SE signal without having to tilt the specimen It is made from machined aluminum with stainless steel Allen set screws. It accommodates up to three standard 12.7mm (1/2") pin stubs with 3.2mm (1/8") pin.



75952-60	45° Multi Holder for 3 pin stubs,	each
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► 45° Multi Holder for 6 Pin Stubs

This 35 mm in diameter 45 Degree multi pin holder is designed to save time. It allows for a higher SE signal without having to tilt the specimen It is made from machined aluminum with stainless steel Allen set screws. It accommodates up to six standard 12.7mm (1/2") pin stubs.



75952-70	45° Multi Holder for 6 pin stubs, 3.2mm (1/8")	each
75952-70H	450 Multi Holder for 6 pin stubs, Hitachi, M4	each

► Set Screw Vise

This set screw vice which is made from machined aluminum with stainless steel allen set screws has an open slot that is 4mm (.157") wide x 5mm (.197") deep. It measures 12.7mm (1/2") dia. x 17.7mm (0.70") high. And has a 3.2mm (1/8") dia. pin.



75941-01	Set Screw Vise, 12.7mm	each
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► Large Set Screw Vise



75941-03

75941-03H

This set screw vice which is made from machined aluminum with stainless steel allen set screws has an open slot that is 10mm (.394") wide x 5mm (.197") deep. It measures 25mm (1") dia. x 17.5mm (0.69") high.

75941-03	Large Set Screw Vise, 25mm, 3.2mm (1/8") Pin	each
75941-03H	Large Set Screw Vise, 25mmx10mm (H), M4	each

► Double Slot Mini Vise

Double-slot set screw vise with (2) 1mm wide x 3mm deep slots. Clamp thin specimens or cross sections. Effectively holds wafers and thin samples up to 1mm (.039") thick.

Dimensions: 15mm dia x 6mm H.

Material: Aluminum with 2 stainless steel allen set screws.

Includes allen wrench.

75943-H Double Slot Set Screw Vise, M4, 15 x 6mm H each



► Large Double Slot Vise, 25mm

Large Double-Slot Set Screw Vise with (2) 2.5mm X 5mm deep slots. Clamp thin specimens and cross sections without conductive paint or tape.

Dimensions: 25 x 10 mm (1 x 0.4").

Material: Machined aluminum with 2 stainless steel allen set screws.

Includes allen wrench.

75947-H Large Double Slot Set Screw Vise, 25mm x 10mm H, M4



each

► Large Double Slot Vise, 32mm

32mm Large double slot set screw vise with (2) 2.5mm wide X 5mm deep slots.

Clamp thin specimens and cross sections without conductive paint or tape.

Dimensions: 32 X 10mm (1-1/4" x 0.394")

Material: Machined aluminum with 2 stainless steel allen set screws.

Includes allen wrench.

75947-HH Large Double Slot Set Screw Vise, 32 x 10mm, M4

each



► 45° Pin Mount and 90° Profile, Combination Holder

For Hitachi S-800, S-4000, S-4100, S-4200, S-4300, S-4500, S-4700 and S-3600N SEMs.

For cross sections up to 6.35mm (1/4"). Available in aluminum or brass with stainless steel allen set screws.

Includes allen wrench.

75950-07-A 45°/90° Combination Holder, Aluminum each

75950-07-B 45°/90° Combination Holder, Brass each



► Thin Specimen Split Mount on Pin Stub

12.7mm (1/2") dia., 3.2mm (1/8") dia. pin

For examination of thin samples from paper, plastics, metals, textiles, plants, etc., in cross section. Features a wide opening up to 6.4mm (1/4"). Grooved head.

Height of head is 7.4mm (0.29").

Pin Length: 8mm (.314"). Pin is centered.

Material: Machined aluminum with stainless steel allen set screw.

Includes allen wrench.

75950-08 Thin Specimen Split Mount, 1/2", 8mm L pin each



► Thin Specimen Split Mount (AMRAY), 15mm

15mm (0.59") dia., 3.2mm (1/8") dia. pin

Opens to 3.75mm (3/8").

Pin length: 14.3mm (9/16")

Height of head: 10.2mm (0.4"), centered split.

Pin is off-center.

Material: Machined aluminum with two stainless steel allen set screws.

Includes allen wrench.

75950-09 Thin Specimen Split Mount, AMRAY each



► Double Slot Mini Vise, 15mm

Features (2) 1mm wide X 3mm deep slots. Clamp thin specimens and cross sections without tape or conductive paint.

Pin Length: 3.2mm (1/8").

Material: Machined aluminum with 2 stainless steel allen set screws.

Includes allen wrench.

75951-03 Double Slot Set Screw Vise, 15mm each



► Large Double Slot Vise, 25mm

Features (2) 2.5mm by 5mm deep slots. Clamp thin specimens and cross sections without conductive paint or tape.

Dimensions: 25 x 8 mm (1 x 0.32") with 3.2mm (1/8") pin.

Material: Machined aluminum with 2 stainless steel allen set screws.

Includes allen wrench.

75951-04 Large Double Slot Set Screw Vise, 25mm each



► Metallurgical Mount Holder, 1" and 25mm

This mount holder which is made from machined aluminum with stainless steel Allen screws is specifically for 1" or 25mm metallurgical mounts.

75941-05	Metallurgical Mount Holder, 1" and 25mm, 3.2mm ($\frac{1}{8}$ ") x 8mm (D)	each
75941-05H	Metallurgical Mount Holder, 1" and 25mm, Hitachi, M4	each



► Metallurgical Mount Holder, 1-1/4" and 30mm

This mount holder which is made from machined aluminum with stainless steel Allen screws is specifically for 1 1/4" and 30mm metallurgical mounts.

75941-06	Metallurgical Mount Holder, 1-1/4" and 30mm, 3.2mm ($\frac{1}{8}$ ") x 8mm (D)	each
75941-06H	Metallurgical Mount Holder, 1-1/4" and 30mm, Hitachi, M4	each



► Metallurgical Mount Holder, 1-1/2" and 40mm

This set screw vice which is made from machined aluminum with stainless steel allen set screws has an open slot that is 10mm (.394") wide x 5mm (.197") deep. It measures 25mm (1") dia. x 17.5mm (0.69") high.

75941-08	Metallurgical Mount Holder, 1 1/2" and 40mm, 3.2mm ($\frac{1}{8}$ ") x 8mm (D)	each
75941-08H	Metallurgical Mount Holder 1 1/2" or 40mm, Hitachi, M4	each



► Metallurgical Mount Holder, 2" and 50mm

This mount holder which is made from machined aluminum with stainless steel Allen screws is specifically for 2" and 50mm metallurgical mounts.

75941-09	Metallurgical Mount Holder, 2" and 50mm, 3.2mm ($\frac{1}{8}$ ") x 8mm(D)	each
75941-09H	Metallurgical Mount Holder, 2" and 50mm, Hitachi, M4	each



► Geological Thin Section Holder

This thin section holder is made from aluminum with copper clips and brass screws. The unit measures 55x30x8mm and holds a standard geological thin section or slide measuring 47 x 27mm. The holder comes complete with 2 clips to insure nothing moves. The holder has convenient tweezer inserts which allow for easy loading.

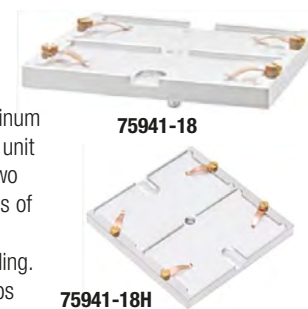
75941-15	Geological Thin Section Holder, 9.5mm	each
75941-15H	Geological Thin Section Holder, Hitachi M4	each



► Dual Geological Thin Section Holder

This thin section holder made from aluminum with copper clips and brass screws. The unit measures 55 x 58 x 8mm and it holds two standard geological thin sections or slides of 47 x 27mm. The holder has convenient tweezer inserts which allow for easy loading. Tweezer inserts enable easy loading. Clips are provided for secure holding.

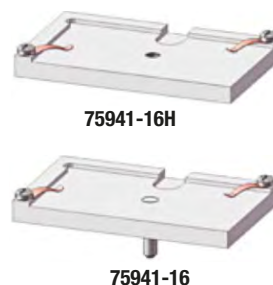
75941-18	Dual Geological Thin Section Holder, 9.5mm Pin	each
75941-18H	Dual Geological Thin Section Holder, Hitachi M4	each



► Variable Size Geological Thin Section Holder

This thin section holder is made from vacuum grade aluminum with copper clips and brass screws. The unit measures 51x32x8mm and holds either standard thin sections of 47 x 27mm or smaller or larger thin sections. Smallest size would be 40x20mm. The holder comes complete with 2 clips to insure nothing moves. The holder has convenient tweezer inserts which allow for easy loading.

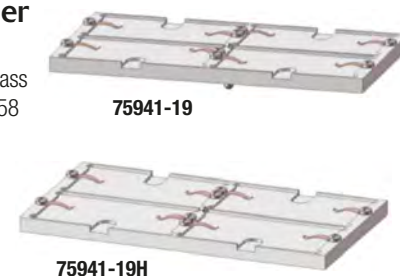
75941-16	Variable Size Geological Thin Section Holder, 9.5mm Pin	each
75941-16H	Variable Size Geological Thin Section Holder, Hitachi M4	each



► Quadruple Geological Thin Section Holder

This thin section holder made from aluminum with copper clips and brass screws. The unit measures 107 x 58 x 8mm and it holds four standard geological thin sections or slides of 47 x 27mm. The holder has convenient tweezer inserts which allow for easy loading. Tweezer inserts enable easy loading. Clips are provided for secure holding.

75941-19	Quadruple Geological Thin Section Holder, 8.5mm Pin	each
75941-19H	Quadruple Geological Thin Section Holder, Hitachi M4	each



► Small FIB Grid Holder

Holds up to 2 FIB grids of the same thickness. Handy FIB grid holder on a standard 12.7mm (1/2") pin stub. Can also be used to safely store FIB grids with thin sections attached.

Overall Dimensions: 12.7mm (1/2") x 7.8mm (0.3mm) H w/o pin.

Pin: Standard 3.2mm (1/8").

Material: Vacuum grade aluminum with brass screw. Includes Philips screwdriver #0.



Cat. #	Description	Qty
75950-02	Small FIB Grid Holder, 12.7mm, Pin	each

► Single 1/2" FIB Sample and Grid Holder

Holds a FIB sample mounted on standard 1/2" (12.7mm) pin stub for FIB milling and lift-out procedures. Conveniently holds two FIB grids close to the sample to mount prepared TEM lamellae on the FIB grid for TEM imaging. Cost-effective holder suitable for all FIB/SEM systems which accept pin mount holders, including the FEI, ZEISS and Tescan systems. For the JEOL and Hitachi systems, use a pin mount adapter.

Overall Dimensions: 22.4 x 12.7 x 11.7mm (0.88" x 0.5" x 0.46").

Pin: Standard 3.2mm (1/8").

Material: Vacuum grade aluminum with brass screws. Includes Philips screwdriver #0.



Cat. #	Description	Qty
75950-03	Single 1/2" FIB Sample and Grid Holder, Pin	each

► Double 1/2" FIB Sample and Grid Holder

Holds FIB samples mounted on two standard 1/2" (12.7mm) pin stubs for FIB milling and lift-out procedures. Conveniently holds two FIB grids close to the sample to mount prepared TEM lamellae on the FIB grid for TEM imaging. Cost-effective holder suitable for all FIB/SEM systems which accept pin mount holders, including the FEI, ZEISS and Tescan systems. For the JEOL and Hitachi systems, use a pin mount adapter.

Material: Vacuum grade aluminum with brass screws.

Overall Dimensions: 36.5 x 12.7 x 11.6mm (1.44" x 0.5" x 0.46").

Pin: Standard 3.2mm (1/8").

Philips screwdriver #0 included.

Cat. #	Description	Qty
75950-04	Double 1/2" FIB Sample and Grid Holder, Pin	each



► Multiple FIB Grid Holder

Larger size enables this FIB grid holder to handle multiple FIB grids of the same thickness. Can also be used to safely store FIB grids with thin section (lamellae) attached. Convenient brass thumbscrews make loading and unloading easy.

Overall Dimensions: 22.5 x 29 x 13.5mm (7/8" x 1-1/8" x 5/8").

Pin: Standard 3.2mm (1/8").

Material: Vacuum grade aluminum with brass thumbscrews.

Cat. #	Description	Qty
75950-05	Multiple FIB Grid Holder	each

► 1" FIB Sample and Grid Holder

Holds an FIB sample mounted on a standard 25mm (1") pin stub for FIB milling and lift out procedures. Can also be used to hold FIB grids of the same thickness to mount the prepared lamellae on an FIB grid for TEM imaging. This cost-effective and versatile holder is suitable for all FIB/SEM systems which accept pin mount holders, including the FEI, ZEISS and Tescan systems. For the JEOL and Hitachi systems, use a pin mount adapter. Convenient brass thumbscrews make loading and unloading easy.

Overall Dimensions: 50 x 29 x 13.5mm (2" x 1-1/8" x 5/8").

Pin: Standard 3.2mm (1/8").

Material: Vacuum grade aluminum with brass screws.



Cat. #	Description	Qty
75950-06	1" FIB Sample and Grid Holder, Pin	each



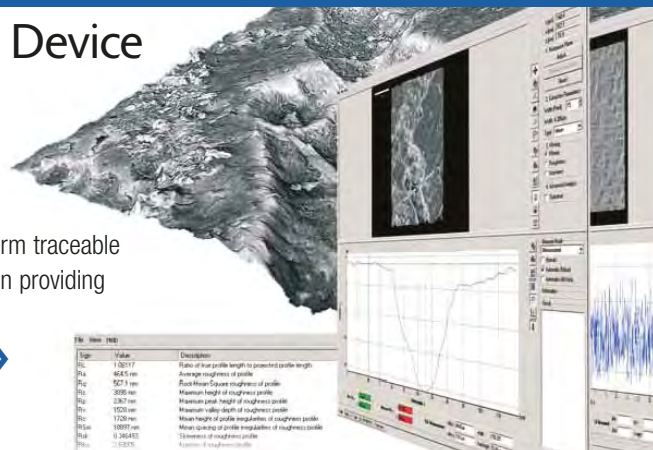
Turn Your SEM into a 3D Measurement Device

MeX 3d Surface Metrology With The SEM

MeX is a stand alone software package that turns any SEM with digital imaging into a true surface metrology device.

Using stereoscopic images the software automatically retrieves 3D information and presents a highly accurate, robust and dense 3D dataset which is then used to perform traceable metrology examination. The results are obtained irrespective of the SEM magnification providing metrology at macro and micro levels.

For more information, see pages 670-675. >>>>



► Bulk Holders

► SEM Bulk Specimen Holder

For clamping irregular, bulky samples

Opening: 15.9mm (5/8") wide X 25.4mm (1") long X 9.5mm (3/8") deep.

Pin Diameter: 3.2mm (1/8").

Material: Machined aluminum with stainless steel allen set screws.
Allen wrench included.

75951-06 SEM Bulk Specimen Holder each



► Large Bulk Specimen Holder

Opening: 32mm (1-1/4") wide X 32mm (1-1/4") long X 13mm (1/2") deep.

Pin Diameter: 3.2mm (1/8").

Material: Machined aluminum with stainless steel allen set screws.
Allen wrench included.

75951-07 Large Bulk Specimen Holder each



► X-Large Bulk Specimen Holder

Holds up to 2" specimens

Opening: 52mm (2") wide X 40mm (1-1/2") long X 13mm (1/2") deep.

Pin Diameter: 3.2mm (1/8")

Material: Machined aluminum with stainless steel allen set screws.
Allen wrench included.

75951-08 X-Large Bulk Specimen Holder each



► XX-Large Bulk Specimen Holder

Holds up to 3" specimens

Opening: 80mm (3-1/8") wide X 48mm (1-7/8") long X 13mm (1/2") deep.

Pin Diameter: 3.2mm (1/8").

Material: Machined aluminum with stainless steel allen set screws.
Allen wrench included.

75951-09 XX-Large Bulk Specimen Holder each



► SEM Clamps

► Mini SEM Clamp, 12.7mm

Mini SEM Clamp on a standard 12.7mm (1/2") pin stub. Suitable for holding flat or thin specimens such as silicon chips, foil, wires, and small tubes.

Material: Vacuum-grade aluminum with brass screw.

75954-01 Mini SEM Clamp 12.7mm, Pin each



► Small SEM Clamp, 15 x 10mm

15mm (0.6") long with 10mm (0.4") wide clamping area and standard pin stub 3.2mm (1/8"). Suitable for holding samples up to 7mm overall thickness. Perfect for small tubes, strips, wires, and smaller flat samples.

Overall Dimensions 23 x 20 x 9mm (0.9"x0.78"x0.35")

Material: Machined aluminum with brass screws.

75954-02 Small SEM Clamp 15 x 10mm, 3.2mm (1/8") Pin each



► Medium SEM Clamp, 25 x 15mm

25mm (1") long with 15mm (0.6") wide clamping area. Features standard pin stub 3.2mm (1/8"). Suitable for holding samples up to 7mm overall thickness. Perfect for small tubes, strips, wires, and smaller flat samples.

Overall Dimensions: 33 x 25 x 9mm (1.3"x1"x0.35")

Material: Machined aluminum with brass screws.

75954-03 Medium SEM Clamp 25 x 15mm, 3.2mm (1/8") Pin each



► Recessed SEM Clamp, 25 x 15mm

Achieve background-free imaging and no contact with sample surface in imaging area with this 5mm recessed clip

Clamping Area: 25mm (1") long X 15mm (0.6") wide.

Maximum Thickness: 7mm under the clamping strips.

Overall Dimensions: 33 x 25 x 11mm 1.3"x1"x0.43").

Material: Machined aluminum with brass screws.

75954-05 Recessed SEM Clamp 25 x 15mm, 3.2mm (1/8") Pin each



► SEM Clip Specimen Mounts

Specially designed for easy, quick and clean mounting of any type of thin specimen on specimen stubs.

These spring-loaded clips accommodate samples of up to 2mm thickness. Samples are held securely by small spring-loaded clips and allow for easy change of samples. Adhesives are not required, eliminating possible outgassing issues and saving time

■ Available with single and multiple clips

■ Ideal for holding silicon chips, paper, wire, threads, thin films, sheet metal, etc.

■ SEM Clip Mounts with multiple clips can hold larger samples or multiple smaller samples.

► 18mm Dia., Pin Mount

For FEI/Philips, ZEISS/LEO, Cambridge, Leica, Amray, CamScan and Tescan SEMs. Made in USA. Mount with one clip



75923-10 SEM Clip, 18mm Pin Mount, 1 clip each

Shorter version for ZEISS/LEO SEM/FIBs with 6mm pin height

75923-11 SEM Clip, 18mm Pin Mount, 6mm pin height, 1 clip each

► 25mm Dia., Pin Mount

Available with one, two or three clips



75923-12

75923-13

75923-14

side view

75923-12 SEM Clip, 25mm Pin Mount, 1 clip each

75923-13 SEM Clip, 25mm Pin Mount, 2 clips each

75923-14 SEM Clip, 25mm Pin Mount, 3 clips each

Shorter version for ZEISS/LEO SEM/FIBs with 6mm pin height

75923-15 SEM Clip, 25mm Pin Mount, for ZEISS/LEO SEM/FIBs 6mm pin height, 1 clip each

75923-16 SEM Clip, 25mm Pin Mount, for ZEISS/LEO SEM/FIBs 6mm pin height, 2 clips each

75923-17 SEM Clip, 25mm Pin Mount, for ZEISS/LEO SEM/FIBs 6mm pin height, 3 clips each

► 32mm Dia., Pin Mount

Available with one, two, or three clips



75923-18

75923-19

75923-20

side view

75923-18 SEM Clip, 38mm Pin Mount, 1 clip each

75923-19 SEM Clip, 38mm Pin Mount, 2 clips each

75923-20 SEM Clip, 38mm Pin Mount, 3 clips each

► SEM Clip Replacement Clips and Screws

Clips are made from spring grade beryllium-copper alloy. Thickness: 0.25mm (0.01"), overall length: 12.7mm (1/2"), width at tip: 1.6mm (1/16"), hole diameter: 2.2mm (0.087").

75954-06 SEM Clips pkg/10

75954-07 SEM Screws, Brass, M2 x 3mm length pkg/10



► 38mm Dia., Pin Mount

Available with one, two or three clips



75923-21

75923-22

75923-23

side view

75923-21 SEM Clip, 38mm Pin Mount, 1 clip each

75923-22 SEM Clip, 38mm Pin Mount, 2 clips each

75923-23 SEM Clip, 38mm Pin Mount, 3 clips each

► 25mm Dia., Cylinder Mount, M4

Available with one, two, or three clips. For Hitachi



75930-05

75930-10

75930-20

bottom view

75930-05 SEM Clip, 25x6mm x M4 Cylinder Mount, 1 clip each

75930-10 SEM Clip, 25x6mm x M4 Cylinder Mount, 2 clips each

75930-20 SEM Clip, 25x6mm x M4 Cylinder Mount, 3 clips each

► 32mm Dia., Cylinder Mount, M4

Available with one, two, or three clips. For Hitachi



75930-15

75930-25

75930-35

bottom view

75930-15 SEM Clip, 32x10mm x M4 Cylinder Mount, 1 clip each

75930-25 SEM Clip, 32x10mm x M4 Cylinder Mount, 2 clips each

75930-35 SEM Clip, 32x10mm x M4 Cylinder Mount, 3 clips each

► 50mm Dia., Cylinder Mount, M4



75954-15

75954-25

75954-30

75954-35

75954-40

bottom view

75954-15 SEM Clip, 50x6mm x M4 Cylinder Mount, 1 clip each

75954-25 SEM Clip, 50x6mm x M4 Cylinder Mount, 2 clips each

75954-30 SEM Clip, 50x6mm x M4 Cylinder Mount, 3 clips each

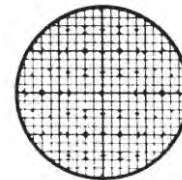
75954-35 SEM Clip, 50x6mm x M4 Cylinder Mount, 4 clips each

75954-40 SEM Clip, 50x6mm x M4 Cylinder Mount, 8 clips each

► Special Grids for SEM

Finder grids for SEM; a valuable tool for analytical studies. The grids are available in 10mm diameter and they can be placed directly on the stub surface and used to identify the area of interest in which the studies are performed.

80100-Cu SEM, Finder Grids, Copper 25/vial



► SEM Finder Grids

These new SEM grids are designed to aid in the identification and localization of SEM specimens when placed on standard SEM stubs.

The SEMF1 has several features that are incorporated for easier location of the specimen and identification of areas of special interest

- Referring to the annular rim identifies north, south, east and west.
- The four quadrant markers are tapered towards the center.

Type SEMF1

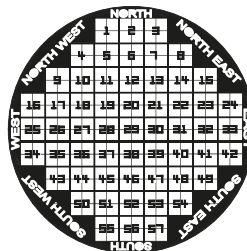
Referring to the annular rim identifies north, south, east and west. The four quadrant markers are tapered towards the centre. 100 Radial sectors are identified by reference to decimal numbers in the annular rim and alphabet letters in the four quadrants.



Overall Diameter:10 mm
 Overall Thickness:~50 µm
 Material:Copper, Nickel or Gold

Type SEMF2

The larger cells are identified using numbers from 1 – 57. Each large cell is sub-divided into 4, making a total of 228 identifiable cells by reference to their number and geographical location.



Overall Diameter:10 mm
 Overall Thickness:~50 µm
 Material:Copper, Nickel or Gold

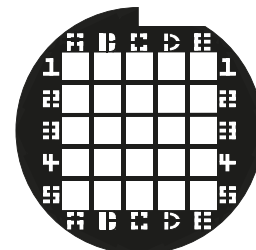
- 100 Radial sectors are easily identified by reference to decimal numbers in the annular rim and alphabet letters in the four quadrants.
- A matt surface on one side is for correct positioning – matt side up.

The SEMF2 allows for easy characterization and analysis of particles and suspensions.

The SEMF3 uses an alpha-numeric index, allowing up to 25 predetermined specimens to be fixed and then located in a SEM.

Type SEMF3

25 cells are identified by reference to their alpha-numeric position. The large asymmetric cut-out feature in the rim enables the right view to be easily obtained when placing on a SEM stub.



Overall Diameter:10 mm
 Overall Thickness:~50 µm
 Material:Copper, Nickel or Gold

Ordering:

80101-Cu	SEMF1, Copper	10/vial
80101-Ni	SEMF1, Nickel	10/vial
80101-Au	SEMF1, Gold	5/vial
80102-Cu	SEMF2, Copper	10/vial
80102-Ni	SEMF2, Nickel	10/vial
80102-Au	SEMF2, Gold	5/vial
80103-Cu	SEMF3, Copper	10/vial
80103-Ni	SEMF3, Nickel	10/vial
80103-Au	SEMF3, Gold	5/vial

► Beryllium Planchets

These planchets are prepared from high purity beryllium (min. 98.5%) by electro-fusion to provide vacuum tight (~1x10⁹atm-cm²/sec) and ±10% dimensional tolerances.

Notes:

1. Beryllium is a hazardous substance. Care should be taken seriously when working with this material.
2. Beryllium is a strategic commodity that is controlled by the U.S. government for reasons of nuclear non-proliferation and anti-terrorism. Its' ECCN No is 1C230. If you export this material, you must follow the Export Administration Regulations. Diversion contrary to U.S. Law is prohibited.
3. Following is the typical Specification Limits of our Be that supply by us:

Carbon Rods, Cord, and Fiber, See Vacuum Pumps, Acc., & Evaporation Supplies, page 960 >>>>>

Gel-Pak Storage/Carrier Boxes, page 236, 377 >>>>>

Characteristic	Unit	Value	Specification Limits	
			Lower	Upper
Lot Identification: Lot Number		5077		
Chemistry Composition				
Beryllium Assay	%	99.00	98.5	—
Beryllium Oxide	%	0.90	-	1.50
Iron Content	%	0.1000	-	0.1300
Aluminum Content	%	0.04	-	0.10
Magnesium Content	%	<0.0100	-	0.0800
Silicon Content	%	0.0300	-	0.0600
Carbon Content	%	0.13	-	0.15
Other Metallic – each	%	<0.0400	-	0.0400

Ordering:

Cat. #	Planchet Size	Qty
76010	Be Substrate Planchet 1cm Dia x 0.25mm Thick	each
76014	Be Substrate Planchet 1.27cm Dia x 0.25mm Thick	each
76015	Be Substrate Planchet 2.5cm Dia x 1.0mm Thick	each
76016	Be Substrate Planchet 50.8cm Dia x 1.0mm Thick	each
76017	Be Substrate Planchet 101.6cm Dia x 1.0mm Thick	each

► Holders & Accessories

► SampleSaver™

► Portable Storage Containers

Our custom storage container for the storing and transporting of samples for SEM, TEM, FIB, AFM, etc. This device is different from a vacuum storage unit or from desiccators. The unit allows you to evacuate and backfill or purge with dry nitrogen. You can then pressurize the container to eliminate the possibility of diffusion into the container. It is ideal for shipping or storing sensitive samples from lab to lab.



Cat. #	Description	Qty
76540-01	Small Portable Storage Container, SS100	each
76540-02	Large Portable Storage Container, SS200	each

► Sample Racks for the SS100 Sample Saver™

These sample racks are designed to fit into the SS100 Sample Saver™ for the storage of TEM grid boxes or aluminum stubs that needed to store in safe environment.



Cat. #	Description	Qty
76541-10	Model SS100-TEM – TEM Grid Box Holder. Consists of 3 vented TEM grid boxes and storage rack to fit into SampleSaver™ SS100	set
76541-20	Model SS100-125 – 1/8" SEM Stub Holder. Consists of 3 tiers sample rack. Each shelf holds 5 SEM stubs with 1/8" pin. (SEM stubs not included)	set
76541-30	Model SS100-375 – 3/8" SEM Stub Holder. Consists of 3 tiers sample rack. Each self holds 3 SEM stubs with 3/8" pin (SEM Stub not included)	set
76541-40	Model SS100-125-1 – 1/8" SEM Stub Holder. Consists of 3 tiers sample rack. Bottom shelf holds 1" dia sample mount and top two shelves each hold 5 SEM stubs with 1/8" pin (SEM stubs not included)	set
76541-50	Model SS100-375-1 – 3/8" SEM Stub Holder. Consists of 3 tiers sample rack. Bottom shelf holds 1" dia sample mount and two top shelves each hold 3 SEM stubs 3/8" pin (SEM stubs not included)	set

► Sample Racks for the SS200 Sample Saver™

These sample racks are designed to fit into the SS200 Sample Saver™ for the storage of TEM grid boxes or aluminum stubs that needed to store in safe environment.

Cat. #	Description	Qty
76542-00	Model SS200-FIB – FIB Sample Holder to store SBT CastleGuard™ Holders (CastleGuard™ holders not included)	set
76542-20	Model SS200-125 – 1/8" SEM Stub Holder. Consists of 5 tiers sample rack. Each shelf holds 5 SEM stubs with 1/8" pin. (SEM stubs not included)	set
76542-30	Model SS200-375 – 3/8" SEM Stub Holder. Consists of 5 tiers sample rack. Each self holds 3 SEM stubs with 3/8" pin (SEM Stub not included)	set
76542-40	Model SS200-125-1 – 1/8" SEM Stub Holder. Consists of 5 tiers sample rack. Bottom shelf holds 1" dia sample mount and top four shelves each hold 5 SEM stubs with 1/8" pin (SEM stubs not included)	set
76542-50	Model SS200-375-1 – 3/8" SEM Stub Holder. Consists of 5 tiers sample rack. Bottom shelf holds 1" dia sample mount and four top shelves each hold 3 SEM stubs 3/8" pin (SEM stubs not included)	set

► FIB Sample Holder

Fortress™ FIB Holder with CastleGuard™ Protection

Fortress™ FIB Holders are reusable holders that secure FIB sample that are held in a specific orientation without the use of adhesives, adhesive tabs, or conductive paints. Fortress™ FIB Holders can be used to position a thin, whole or cut TEM grid / disk in an orientation such that either in-situ or an ex-situ. FIB lift-out technique can be used to attach a FIB-prepared sample. Physical protection of the mounted sample on the grid is provided with the CastleGuard™ protection design. Up to 30 Fortress FIB Holders can be stored in a single SS200 Sample Saver™ storage container.

Features:

- Unique clamping mechanism secures sample without over tightening
- Standard 1/8" pin mount fits most FIBs and SEMs
- Peripheral support structure protects specimens during handling and transport
- Economical design enables user to prepare and store samples on the same holder
- Compatible with Sample Saver™ Storage containers for secure storage and transport in an inert environment

► Fortress™ FIB Holder – Low Profile

Low Profile Fortress™ FIB Holder to hold either a standard FIB lift out specimen on a grid or an H-Bar cut Sample.



► Fortress™ Sample Loader

Securely holds the Fortress™ Low Profile holder under a stereomicroscope and permits viewing from 2 angles without changing focus on the microscope.



Cat. #	Description	Qty.
75956-01	FIB sample Holder for Low Profile	each
75956-50	Fortress™ Sample Loader for Low Profile	each

► Fortress™ FIB Holder – High Profile

High Profile Fortress™ FIB Holder to hold a standard FIB lift-out specimen on a grid.

► Fortress™ Sample Loader

Securely holds the Fortress™ High Profile holder under a stereomicroscope and permits viewing from 2 angles without changing focus on the microscope.



Cat. #	Description	Qty.
75957-01	FIB sample Holder – High Profile	each
75957-50	Fortress™ Sample Loader for High Profile	each

Storage Boxes

Specimen Mount Holders

1) Box with insert and lid; holds 4 of 1/2" dia. (12.5mm) surface and 1/8" dia. (3.2mm) pin mounts

76600	Mount Holder Box, Pin Type	each
76610	Mount Holder Box, Pin Type	10/pk
76620	Mount Holder Box, Pin Type	100/pk

2) Box with insert and lid; holds 4 of 10mm x 10mm mounts

76700	Mount Holder Box for Jeol	each
76710	Mount Holder Box for Jeol	10/pk
76720	Mount Holder Box for Jeol	100/pk

3) Box with insert and lid; holds 4 of 12.5mm x 12.5mm mounts

76730	Mount Holder Box for Jeol 840	each
76732	Mount Holder Box for Jeol 840	10/pk
76734	Mount Holder Box for Jeol 840	100/pk

4) Universal Reversible Mount Holders

Box with insert and lid; holds 12 of 10 and 15mm diameter mounts or 12 of 3.2mm (1/8") pin mounts

76500	Universal Mount Holder	each
76510	Universal Mount Holder	10/pk
76520	Universal Mount Holder	100/pk

5) Sample Mount Storage Box

A soft silicone base in a hinged plastic box; the base has 9 cavities, each 1" (25mm) in diameter and 1/4" (6mm) deep. The box accommodates up to 9 mounting stubs of either 1" (25mm) in diameter or a 1/8" diameter pin. Overall measurements: 4 3/4" (L) x 3 3/8" (W) x 1 1/4" (H) (12cm x 9.5cm x 3cm)

76525	Mount Holder	each
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SEM Single Mount Storage Tube

A plastic tube and plug. The pin mount 1/8" (3.1mm) in diameter is inserted securely to the plug and protected by the tube. Ideal for storage or mailing.

76530-01	SEM Single Mount Storage Tube	10/pk
76530-05	SEM Single Mount Storage Tube	50/pk
76530-10	SEM Single Mount Storage Tube	100/pk

SEM Single Mount Storage Tube and Mailer, for Hitachi

A plastic tube and plug for M4 threaded Hitachi mounts. 15mm in diameter Tube. A 15 mm Hitachi mount can be inserted securely to the plug and then protected by the tube. Ideal for storage as well as mailing. The internal diameter of the tube is 0.83" (21mm). The Outer measurements of the tube are: 0.9" (23mm) x 2.05" H (52mm)

76535-01	SEM Hitachi Single Mount Storage Tube	10/pk
76531-05	SEM Hitachi Single Mount Storage Tube	50/pk
76531-10	SEM Hitachi Single Mount Storage Tube	100/pk



76600



76700



76730



76500



76525



EMS Specimen Storage Boxes for Hitachi Mounts

SEM Paper Storage Box for Pin Mounts

An inexpensive solution for storing Pin Mounts

With a Pop Up box which stores up to 8 mounts: 1/2" (12.7mm) head, 1/8" (3.2mm) diameter pin.

Box Dimensions: 7cm long x 3.8cm wide x 3.5cm high (2 3/4 x 1 1/2 x 1 3/8")

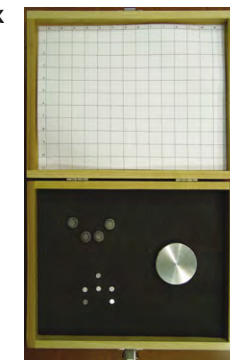
76505	SEM Paper Storage Box	50/Pack
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Wooden Storage Box

EMS offers a high end wooden storage box for the storage of 12.7mm (1/2") pin mounts. The box can store up to 128 mounts in rubber foam with complete indexed sides

76507	Wooden Storage Box for Pin Mounts	each
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EMS18 Pin Mount Storage Box and Holder

The EMS Specimen mount Box and holder is a unique storage box for Pin mounts with 3.2mm (1/8") Pins. The box is numbered 1-18 and it can accept mounts ranging in size from 6.4mm to 50 mm. With the ability to hold as follows: 18 of 12.7mm; 8 of 25mm; 2 of 32mm and even 38 or 50 mm The maximum specimen height between mount surface and closed lid is 16mm (5/8").

76506	18 Pin Mount Storage Box and Holder	each
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EMS- Hitachi SEM Mount Storage Box

EMS introduces a unique box for Hitachi SEM mounts with M4 threaded hole in the base. The box is numbered 1 - 10 to accommodate Hitachi mounts from 15 to 32mm diameter. The box can hold the following:

- 10 x 15mm mounts
- 8 x 25mm mounts
- 2 x 32mm mounts

76503	EMS-Hitachi SEM Mount Box	each
76504	EMS-Hitachi SEM Mount Box	10/pk



► Certified Conductive Adhesives

EMS introduces a new reliable line of conductive adhesives which are certified by the Bureau Veritas Quality International. **Quality Standards:** ISO 9001; EN29001; ANSI/ASQC Q91

► Silver Conductive 18DB70X

Silver Conductive Coating 18DB70X is a direct substitute for Silver Conductive Fluid 416, which is no longer available. This material was specially formulated for use in geographic areas that demand the use of low VOC (Volatile Organic Compounds) products. It provides low ohms at very thin dry film thickness on almost any surface, and exhibits excellent long term shielding and grounding properties.

Typical Properties:

■ As supplied (Liquid)

PigmentSilver
BinderAcrylic
Solids content by weight50.8% ± 5%
Density13.9 lb/gal (1.67kg/l)

■ As applied:

VOC0.5 lb/gal (59.6g/l)
DiluentAcetone (1:1 ratio by volume)

Drying time

5 minutes air dry to touch/10 minutes to handle then 5 minutes at 180°–225°F (82° – 107°C) or air cure for 24 hrs.

■ When dried:

Service temperature300°F (150°C)
Sheet resistance0.015 ohms/sq. in./mil (25µm)
Attenuation.....75 dB

RT 12684-15 Silver Conductive Coating 15 g

► Silver Conductive Adhesive Paste 478SS

Our adhesive 478SS is a conductive, silver-based polymer which is used for thick film coatings where liquid silver is not an option. Once cured, it offers a very high Tg (glass transition temperature) 153°F (67°C) to prevent blocking, and offers superior adhesion to polyester film. Adhesive 478SS can be cured at 200°F (93°C) within 15 minutes. Higher temperatures will reduce the time needed to achieve a final cure.

■ Typical Properties (as supplied):

PigmentSilver
BinderPolyester
ColorSilver
DiluentCarbitol Acetate
ConsistencyPaste (13,000-28,000 cps)
Solid content.....72.5-75.5%
Flash point230°F (110°C)
Shelf life6 months under original seal

■ Typical Properties (as cured):

ColorSilver
Sheet Resistance ..<0.025 ohm/square inch @1 mil

RT 12685-15 Silver Conductive Adhesive 478SS 15g

RT 12685-25 Silver Adhesive 478SS Thinner 25ml



► Silver Conductive Adhesive 503

A High Temperature Conductive Paint

Silver paint 503 is a flexible, high temperature conductive material designed for a wide variety of uses, and adheres to most substrates.

Advantages:

- Withstands ambient temperatures of over 500°F (260°C)
- Remains flexible over temperature range of –40°F to 500°F
- Highly conductive – good adhesion to substrates
- Dries at room temperature
- Ready to use – easy to apply

■ Typical Properties (as supplied):

PigmentSpecially Treated Silver 56%
Binder.....Fluoroelastomer
CarrierMethyl Isobutyl Ketone (MIBK)
ColorSilver - Consistency: fluid
Density.....14.6 lbs/gal (1.75kg/L)
Solid content by volume18%
Weight solids62%
Viscosity.....1700cps

Shelf life for this product is two years under original seal. Store in cool place

■ Typical Properties (as cured):

Color.....Silver
Service temperature525°F (275°C)
Sheet resistance0.05 ohms/sq. in./1 mil dry film

Drying

Air dry coated part approximately 10 minutes (depending on humidity) before carrying out resistance checks. Air dry to touch in 30 seconds and it is ready for use in 2 minutes.

RT 12686-15 Silver Conductive Adhesive 503 15g

► Carbon Conductive Adhesive 502

A High Temperature Conductive Paint

Conductive Adhesive 502 is a combination of specially processed carbon particles in a fluoroelastomer resin system designed to provide high resistance values. In its cured form, it exhibits both high and low temperature flexibility and moisture resistance.

Advantages:

- Withstands ambient temperatures of over 500°F (260°C)
- Remains flexible over temperature range of –40°F to over 500°F (260°C)
- Cures at room temperature
- Good adhesion to a variety of substrate
- Excellent oxidation resistance
- Ready to use - easy to apply

■ Typical Properties (as supplied)

PigmentSpecially Processed Carbon
Binder.....Fluoroelastomer
DiluentMethylEthylKketone (MEK)
ColorBlack
ConsistencyFluid
Density7.2lbs/gal (0.87 kg/l)
Solid content by weight13%
Viscosity600 ± 200 mPas
(Brookfield RVT @ 20rpm)
Flash point.....23°F (-°5C)

Shelf life for this product is one year under original seal. Store in cool place

■ Typical Properties (as cured)

ColorBlack
Maximum service
Temperature:525°F (275°C)
Sheet resistance.....130 ± 100 ohms/sq.in./1 mil dry film

Drying

Air drying of the product is adequate for most applications. To assure complete solvent loss, the coating can be baked for 15 minutes at 302°F (150°C)

RT 12684-30 Carbon Conductive Paint 502 30 g

continued >>>>

➤ **Certified Conductive Adhesives (cont.)**

➤ **Graphite Conductive Adhesive 154**

Adhesive 154 is an easy-to-apply resistance coating designed to provide high lubricity, conductivity, and excellent release properties to many non-conductive substrates, including most plastics. It is made from a dispersion of colloidal graphite in an isopropanol base which quickly air-dries, forms an uniform thin film adherent layer. Air dries to touch in 5 minutes and is ready for use in 30 minutes. After air drying, bake for 5 minutes at 167°F (75°C) to achieve optimum coating qualities in a shorter curing cycle.

■ **Typical Properties (as supplied)**

Pigment	Graphite
Color	Black
Binder	Cellulosic resin
Carrier	Isopropanol
Diluent.....	Isopropanol or equivalent
Consistency	Liquid
Weight solids	20%
Volume solids.....	14%
Flash point	52°F (11°C)
Shelf life	6 months under original seal

■ **Typical Properties (as cured)**

Color	Matte black
Service temp.	150°F (65°C)
Sheet resistance	1.2 K ohms/sq inch
.....	@ 1 mil dry film

RT 12691-30 Graphite Conductive Adhesive 154 30g

➤ **Graphite Conductive Adhesive 112**

Adhesive 112 is an air drying graphite coating of unusually high conductivity. It provides excellent static bleed properties and acts as a protective energy absorbing layer. It also offers good shielding performance (30-50 db over 50-450 MHz) at a coating thickness of 2 mils. It is water based and useful in solvent prohibited applications.

To use: Air dry until all water has flashed off. Air dries to touch in 20 minutes, to handle in 25 minutes. It will continue to harden for 24 hours. It can be forced dried at temperatures up to 160°F (71°C).

■ **Typical Properties (as supplied)**

Pigment	Graphite
Binder	Acrylic
Diluent	None
Color	Black
Solid content	34%
Shelf life	6 months under original seal

■ **Typical Properties (as cured)**

Color	Black
Service temp.....	350°F (190.8°C)
Sheet resistance:	20 ohms/square inch
.....	@ 1 mil dry film

RT 12693-30 Graphite Conductive Adhesive 112 30g

➤ **Colloidal Compounds and Conductive Adhesives**

➤ **A) Silver Adhesives**

Liquid; Colloidal Silver: 1-Methoxy-2-propanol base. Fast drying. Average grain size less than 1 µm and Silver content is 60%. Sheet resistance is 0.02 ohm per square inch @ 1 mil thickness. Comes with a brush attached to the cap. Service temperature is 30 minutes at 200°C.

RT 12630 Silver Liquid 15g

RT 12641 Colloidal Silver Extender 25ml

Paste; Colloidal Silver: Clear Lacquer base. Thick base — ideal for non-flowing requirements. Easily applied with micro-spatula or wooden toothpick. Particle size ranging from 0.4–1 µm. 80% are less than 1 µm. Cure in 16–20 hours at room temperature or 30 minutes at 125–150°C

RT 12640 Silver Paste 25g

RT 12641 Colloidal Silver Extender 25ml

Wooden Picks, See Specimen Prep. page 366 >>>>

➤ **B) Graphite Adhesives**

Water Base: Flat surface texture. The average flake size is 1µm. Service temperature: 200°C.

RT 12650 Graphite, Water base 50g

Isopropanol base: Flat surface texture. The average flake size is 1µm. Service temperature is 65°C.

RT 12660 Graphite, Isopropanol base 30g

RT 12661 Graphite Extender 30ml

➤ **C) CCC Carbon Adhesive**

An electrically Carbon Conductive Cement for specimen mounting in all SEM work. After drying of the cement, immediate investigation of conductive specimens is possible. Non-conductive specimens need only to be coated with carbon or metal. Thinner is available if the cement viscosity is too thick.



RT 12664 CCC Adhesive 30g

RT 12665 CCC Thinner 30ml



➤ **D) Leit-C-Plast**

A special adhesive with very high electrical conductivity and permanent plasticity for the preparation of big specimens in SEM work.

RT 12667 Leit-C-Plast 15g



➤ **E) Tempfix Adhesive**

A thermoplastic adhesive for mounting powder specimens and small particles for SEM. It does not contain any solvents and it is stable in high vacuum. It is not sticky at room temperature but becomes adhesive at 40°C and melts at 120°C. Tempfix may also be used as an embedding medium.

RT 12668 Tempfix Adhesive Set each

TECHNICAL TIP

Mounting Powders, Granules, And Fibers

The thermoplastic adhesive, Tempfix (EMS Cat.# 12668), is an excellent smooth embedding medium for stabilizing powders, granules and fibers. Tempfix becomes sticky at 40°C and melts at 120°C. To use: spread a thin layer over a sample support disc and allow to cool. The sample is then sprinkled on the hard surface and the temperature is raised to 40°C for 30-60 seconds and allowed to cool again to room temperature. Excess particles are then removed by gentle brushing or compressed air. At room temperature Tempfix has a smooth featureless surface that allows specimens to be imaged and clearly distinguished from the support media. Silvio Marchese-Ragona, Renee Jobe, Aleda Jacobs. "AFM Preparation Techniques for Bulk and Powder Samples". EMSA Bulletin 22:3 Nov., 1992.

continued >>>>

► Certified Colloidal Compounds

► EMS Conductive GOLD Paste



► EMS Conductive Epoxy Gold-Paste

This EMS one part Epoxy Gold Paste is a gold-filled conductive bonding, exhibiting high electrical conductivity and bond strength. This Gold Paste is used in preference to silver-epoxy or other silver preparations to avoid silver migration problems, or when a higher signal is required.

This Gold Paste is well suited to all SEM work, and it bonds well to alumina ceramic substrate, phenolic circuit boards, and transistor headers. It is also useful in a variety of applications in solid state and hybrid circuits including attachment, bonding semiconductor devices, heat sinks, capacitor chips.

Properties of Epoxy Gold-Paste:

Composition:	88% Gold
System:	One-part epoxy
Viscosity:	175,000 cps
Pot Life (25°C):	6 months
Cure:	15 hrs. @150°C, or 1 hr. @ 150°C plus 2 hrs. @200°C
Elec. Resist (Ohm-cm):	4 x 10 ⁴
Bond Shear Strength:	1000 psi
Outgassing (postcure):	0.70% 1000 hrs @125°C
Thinner:	Butyl carbitol acetate or butyl cellosolve acetate
Serv. Temp. Range:	-65°C to +200°C

12640	Gold Epoxy Paste	2 g
12685-25	Gold Thinner(Butyl Carbitol Acetate)	25 ml

► EMS Conductive Gold-Paste

This EMS Conductive Gold-Paste is a one part adhesive. Fast drying – dries at room temperature. Maximum service temperature is 65°C. This adhesive is not for permanent use, useful for testing and temporary work where a high signal is required from the adhesive.

Gold content is ~75%, including sphere sizes < 2 µm, and flake size <10 µm, in organic binders and a solvent. Keep refrigerated for good shelf life.

Sheet resistance is 0.02 to 0.05 ohm-cm @ 1 mil thickness.

12642	EMS Conductive Gold-Paste	2 gm
12643	Conductive Gold-Paste Extender	25ml

► Two Part Conductive Silver Epoxy

This electrically conductive silver epoxy is used for adhering samples as well as solderless

connections such as bonding in electric design, prototype and repair work, circuit board repair, surface mount connections, static discharge, shielding and grounding. It is also ideal for the bonding of heat sensitive components. Its curing time is within ten minutes at 100°F (38°C), or at room temperature. Conductivity is 0.001 ohm/cm.

12642-14	Two Part Silver Epoxy	14g/kit
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► Conductive Silver Pen

This pen is designed for making instant conductive

silver traces. It is ideal for applying samples to SEM stubs. A unique valve tip allows for very smooth flow with normal writing pressure and it is spring loaded to prevent clogging. For conductivity traces, solderable terminations are possible using a 250°F cure for 15-20 minutes. Tin, lead, or silver solder can be used (Do not exceed 350°F for more than 5 seconds). Each pen is filled with approximately 100 feet of traces. Silver content: 39-45% with less than 10 micron diameter. The thinner that is used for this pen is Butyl Acetate.

12644-01	Conductive Silver Pen, Standard Tip	each
12644-02	Conductive Silver Pen, Micro Tip	each



► Flex Conductive Pen

This micro-tip pen is used for drawing flexible conductive silver traces on Mylar® and any flex

circuitry. Dries in minutes. 8.5g (0.3oz)

12645-01	Flex Conductive Pen	each
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► Opaque White, Extra Fine Pen

Permanently mark on nearly any surface in white color and the marking is waterproof. This pen is ideal for SEM, marking sample identification on carbon tabs, aluminum stubs, conductive tape or any similar surface. The pen contains xylene.

72168-01	Opaque White Pen	each
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► Graphite Spray

An easy to use graphite spray to coat small samples. Its electrical resistance is 1-2 Kohm/sq" at 1 mil thickness. It is fast drying and produces a very flat, thin, and uniform graphite film. Its service temperature is up to 204°C.

12648	Graphite Spray	450g
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► EPO-TEK – Epoxy Conductive Adhesive

► EPO-TEK® EE129-4

Epo-Tek® EE129-4 is a room temperature cure, silver-filled epoxy, designed for making electrical connection in SEM mounting sample, circuit assembly, semiconductor, LCD applications.

Epo-Tek® EE129-4 comes with two parts: A & B and mixing ratio is 1:1. Shelf life is one year at room temperature

Works well with surface like Au, Ag-Pd, Cu, brass, Kovar, stainless steel, as well as ceramic, PCB, solder masks, most plastic and glasses

- Low temperature cures capable from 23°C to 80°C.
- Suggested for cryogenic cooling applications
- Works well in SEM, microscopy applications
- Works well in aerospace hybrid circuits and ITO electrodes in LCD packaging and assembly
- Reasonable pot life of 3 hours, allows for preparation.
- Smooth thixotropic paste allows for many way of application

Maximum Bond Line Cure Schedules:

100°C.....	15 minutes	23°C.....	24 hours
80°C.....	1 hour	Pot Life.....	3 hours
70°C.....	2 hours		

Typical Properties *(to be used as a guide only, not a specification)*

Physical Properties:	
Color:	Part A – silver; Part B – silver
Consistency:	Smooth, thixotropic – 4000 cPs
Viscosity (@ 100 RPM / 23°C):	2,000 – 4000 cPs
Thixotropic Index:	4.6
Glass Transition Temp (Tg):	≥ 45°C (Dynamic cure 20 – 200°C / ISO 25 Min; Ramp -10 – 200°C @20°C/Min)
Coefficient of Thermal Expansion (CTE):	Below Tg: 30 x 10 ⁻⁶ in/in/°C Above Tg: 227 x 10 ⁻⁶ in/in/°C
Shore D Hardness:	63
Lap Shear Strength @ 23°C:	1,110 psi
Die Shear Strength @ 23°C:	≥ 5 kg / 1,700 psi
Weight Loss:	@200°C: 0.18%; @250°C: 0.54%; @300°C: 2.06%
Degradation Temp (TGA):	303°C
Operating Temp:	Continuous: -55°C to 150°C Intermittent: -55°C to 250°C
Storage Modulus @ 23°C:	156, 318 psi
Ion:	Cl ⁻ 223 ppm; Na ⁺ 26 ppm NH ₄ ⁺ 22 ppm; K ⁺ 12 ppm
Particle Size:	≤ 45 microns
Electrical Properties:	
Volume Resistivity @ 23°C:	≤ 0.0003 Ohm-cm
Volume Resistivity @ 23°C (23°C/24 hour cure):	0.01 Ohm-cm
Thermal Properties	
Thermal Conductivity:	1.60 W/mK

► EPO-TEK® H20E

Epo-Tek® H20E is a two component, 100% solid silver-filled epoxy system, silver-resin paste and liquid hardener, mixing ratio is 1:1.

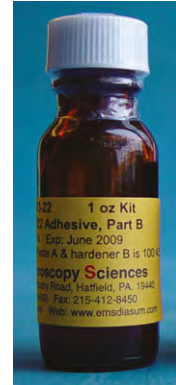
- Epo-Tek H22E features high thermal conductivity, and is very well suited for extensive high temperature applications (300 – 400°C)
- Epo-Tek H20E is also a conductive adhesive of choice for old or new applications.
- Its applications include: chip bonding and electronic bonding as well as SEM mounting.
- H20E contains no solvents and will not outgas.
- When cured, H20E is resistant to solvents, resin and moisture
- Long Pot life (2½ days)
- Shelf life is one year when store at 23°C

Maximum Bond Line Cure Schedules:

175°C.....	15 minutes	120°C.....	2 hours
150°C.....	1 hour	80°C.....	24 hours

Typical Properties *(to be used as a guide only, not a specification)*

Physical Properties:	
Color:	Part A – silver; Part B – silver
Consistency:	Smooth, thixotropic
Viscosity (@ 100 RPM / 23°C):	2,200 – 3,200 cPs
Thixotropic Index:	3.69
Glass Transition Temp (Tg):	≥ 80°C (Dynamic cure 20 – 200°C / ISO 25 Min; Ramp -10 – 200°C @20°C/Min)
Coefficient of Thermal Expansion (CTE):	Below Tg: 31 x 10 ⁻⁶ in/in/°C Above Tg: 158 x 10 ⁻⁶ in/in/°C
Shore D Hardness:	75
Lap Shear Strength @ 23°C:	1,475 psi
Die Shear Strength @ 23°C:	≥ 5 kg / 1,700 psi
Weight Loss:	@200°C: 0.59%; @250°C: 1.09%; @300°C: 1.67%
Degradation Temp (TGA):	425°C
Operating Temp:	Continuous: -55°C to 200°C Intermittent: -55°C to 300°C
Storage Modulus @ 23°C:	808, 700 psi
Ion:	Cl ⁻ 73 ppm; Na ⁺ 2 ppm; NH ₄ ⁺ 98 ppm; K ⁺ 3 ppm
Particle Size:	≤ 45 microns
Electrical Properties:	
Volume Resistivity @ 23°C:	≤ 0.0004 Ohm-cm
Thermal Properties	
Thermal Conductivity:	2.50 W/mK
Thermal Conductivity:	29 W/mK Based on Thermal Resistance Data: R=L x K-1 x A-1
Thermal Resistance:	(Junction to Case): TO-18 package with nickel-gold metallized 20 x 20 mil chips and bonded with Epo-Tek H20E (2 mil thick)
Epo-Tek®H20E:	6.7 to 7.0°C/W
Solder:	4.0 to 5.0°C/W

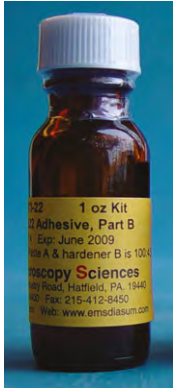


RT 12670-EE Epo-Tek® EE129-4 Adhesive 1 oz

RT 12671-20E Epo-Tek® H20E Adhesive 1 oz

continued >>>>

► EPO-TEK – Epoxy Conductive Adhesive (continued)



► EPO-TEK® H20S

Epo-Tek® H20S is a modified version of Epo-Tek®H20E. Epo-Tek® H20S is a highly reliable, two component, silver-filled epoxy with a smooth, thixotropic consistency (mixing ratio 1:1). This modified version offers high electrical conductivity, short curing cycles, proven reliability, and the convenient mix ratio, Epo-Tek® H20S is extremely simple to use. Epo-Tek® H20S pot life is 2.5 days and shelf life is one year when store at room temperature.

Maximum Bond Line Cure Schedules:

175°C	45 seconds
150°C	5 minutes
120°C	15 minutes
100°C	45 minutes
80°C	90 minutes

Typical Properties (to be used as a guide only, not a specification)

Physical Properties:	
Color:	Part A – silver; Part B – silver
Consistency:	Smooth, thixotropic – 4000 cPs
Viscosity (@ 100 RPM / 23°C):	1,800 – 2,800 cPs
Thixotropic Index:	5
Glass Transition Temp (Tg):	≥ 80°C (Dynamic cure 20 – 200°C / ISO 25 Min; Ramp -10 – 200°C @20°C/Min)
Coefficient of Thermal Expansion (CTE):	Below Tg: 31 x 10 ⁻⁶ in/in/°C Above Tg: 120 x 10 ⁻⁶ in/in/°C
Shore D Hardness:	57
Lap Shear Strength @ 23°C:	1,240 psi
Die Shear Strength @ 23°C:	≥ 5 kg / 1,700 psi
Weight Loss:	@200°C: 0.40%; @250°C: 0.60%; @300°C: 1.37%
Degradation Temp (TGA):	414°C
Operating Temp:	Continuous: -55°C to 200°C Intermittent: -55°C to 300°C
Storage Modulus @ 23°C:	339, 720 psi
Ion:	Cl ⁻ 162 ppm; Na ⁺ 0 ppm NH ₄ ⁺ 282 ppm
Particle Size:	≤ 20 microns
Electrical Properties:	
Volume Resistivity @ 23°C:	≤ 0.0005 Ohm-cm
Thermal Properties	
Thermal Conductivity:	3.25 W/mK

► EPO-TEK® H22

Epo-Tek® H22 is a two component, silver-filled epoxy system. Mixing ratio of silver resin paste and liquid hardener is 100:4.5. Pot life 16 hours, and shelf life is 6 months at room temperature.

- Smooth, free-flowing, slightly thixotropic paste
- High Tg allows it to be used for high temperature applications ≤300°C)
- Contains no solvents – It is a NASA approved low outgassing epoxy.
- Excellent resistance to solvents, chemicals and moisture
- Extended pot life and fast curing at low temperature <100°C
- Designed for die bonding and sealing hybrid circuit. Recommended for SEM small angle cleavage and wafer bonding.

Maximum Bond Line Cure Schedules:

150°C.....	5 minutes
120°C.....	10 minutes
100°C.....	20 minutes
80°C.....	45 minutes

Typical Properties (to be used as a guide only, not a specification)

Physical Properties:	
Color:	Part A – silver; Part B – amber
Consistency:	Smooth, flowing paste
Viscosity (@ 100 RPM / 23°C):	12,000 – 20,000 cPs
Thixotropic Index:	2.36
Glass Transition Temp (Tg):	≥ 100°C (Dynamic cure 20 – 200°C / ISO 25 Min; Ramp -10 – 200°C @20°C/Min)
Coefficient of Thermal Expansion (CTE):	Below Tg: 39 x 10 ⁻⁶ in/in/°C Above Tg: 224 x 10 ⁻⁶ in/in/°C
Shore D Hardness:	80
Lap Shear Strength @ 23°C:	1,980 psi
Die Shear Strength @ 23°C:	≥ 5 kg / 1,700 psi
Weight Loss:	@200°C: 0.09%; @250°C: 0.23%; @300°C: 1.42%
Degradation Temp (TGA):	454°C
Operating Temp:	Continuous: -55°C to 250°C Intermittent: -55°C to 350°C
Storage Modulus @ 23°C:	540, 120 psi
Ion:	Cl ⁻ 175 ppm; Na ⁺ 60 ppm NH ₄ ⁺ 148 ppm; K ⁺ 6 ppm
Particle Size:	≤ 45 microns
Electrical Properties:	
Volume Resistivity @ 23°C:	≤ 0.005 Ohm-cm
Thermal Properties	
Thermal Conductivity:	.94 W/mK

RT 12672-20S Epo-Tek® H20S Adhesive 1 oz

RT 12673-22 Epo-Tek® H22 Adhesive 1 oz

► Loctite Adhesives

Loctite 409™ Super Bonder®

For a general-purpose gel adhesive, clear, gap fills 0.010"; surface insensitive Ethyl, tensile shear strength 3,200 psi, and temperature range -65°F to 180°F. Cure speed: fixture - 75 seconds, full - 24 hours.

Loctite 454™ Prism®

For use with porous surfaces, clear, gap fills 0.010", surface insensitive Ethyl, gel type, tensile shear strength 3200 psi, temperature range -65°F to 180°F. Cure speed: fixture - 15 seconds, full - 24 hours.

Loctite 4861™ Prism®

For use with flexible surfaces, clear, gap fill 0.008", surface flexible Alkyl, viscosity 4,000 cP, tensile shear strength 2465 psi, temperature range -65°F to 212°F. Cure speed: fixture - 25 seconds, full - 24 hours.

Loctite 349™ Impruv®

For bond glass/metal, appearance: clear/straw, cure type: UV, viscosity: 9,500cP, shore hardness: D70, temperature range: -65°F to 266°F

Loctite 4011™ Prism®

Designed for the assembly of difficult-to-bond materials, such as wood, paper, leather and fabric. Suitable for use in the assembly of disposable medical devices. The product provides rapid bonding of a wide range of materials, including metals, plastic and elastomers. Cure speed: 2 to 20 seconds depending on the material.

Chemical type: Ethyl cyanoacrylate, transparent, colorless to straw colored fluid. One part required no mixing. Low-viscosity (100 cP). Cure by humidity, and temperature range -65°F to 180°F

RT	72570-09	Loctite Super Bonder 409	3 g Tube
RT	72571-54	Loctite Prism 454 Adhesive	3 g Tube
RT	72572-61	Loctite Prism 4861 Adhesive	20 g
RT	72582-01	Loctite 349 Impruv Adhesive	50 ml
RT	72573-11	Loctite Prism 4011 Adhesive	20 g

Loctite 404 Quick Set Tissue Adhesive

This adhesive is perfect for those applications where a quick-curing adhesive is needed. Comes in an applicator-tipped bottle, 0.33 oz. (10ml).

RT 12687-01 Loctite 404 Quick Set Tissue Adhesive 10ml



Loctite™ 460 Adhesive

Our Loctite™ 460 is a quick curing low viscosity glue that can be used for mounting samples to any substrate (glass, metal and/or plastic). It is soluble in acetone. Comes in an applicator-tipped plastic bottle — 20 g.

RT 12646-08 Loctite™ 460 Adhesive each



Loctite® Fixmaster® Poxy Pak™, Fast Cure Epoxy

This fast cure, general purpose epoxy bonds virtually any material. It will also fill or seal cracks and rebuild worn surfaces. Comes in a 1 oz. syringe with a built-in plunger for easy dispensing without equipment. Working time is approximately 4 minutes. Includes nozzle and mixing stick. This unique adhesive may be made electrically conductive with the addition of any conductive powder (Silver, Carbon etc.)

RT 12646-09 Loctite® Fixmaster® Poxy Pak™, Fast Cure Epoxy each



► Krazy Glue™ Pen

The one we all know and have used. Ready to use. Requires no mixing or preparation. This pen contains cyanoacrylate. Clear in color and bonds immediately. Comes in a 3g tube.

RT 12646-05 Krazy Glue™ Pen each



► Mikrostik™ Adhesive, Non-Conductive

Fast drying, ultrathin clear adhesive suitable for mounting small particles which can be submerged in other adhesives. It can be diluted with methyl ethyl ketone. Quick-drying. Comes in a bottle with an applicator brush. 14 ml.

12646-01 Mikrostik™ Adhesive, Non-Conductive 14ml



► SEM Specimen Preparation Stand

Specimen mounts of different sizes are placed in the outer ring of the holder base. The center hole of the base will hold a bottle of conductive adhesive. One side of the base takes 10 of the 1/8" pin mounts; reverse side takes 10 of 10 to 15mm diameter mounts.



76750 1/8" SEM Preparation Stand each

► Adhesive Tabs

Press these self-sticking adhesive tabs to the surface of an SEM mount, then lift off tab for applying the sample. Each box contains 72 sheets of 36 tabs each. Tab measures 12mm in diameter. Non-conductive.



76760 Adhesive Tabs 2592 tabs/box

► Conductive "Lift-N-Press" Adhesive Tabs

This 1/2" (12mm) diameter conductive tabs are similar to our adhesive tabs, but they work like carbon adhesive tabs. Just remove tab from the roll, press onto surface where you want the film, lift "tab" and peel it off. The tabs can be cut to desired size before being removed from its backing, for use on smaller samples.



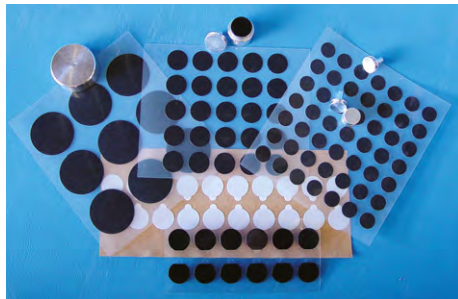
FEATURES:

- Smoother background – Over 99% transparent to EDS
- High strength adhesive
- Better particle detection
- Adhesive only 0.002" thick
- Content a traces of nickel (<0.6%) and copper (<0.3%)
- 250 tabs per roll.
- An affordable double-sided conductive tab for all SEM samples.

76762-01 Conductive Adhesive Tabs 250/roll

► Conductive Carbon Adhesive Tabs

Standard Carbon Conductive Adhesive Tabs – Tabs are formed by two sides of thick conductive adhesive (45 µm on each side) with the center conductive core film (35 µm). With the total thickness of 125 µm, these tabs will offer reasonably firm, smooth surfaces for a variety SEM applications, including gunshot residue analysis. Tabs are protected by white liners, which do not have to be removed when samples are ready to be mounted.



- No out-gassing
- Conductive adhesive is carbon filled acrylic glue
- Solvent free
- Adhesive can be removed by ethyl acetate, ethanol, isopropyl alcohol or alcohols
- Service temperature is up to 60°C (140°F)

Tabs contain some traces of Si, Sb, S, Fe, Mg, Na.

Thick Carbon Conductive Tabs or Image Tabs – The stiff and smooth surface conductive tabs are 260 µm thick, including 200 µm thick conductive carbonate base, coated 30 µm thick on each side with conductive adhesive. However, these tabs are not as conductive and sticky as the Standard Carbon Conductive Tabs. Thick Carbon Conductive Tabs are used for photographic background as well as for Jet Scan applications, where the tabs must be removed and filed away.

Ultra-Thin Carbon Conductive Adhesive Tabs – These tabs have Core material which is nonconductive cloth (70 µm) with Carbon Filler Conductive Adhesive (2 x 45µm). Total thickness is 160 µm.

Spectro Grade Carbon Adhesive Tabs – High purity conductive carbons for less interference signals, such as X-Ray analysis.

Ultra-Smooth Carbon Adhesive Tabs – Carbon adhesive tabs that eliminate issues with rough surfaces, insufficient tackiness, and hardness with significantly lower contaminant levels under EDS. Tabs are made in USA and very popular, and may be used in place of other conductive adhesive in many applications in conventional and field emission microscopes. They are also widely used in forensic laboratories for study of gunshots residues. Without the addition of conductive coating, small nonconductive particles can often be imaged and X-Ray analyzed, cutting down your analysis time. These tabs are composed of a thin film of strong adhesive approximately 1/2" diameter. Over 99% transparent to EDS, with a very small amount of nickel (0.6%) and copper (< 0.3%).

Refrigeration will increase shelf life but tabs need to be warmed up to room temperature before use (usually more than one hour)

Cat. #	Description	Qty.
77825-06	Standard Carbon Adhesive Tabs, 6mm Dia.	100/pk.
77825-09	Standard Carbon Adhesive Tabs, 9mm Dia.	98/pk.
77825-12	Standard Carbon Adhesive Tabs, 12mm Dia.	100/pk.
77825-25	Standard Carbon Adhesive Tabs, 25mm Dia.	54/pk.
77824-12	Thick Carbon Conductive Tabs, 12mm Dia.	100/pk.
77825-12-SP	Ultra Thin Carbon Adhesive Tabs, 12mm Dia.	200/pk.
77826-12	Spectro Grade Carbon Adhesive Tabs, 12mm Dia.	120/pk.
77827-12	Ultra-Smooth Carbon Adhesive Tabs, 12mm	100/pk.
77827-25	Ultra-Smooth Carbon Adhesive Tabs, 25mm	50/pk.

► Low Temperature Hot Glue Gun

This low temperature mini glue gun is safe and allows for the easy application of the melt glue to the aluminum stub for the mounting of bulk or irregular shaped specimens for SEM. Comes complete with a 40" cord, and two glue sticks. Accepts 3/16" diameter all temperature or low temperature glue sticks. 110 volt, 10 watts.



72171-00	Low Temp Hot Glue Gun	each
72171-10	Low-Temp Glue Sticks	10/pk

► Rubber Cement

Excellent adhesive for all paper pasting and mountings of drawings and photographs. It is also used to adhere specimens to SEM Stubs. Any excess cured cement can be easily removed. A 4 oz bottle comes with a brush in the cap.



72170	Rubber Cement	each
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TECHNICAL TIP

THE MOUNTING OF SPECIMENS FOR SEM WITH THE COMMON GLUE GUN

Specimens are usually attached to SEM stubs by means of either sticky tape, adhesives, or melt adhesives.

- Sticky tapes are very convenient and fast; but the bonds formed are not strong or stable. In addition, it is difficult to attach large, bulk, and irregular shaped specimens with tape.
- Adhesives, usually solvent based, can form strong bonds, however, for the satisfactory operation of the coater and the SEM, the solvent must be evaporated completely which can take a considerable amount of time.
- Melt adhesives can set up strong bonds very quickly, however, the procedure for its use is cumbersome.

Mounting with melt adhesives using a common glue gun is quicker and more convenient. Several glue guns were examined and tested. The temperature at the nozzle of conventional glue guns was found to be between 180-195°C which could cause damage to heat-sensitive specimens.

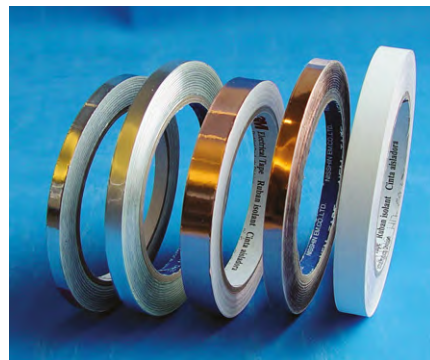
However, now there is a so-called low temperature glue gun and adhesive (see New Products, Section III in this N/V) that overcomes this problem. The nozzle temperature measures only at 106°C. The general procedure is very simple: the melt is dispersed from the nozzle directly onto the surface of a stub. While the adhesive is still molten or soft, the specimen is applied to it, forming a strong bond quickly. The specimen can be repositioned by softening the adhesive with the hot nozzle of the glue gun.

There is no evidence of any degassing of the melt adhesive in either the sputter coater or the SEM. The glue gun can also be used in mounting granular or powdered specimens. A drop of melt adhesive is deposited and smeared onto the stub. The granular or powdered specimen is adhered to the adhesive by either sprinkling or dipping it.

G.W. Bailey, and J.A. Small, Editors, Proc. 50th Annual Meeting of the EMSA/MAS/MSC/SMC. (1992) pg. 410-411.

► Conductive Adhesive Tapes

► 1) Scotch Conductive Tapes:



We offer two types of foil: Aluminum foil tape (Scotch 1170) and copper foil tape (Scotch 1181) with conductive adhesive. 3" core, 1/4" (6.35mm) width x 54 ft (16.5m) long

Technical Data	Copper	Aluminum
Foil Thickness, mils	1.4	2
Total Thickness, mils (mm)	3(.076)	4(.102)
Adhesion oz/In (N/10mm)	35(3.81)	35(3.81)
Electrical Resistance		
Through Adhesive ohm/in(ohm/cm)	.005(.032)	.01(.07)
Continuous Long Term °C	155°	155°
Functional Days-Weeks °C	175°	175°

77800	Aluminum Tape, Single Sided 1/4" x 18yds	1 roll
77799	Aluminum Tape, Single Sided 1/2" x 18yds	1 roll
77798	Aluminum Tape, Single Sided 1" x 18yds	1 roll
77801	Copper Tape, Single Sided 1/4" x 18yds	1 roll
77802	Copper Tape, Single Sided 1/4" x 18yds	1 roll

Double Sided Copper Conductive Tape

With the same technical properties of our 77802 shown above this conductive tape is 12.7mm(W)x16.4m(L).

77802-22 Copper Conductive Tape, Double Sided each

► 2) SEM Conductive Tapes:



Technical Data	Cu Contained Nickel Tape	Al Contained Nickel Tape
PAD	Pressed thin Cu	Pressed thin Al
Overall Thickness	0.075mm	0.09mm
PAD	0.035mm	0.05mm
Adhesive	0.040mm	0.04mm
Conductive resistivity	0.004ohm/sq. Inch	0.008ohm/sq. Inch
Adhesive Power/25mm width	920 gf	840 gf
Capacity after 60 min	0.1mm	0.1mm

We now offer a new line of conductive tapes, that are electrically conductive and offer a clean background. They were developed especially for SEM.

77810	Copper/Nickel Tape	each
77811	Copper/Nickel Tape	5 Rolls/pk
77813	Aluminum/Nickel Tape	each
77814	Aluminum/Nickel Tape	5 Rolls/pk

► 3) Double Sided Carbon Tape

With carbon double-sided tape, small particle sizes, such as 15-20 microns, can be mounted on the adhesive and produce good background structure. Our Double sided Carbon tape is also available in five widths to accommodate varying specimen mount surface sizes and applications.

Double sided Carbon Tape	
PAD	Isolate unwoven cloth
Overall Thickness	0.16mm
PAD	0.07mm
Adhesive	0.045mmx2
Conductive resistivity	50ohm/sq. Inch
Adhesive Power/25mm width	1,000 gf
Capacity after 60 min	0.2mm

77816	Double Sided Adhesive Carbon Tape 8mm(W) x 20m(L) (5/16" x 65)	each
77817	Double Sided Adhesive Carbon Tape 8mm(W) x 20m(L) (5/16" x 65)	5 Rolls/pk
77817-05	Double Sided Carbon Tape, 5mm(W)x20m(L)	each
77817-12	Double Sided Carbon Tape, 12mm(W)x20m(L)	each
77817-20	Double Sided Carbon Tape, 20mm(W)x20m(L)	each
77817-50	Double Sided Carbon Tape, 50mm(W)x20m(L)	each

Same as above however with Aluminum base as opposed to the unwoven base above. Offers a smoother surface

77817-05-AI	Double Sided Carbon Tape, 5mm(W)x20m(L)	each
77817-08-AI	Double Sided Carbon Tape, 8mm(W)x20m(L)	each
77817-12-AI	Double Sided Carbon Tape, 12mm(W)x20m(L)	each
77817-20-AI	Double Sided Carbon Tape, 20mm(W)x20m(L)	each
77817-50-AI	Double Sided Carbon Tape, 50mm(W)x20m(L)	each

► 3a) Carbon Conductive Tape, Double Coated

EMS introduces this unique double sided carbon tape which is 260 microns in thickness. The base which is Polycarbonate and 200 microns thick has on both of its sides 30 microns of conductive glue giving it a total thickness of 260 microns. The tape has one transparent liner on one side and a white thicker one on the reverse which protects the tape in shipping.

Specifications:

Core Diameter:	3" (76mm)
Adhesive:	Carbon Filled Acrylic Glur
Remover:	Ethyl acetate, ethanol, isopropanol and or alcohol
Temperature:	60°C(140°F)-Maximum
Impurities:	Cu, Si, Sb, S, Na, P, Fe and Mg*

* These are considered to be small impurities but they may be present

77819-12	Double sided Carbon Conductive Tape, 12mm (W) x 5m (L)	each
77819-25	Double Sides Carbon Conductive Tape, 25mm (W) x 5m (L)	each
77819-65	Carbon Conductive Tape in sheet form, 65mm (W) x 300mm (L)	each

► 4) Double Sided Conductive Cohesive Sheets



Features:

- Minimum impurities - Maximum conductivity.
- Produces minimum gas under vacuum conditions.
- Easy handling.

These conductive cohesive sheets offer good adhesion to the specimen and yield good conductivity and background structures, even with particles as small as 15 microns.

Sheet size: 5cm(W)x12cm(L)

Technical Data	Thickness	Adhesive Power	Conductive Resistivity
Silver Sheet	0.13mm	880 gf/25mm	0.00ohm/5mm ²
Carbon Sheet	0.16mm	1,100 gf/25mm	4,000ohm/5mm ²
77820	Silver Cohesive Sheet		5/pk
77822	Carbon Cohesive Sheet		10/pk
77822-01	Carbon Cohesive Sheet (Technical Grade)		10/pk

► XYZ-Axis Electrically Conductive, 3M™ Double Sided Tape 9712



3M™ XYZ-Axis Electrically Conductive Tape 9712 is an isotropically conductive pressure sensitive tape. The tape consists of a 3M adhesive loaded with conductive fibers. The result is a double-sided tape providing both good adhesion and good electrical performance with very high conductivity.

The 9712 Tape is an excellent choice when needing to bond your samples for all SEM work.

Specification:

Adhesive Type:	Filled Acrylic
Filler Type	Conductive Fibers
Release Liner	Silicone treated PolyCoated Kraft Paper
Remover:	Acetone
Thickness Approximate:	Tape Only; .005" (.127mm) Release Liner; .004" (.010mm)
Temperature Range:	Short Term Exposure; 250°F (121°C) Long Term Exposure; 158°F (70°C)

Electrical Properties: Contact Resistance

Substrate Tested			
Aluminum/ Aluminum	Aluminum/ Stainless Steel	Copper/ Aluminum	Copper/ Copper
<24Ω	<21.5Ω	<16Ω	<.66Ω

Based upon four wire (Kelvin probe) resistance measurements made with crossed pieces of Foil/Type 9712 or 9713/Rigid plate construction using a 1.0" x 1.0" square piece of 3M tape Type 9712 or 9713. The rigid metal surface was prepared with a Scotch-Brite™ pad to roughen the surface and cleaned with isopropyl alcohol.

Adhesion Properties:

Substrate	Adhesion in oz./in(g/cm)			
	20 Min at 72°F (22°C)	24 Hours at 72°F (22°C)	20 Min at 158°F (70°C)	24 Hours at 72°F (22°C)
Stainless Steel	>41(457)	>42(468)	>43(479)	>53(590)
Aluminum	>35(390)	>33(367)	>36(401)	>43(479)
Copper	>47(412)	>39(434)	>43(479)	>55(613)

The tape is available in 3 sizes and it comes on a 3" Core(76mm)

Cat. #	Description	Qty
77808-63	XYZ-Axis Electrically Conductive, 3M™ Double Sided Tape, 9712, 6.35mm (W) x 32.9m (L)	each
77808-12	XYZ-Axis Electrically Conductive, 3M™ Double Sided Tape, 9712, 12.7mm (W) x 32.9m (L)	each
77808-25	XYZ-Axis Electrically Conductive, 3M™ Double Sided Tape, 9712, 25mm (W) x 32.9m (L)	each

► XYZ-Axis Electrically Conductive, 3M™ Double Sided Tape 9713



3M™ XYZ-Axis Electrically Conductive Tape 9713 is an isotropically conductive pressure sensitive tape. 3M tape 9713 conducts electricity through the thickness (Z-axis) and in the plane of the adhesive (X, Y planes) and is ideal for EMI/RFI shield and EMI/RFI gasket attachment to metal surfaces.

The tape consists of a high performance 3M adhesive loaded with conductive fibers. The result is a double-sided tape providing both good adhesion and good electrical performance. The conductive fibers in 3M tape 9713 also provide improved handling characteristics. The 9713 Tape is an excellent choice when needing to bond your samples for all SEM work

Specification:

Adhesive Type:	Filled Acrylic
Filler Type	Conductive Fibers
Release Liner	Silicone treated PolyCoated Kraft Paper
Remover:	Acetone
Thickness Approximate:	Tape Only; .0035" (.0889mm) Release Liner; .004" (.010mm)
Temperature Range:	Short Term Exposure; 250°F (121°C) Long Term Exposure; 158°F (70°C)
Outgassing:	Total Mass Loss (TML); 1.60%
(ASTM E-595)	Collected Volatile Condensed Materials (CVMC); 0.03%
	Water Vapor Recovered (WVR) 0.36%

Electrical Properties: Contact Resistance

Substrate Tested			
Aluminum/ Aluminum	Aluminum/ Stainless Steel	Copper/ Aluminum	Copper/ Copper
<2.5Ω	<2.0Ω	<1.0Ω	<0.5Ω

Based upon four wire (Kelvin probe) resistance measurements made with crossed pieces of Foil/Type 9712 or 9713/Rigid plate construction using a 1.0" x 1.0" square piece of 3M tape Type 9712 or 9713. The rigid metal surface was prepared with a Scotch-Brite™ pad to roughen the surface and cleaned with isopropyl alcohol.

Adhesion Properties:

Substrate	Adhesion in oz./in(g/cm)				
	15 min. at 72°F (22°C)	1 hr. at 72°F (22°C)	24 hr. at 72°F (22°C)	1 hr. at 158°F (70°C)	24 hr. at 158°F (70°C)
Stainless Steel	> 30 (335)	> 45 (502)	> 50 (558)	> 50 (558)	> 55 (613)
Aluminum	> 20 (223)	> 35 (390)	> 40 (446)	> 40 (446)	> 55 (613)
Copper	> 20 (223)	> 40 (446)	> 45 (502)	> 40 (446)	> 60 (669)

The tape is available in 5 sizes and it comes on a 3" Core(76mm)

Cat. #	Description	Qty
77809-12	XYZ-Axis Electrically Conductive, 3MTM Double Sided Tape, 9713, 12.7mm (W) x 32.9m (L)	each
77809-25	XYZ-Axis Electrically Conductive, 3MTM Double Sided Tape, 9713, 25mm (W) x 32.9m (L)	each
77809-100	XYZ-Axis Electrically Conductive, 3MTM Double Sided Tape, 9713, 100mm (W) x 32.9m (L)	each
77809-60	XYZ-Axis Electrically Conductive, 3MTM Double Sided Tape, 9713, 0.61m (W) x 98.6m (L)	each
77809-61	XYZ-Axis Electrically Conductive, 3MTM Double Sided Tape, 9713, 0.61m (W) x 32.9m (L)	each

➤ Z-Axis Electrically Conductive, 3M™ Double Sided Tape, 9703



3M™ Electrically Conductive Adhesive Transfer Tape 9703 is a pressure sensitive adhesive (PSA) transfer tape with anisotropic electrical conductivity. The PSA matrix is filled with conductive particles which allow interconnection between substrates through the adhesive thickness (the "Z-axis") but are spaced far enough apart for the product to be

electrically insulating in the plane of the adhesive. The PSA tack properties and lack of any thermal curing make tape 9703 easy to use in all applications requiring a conductive tape.

Specification:

Adhesive Type: Filled Acrylic Pressure Sensitive
 Release Liner: Silicone treated PolyCoated Kraft Paper
 Remover: Acetone
 Temperature Range: Short Term Exposure; 250°F (121°C)
 Long Term Exposure; 158°F (70°C)
 Outgassing: Total Mass Loss (TML): 0.7%
 (ASTM E-595)

The tape is available in 2 sizes and it comes on a 3" Core (76mm)

Cat. #	Description	Qty
77809-70	Z-Axis Electrically Conductive, 3MTM Double Sided Tape 9703, 6.35mm x 32.9m (1/4" x 36yds)	each
77809-80	Z-Axis Electrically Conductive, 3MTM Double Sided Tape 9703, 12.7mm x 32.9m (1/2" x 36yds)	each

➤ Scotch Double Sided Tape:

➤ 1) Without backing paper: Scotch 665

This is a non-conductive transparent tape with adhesive on both sides. There is no liner to remove and it is long lasting for permanent applications. 3" (77mm) core.



Cat. #	Description	Qty
77100	3M® 665, Double Sided, 1/4" W x 36yds (6.4mm x 32.9m)	each
77110	3M® 665, Double Sided, 1/4" W x 36yds (6.4mm x 32.9m)	5/box
77101	3M® 665, Double Sided, 3/8" W x 72yds (9.5mm x 65.8m)	each
77102	3M® 665, Double Sided, 3/4" W x 36yds (19mm x 32.9m)	each

➤ 2) With paper liner: Scotch 666

This is a non-conductive transparent tape with adhesive on both sides and white paper as a liner, which is slit in the center to facilitate its removal. This produces good adhesion and cleanliness. Comes 3 rolls inside a protective box, 3" core, 1/4" (6.35mm) W x 36 yds (32.9m) L.

Cat. #	Description	Qty
77115	3M® 666, Double Sided, 1/4" W x 72yds (6.4mmx32.9m)	each
77116	3M® 666, Double Sided, 1/4" W x 36yds (6.4mmx32.9m)	5/pk
77117	3M® 666, Double Sided, 3/8" W x 36yds (9.5mmx32.9m)	each
77118	3M® 666, Double Sided, 3/4" W x 36yds (19mmx32.9m)	each
77119	3M® 666, Double Sided, 1" Wx36yds (25.4mm x 32.9m)	each

➤ Disc (Tab) Punches

Produces discs (tabs) from sheet materials. Ticket punching type. Comes with adjustable side gauge for centering hole, 2" maximum reach. Weight 10 oz., 6 1/2" long. Useful for punching adhesive tabs for specimen mounts, or producing circle cover slips from ACLAR® films (EMS #50425 or #50426) for growing cells. Maximum thickness for punching is up to 67-mil (1.7 mm). Disc size available: 5/16", 3/8", 1/2" and 1". Complete unit includes one punch handle and one punching die.



77850-08	Punch, 5/16" (7.94 mm) Circle	each
77850-09	Punch, 3/8" (9.54 mm) Circle	each
77850-12	Punch, 1/2" (12.7 mm) Circle	each
77850-25	Punch, 1" (25.4 mm) Circle	each

Targets, See Vacuum Pumps, Acc. & Evaporation Supplies, page 962 >>>>



➤ X-Checker™

The X-Checker was the first and remains the only complete calibration aid for SEM/EDS Systems. When time is short but you want to know how well your system is performing you need the X-Checker. Each X-Checker comes with the following:

- Manganese to measure full width at half max detector resolution
- Aluminum and copper to perform spectral calibration.
- Carbon to monitor calibration at the low end of the spectra for thin window detectors.

You also get two grid sizes for checking the accuracy of your image analysis software and an easy test for monitoring the amount of vacuum pump oil contamination on your detector window.

- The X-Checker™ BN comes with boron nitride for those who need a more sensitive monitor of low end performance on thin window and windowless detectors.
- The X-Checker™ Extra is the ultimate performance monitor for the latest state of the art X-ray detectors. In addition to the standard features and boron nitride, there is a fluorine source to test resolution at the fluorine K-alpha peak (industry standard for measuring low end resolution). As well it comes with a beryllium grid for the ultimate test of detector performance.

80058-ST	X-Checker™, Standard	each
80058-BN	X-Checker™, With Boron Nitride	each
80058-EX	X-Checker™, Extra	each



QUANTOMIX™

- Attain EM-level imaging of wet samples
- Eliminate artifacts & time-consuming sample preparation
- Achieve reliable, reproducible & quantifiable results
- The biggest breakthrough is coming in a nano-package

QuantomiX WETSEM™ Technology

A MINI-GUIDE TO WETSEM™ TECHNOLOGY

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QuantomiX WETSEM™ – A Technological Breakthrough

Introduction

Electron Microscopy Sciences and Quantomix have joined forces here in The United States to market and sell the breakthrough solutions of Quantomix's proprietary WETSEM™ Technology. This technology enables scanning electron microscopes (SEM) to image and analyze wet samples such as cells, tissue biopsies, foods and ink, in their native environment. Eliminating the need for time-consuming preparation procedures, the WETSEM™ Technology ensures that sample integrity is not compromised by artifacts. QuantomiX innovative technology opens new opportunities for application specific tools to improve drug discovery, and advances treatment and diagnostic solutions for the medical and pharmaceutical markets.

WETSEM™ Technology

Electron Microscopy (EM) is a prime tool for high-resolution imaging, which has been the cornerstone of our understanding of living organisms and our material environment.

Because EM requires samples to be placed in a vacuum, it does not lend itself for use with wet samples. In the 50 years since its development, this drawback has been a major impediment in the use of EM for biomedical research, and for many clinical and industrial applications.

Light Microscopy, on the other hand, requires only minimal sample preparation. However, the resolution of light microscopy is limited to a few hundred nanometers.

The revolutionary technology of QuantomiX solves the problem of preparing wet samples for high-resolution imaging. It closes the resolution gap between conventional electron microscopy and light microscopy and offers the convenient sample preparation of light microscopy.

For the first time, rapid and routine EM imaging of biological samples in a wet environment is now possible without the artifacts normally associated with sample preparation.

Concept

The New QX capsule completely isolates wet samples from the vacuum in the microscope chamber. This makes possible the imaging of fully hydrated samples- including food, cosmetics, ink, human, animal, plant, and microbial cells, tissues, and fluids-at resolutions unachievable with light microscopy. The QX capsule fits the standard SEM specimen stage.

The capsule combines the function of a specimen holder, cell culture dish, or a tissue specimen holder with an electron transparent, vacuum tight window. This unique receptacle permits electron microscopy of samples held in water or any other liquid medium at atmospheric pressure.

Imaging of samples in the QX capsule can be accomplished with backscattered electron detection, x-ray detection, or light detection, to reveal structure as well as material composition.

Advantages

- Artifacts associated with sample preparation techniques are eliminated.
- Sample preparation time drastically reduced or completely eliminated.
- Direct imaging of wet samples (food, cosmetics, inks, cells, tissues).
- Compositional analysis of wet samples by X-ray microanalysis.
- Wide spectrum of staining and labeling capabilities for cells and tissues.
- Ability to image unstained or unfixed cells and tissues.
- Imaging of both adherent and non-adherent cells.
- High resolution histopathology.
- Intracellular imaging in a scanning EM.
- Imaging the entire cell surface.
- Excellent preservation and imaging of lipid structures.
- Easy-to-automate sample processing and imaging.
- Ability to work with a variety of sample consistencies (pastes, foam, creams, emulsions, etc.).

Features

- Direct imaging of all types of wet samples, including suspensions, emulsions, creams, cells, and tissues.
- Rapid and simplified sample preparation.
- Compositional analysis of wet samples by X-Ray analysis.
- Excellent preservation and imaging of lipid structures.
- Easy to automate sample processing and imaging.
- Utilizes SEM backscattered electron imaging based on atomic number difference.
- Compatible with light microscopy for comparative studies.
- Single use.

WETSEM™ Product Listings

► QX-102 Capsules



The QX-102 Capsules are used for imaging various wet materials and biological samples, such as liquid samples (foods, cosmetics, oils, paints, etc.), particles in solutions, adherent and non-adherent human and animal cells, and microorganisms. The samples can be visualized either directly or by following appropriate contrast enhancement staining or labeling procedures. The capsule serves as a cell culture dish, specifically designed for the SEM. No coating or embedding of the sample are required, enabling electron microscopy imaging with easy sample preparation comparable to light microscopy.

The QX-102 Capsules are supplied sterile for single use in boxes of 24.

Cat. #	Description	Pack
QX-102-24	Cell biology and general liquid	24/pkg

ACCESSORIES FOR THE QX-102 CAPSULES:



► MP-10 Multi-well Plate

The Multi-well Plate is designed to enable parallel handling of multiple QX-102 Capsules. It serves as a well plate for holding the capsules during various manipulations, for culturing cells in QX-102 Capsules, and for inspection in an inverted light microscope. The Multi-well Plate is specially designed to maintain humidity of the samples during incubation,

and is compatible with standard laboratory equipment.

The Multi-well Plates are supplied sterile for single use in boxes of 2.

Cat. #	Description	Pack
MP-10-2	Multi-well Plate	2/pkg

► MA-4 Multi-well Aspirator

The Multi-well Aspirator system is designed to safely and conveniently aspirate liquids from the QX-102 capsules, and is required for applications that need liquid exchange in capsules during sample preparation or cell culturing.

The multi-well aspirator drains liquids simultaneously from up to four capsules placed in a row in the MP-10 Multi-well Plate.



Cat. #	Description	Pack
MA-4	Multi-well Aspirator	each

► QX Aspirator Tips

The QX Aspirator Tips are used to safely and conveniently aspirate liquids from an individual QX-102 capsule with a pipette. The tips fit on any standard pipette, and are designed to ensure safe liquid removal. In cases where multiple capsules will be used or multiple liquid exchanges are required, it is recommended to use the MA-4 Multi-well Aspirator, which drains liquids simultaneously from multiple capsules.

The QX Aspirator Tips are supplied sterile in boxes of 60.

Cat. #	Description	Pack
AT-60	QX Aspirator Tips	60/pkg

► QX Imaging Buffer

QX Imaging Buffer is a solution optimized for imaging samples in an SEM with QX-102 capsules and is formulated to minimize damage to the samples by the electron beam. It is applied on samples in the QX-102 capsules prior to SEM imaging.

The QX Imaging Buffer is supplied sterile and lyophilized.

Cat. #	Description	Pack
IB-64	QX-102 Imaging Buffer	each

► QX-102 Calibration Capsule

The QX-102 Calibration Capsule is a QX-102 Capsule that has been specially designed to assist first time users in finding optimal imaging conditions for WETSEM™ imaging in their SEM. The Calibration Capsule contains nanoparticles of two different sizes; 40 and 500 nm. The particles are easily visualized in an SEM and provide a convenient means to calibrate the parameters for optimal wet imaging conditions.

Cat. #	Description	Pack
RT-56	QX-102 Calibration Capsule	each

► PI-24 Particle Imaging Kit

When imaging particles with WETSEM™ Technology, image quality is dependent on the proximity of the particles to the QX-capsule membrane. The closer the particles are, the higher the resolution. Coating the membrane with a suitable charged polymer will attract particles to the membrane and improve the resulting image.

The particle imaging kit provides the WETSEM™ Technology user with the tools and reagents necessary to coat the QX-capsule membrane. Poly-L-Lysine is a positively charged polymer which will attract negatively charged particles. Poly [sodium 4-sulfonate] (PSS) is a negatively charged polymer which will attract positively charged particles. Aspirator tips are designed to safely aspirate the QX-102 capsules, without damaging the capsule membrane. Aspirator tip should be used with a standard calibrated pipette to aspirate liquids from the QX capsule liquid dish. To apply liquids into the liquid dish use conventional tips. The supplied distilled water is used to wash the membrane from residual reagents.

The kit contains:

- Aspirator Tips (24 units)
- Poly-L-Lysine 1% WT (1ml)
- Poly [sodium 4-styrenesulfonate] 0.3%WT (1ml)
- Distilled water (4ml)

Cat. #	Description	Pack
PI-24	Particle Imaging Kit	each

► QX-302 Capsules



The QX-302 Capsules are used for imaging various thick, non-adherent samples, such as tissue biopsies, plants and material specimens, in their natural wet state. The capsule is suitable for variable sample sizes, with a maximum diameter of 3mm and thickness of up to 1mm. No coating or embedding of the sample are required, enabling electron microscopy imaging with easy sample preparation comparable to light microscopy.

The QX-302 Capsules are supplied sterile for single use in boxes of 6.

Cat. #	Description	Pack
QX-302-6	QX-302 Capsules	6/pkg

ACCESSORIES FOR THE QX-302 CAPSULES

► MP-12 Multi-capsule Plate

The Multi-capsule Plate is designed to enable parallel handling of a number of individual QX-302 Capsules. It serves for holding the capsules during specimen preparation, and for storage.

The Multi-capsule Plates are supplied sterile and intended for single use.

Cat. #	Description	Pack
MP-12-2	MP-12 Multi-capsule Plate	2/pkg

► QX-302 Imaging Buffer

QX-302 Imaging Buffer is a solution optimized for imaging samples in an SEM with QX-302 capsules and is formulated to minimize damage to the samples by the electron beam. It is applied on samples in the QX-302 capsules prior to SEM imaging. The QX-302 Imaging Buffer includes spacers that are used during sample preparation.

The QX-302 Imaging Buffer is supplied sterile and lyophilized.

Cat. #	Description	Pack
IB-74	QX-302 Imaging Buffer	each

► QX-302 Calibration Capsule

The QX-302 Calibration Capsule is a QX-302 Capsule that has been specially designed to assist first time users in finding optimal imaging conditions for WETSEM™ imaging in their SEM. The Calibration Capsule contains nanoparticles of two different sizes; 40 and 500 nm. The particles are easily visualized in an SEM and provide a convenient means to calibrate the parameters for optimal wet imaging conditions.

Cat. #	Description	Pack
RT-58	QX-302 Calibration Capsule	each

► QX-202 Capsule

QX-202 capsules are used for in-situ SEM imaging of various dynamic hydration processes. They can be used for imaging the hydration process of cement, gypsum and other materials. The unique design of the QX-202 capsules allows extended studies to be performed inside the SEM vacuum chamber - the dynamic process can be followed for up to 24 hours, removing the need for multiple-sample imaging or repetitive venting of the SEM. There is no need for coating, drying or freezing of the samples. Simply place the sample in the capsule, seal it and image. The samples can be visualized directly using a BSE detector.

The QX-202 capsules are intended for single use and are supplied in boxes of 24 and 48 units.

Cat. #	Description	Pack
SK-202-24	QX-202 Capsules	24/pk
SK-202-48	QX-202 Capsules	48/pk

ACCESSORIES FOR THE QX-202 CAPSULES:

► MP-12 Multi-capsule Plate

The Multi-capsule Plate is designed to enable parallel handling of a number of individual QX-202 capsules. It serves for holding the capsules during preparation, and for storage.

Cat. #	Description	Pack
MP-12	MP-12 Multi-capsule Plate	2/pk

► QX Imaging Buffer

QX Imaging Buffer is a solution optimized for imaging the Calibration Capsule in an SEM. It should be applied into the Calibration Capsule prior to SEM imaging.

The QX Imaging Buffer is supplied lyophilized.

Cat. #	Description	Pack
IB-64	QX-202 Imaging Buffer	each

► Calibration Capsule

The Calibration Capsule is a capsule that has been specially designed to assist first time users in finding optimal imaging conditions for WET-SEM™ imaging in their SEM. The Calibration Capsule contains nanoparticles of two different sizes; 40 and 500 nm. The particles are easily visualized in an SEM and provide a convenient means to calibrate the parameters for optimal wet imaging conditions.

Cat. #	Description	Pack
RT-56	QX-202 Calibration Capsule	each

► Applicator (Microman M25 and tips)

Gilson Microman® pipette is specially designed to accurately displace small quantities of viscous solutions and mixtures. Also supplied is a box of single-use capillaries and pistons which are used in conjunction with the Microman M25.

Cat. #	Description	Pack
MM-25	Microman M25 and Tips	set

Applications

- Lipid Imaging and Analysis.
- Imaging lipid bodies in fully-wet cells and tissues.
- Airborne Particles.
- EDS of wet samples with QX capsules.
- Imaging particles in their fully-wet environment.
- Experimental Biology.
- Pathogen characterization.
- Subcellular organelles, cytoskeleton and motility, cell contacts, receptor distribution, extracellular matrix, tissue analysis.
- Industrial applications: food, oils, dyes, pharmaceuticals.
- Clinical diagnosis: Histopathology, cytology, oncology.
- Tissue engineering, implants and prostheses.
- Quality Control/Quality Assurance.
- Life Sciences and Medicine: Cultured and primary cells/Tissue histology/ Nerve cells and myelin imaging/ Microbiology/Viruses/ and Plants.
- Environmental and toxicological applications.
- Nanotechnology and Bio nanotechnology.
- Industrial and R & D:

► Starter Kits

► Starter Kits for the QX-102 Capsules

► QX-102 Starter Kit

The SK-102-24 Starter Kit includes QX-102 Capsules and all the necessary accessories to get started with the QuantomiX WETSEM™ technology.

The kit contains:

- QX-102 Capsules (24 units)
- MP-10 Multi-well Plates (2 units)
- MA-4 Multi-well Aspirator
- QX Imaging Buffer
- RT-56 QX-102 Calibration Capsule
- User Manual, Applications Manual, Instructional Training Movie, Imaging Quick Guide

Cat. #	Description	Pack
SK-102-24	QX-102 Starter Kit	each

► QX-102 Starter Package (w/o aspirator)

The SP-102-24 Starter Package includes QX-102 Capsules and all the necessary accessories to get started with the QuantomiX WETSEM™ technology, when minimal liquid aspiration is required. It is recommended to add the Particle Imaging Kit to enhance particle imaging.

The kit contains:

- QX-102 Capsules (24 units)
- MP-10 Multi-well Plates (2 units)
- QX Imaging Buffer
- RT-56 QX-102 Calibration Capsule
- User Manual, Applications Manual, Instructional Training Movie, Imaging Quick Guide

Cat. #	Description	Pack
SP-102-24	QX-102 Starter Package (w/o aspirator)	each

► Q-102 Assessment Kit

The kit contains:

- QX-102-6 (6 capsules)
- MP-10-1 (1 Multi-well plate)
- AT-60 (24 Tips)
- IB-64
- RT-56

Cat. #	Description	Pack
SK-102-6	Q-102 Assessment Kit	each

► Starter Kits for the QX-302 Capsules

► SK-302-12 Starter Kit

The SK-302-12 Starter Kit includes QX-302 Capsules and all the necessary accessories to get started with the QuantomiX WETSEM™ technology.

The kit contains:

- QX-302 Capsules (12 units)
- MP-12 Multi-capsule Plates (2 units)
- QX-302 Imaging Buffer
- QX-302 Calibration Capsule
- User Manual, Graphic User Guide, WETSEM™ Imaging Quick Guide

Cat. #	Description	Pack
SK-302-12	QX-302 Starter Kit	each

► SK -302 Assessment Kit

The kit contains:

- 3 QX-302 Capsules
- MP-12 Capsule Plate (1)
- IB-74 Imaging Buffer (1)
- RT-58 Calibration Capsule (1)

Cat. #	Description	Pack
SK-302-3	Assessment Kit	each

► Starter Kits for the QX-302 and QX-102 Capsules

The SK-102-302 Starter Kit includes QX-102 Capsules and QX-302 Capsules, and all the necessary accessories to get started with the QuantomiX WETSEM™ technology for all types of samples.

The kit contains:

- QX-102 Capsules (12 units)
- QX-302 Capsules (6 units)
- MP-10 Multi-well Plates (2 units)
- MP-12 Multi-capsule Plates (2 units)
- MA-4 Multi-well Aspirator
- QX Imaging Buffer
- QX-302 Imaging Buffer
- QX-102 Calibration Capsule
- User Manuals, Applications Manual, Instructional Training Movie, Graphic User Guide, WETSEM™ Imaging Quick Guide

Cat. #	Description	Pack
SK-102-302	QX-102 & QX-302 Combined Starter Kit	each

► Starter Kits for the QX-202 Capsules

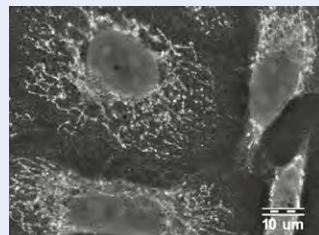
The SK-202-24 Starter Kit includes QX-202 Capsules and all the accessories necessary to get started with the QuantomiX WETSEM™ technology.

The kit contains:

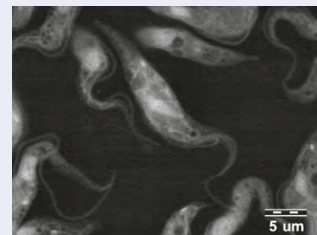
- QX-202 Capsules (24 units) for the -24 and 48 capsules for the -48
- MP-12 Multi-well Plates (2 units)
- IB-64 QX Imaging Buffer
- RT-56 QX Calibration Capsule
- Calibration Capsule Insert
- MicroMan Pipettor
- M-25 Tips
- M-25 Plungers
- User Manual, Training CD, Imaging Quick Guide

Cat. #	Description	Pack
SP-202-24	QX-202 Starter Kit	24/pk
SP-202-48	QX-202 Starter Kit	48/pk

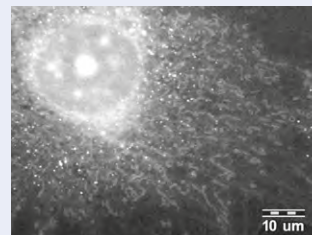
Mitochondria gold-immunolabeled in HeLa cells ▼



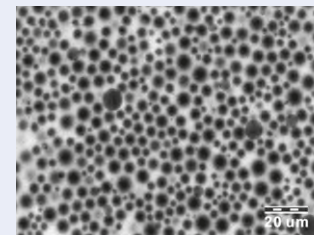
Trypanosoma brucei, uranyl acetate ▼



NIH-3T3 cell, osmium tetroxide ▼



Maternal Milk ▼



Frequently Asked Questions about WETSEM™ technology

This section covers the most frequently asked questions.

Topics:

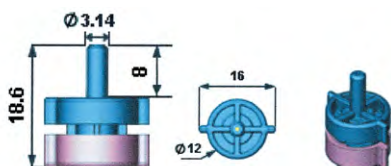
- SEM & imaging
- Applications
- Handling the capsules
- Sample treatment in QX capsules
- Cell biology with QX-102 Capsules

SEM and Imaging

Q Will the QX capsules fit my SEM?

- A** The QX capsules are designed to fit into the specimen stage of most types of SEMs. The QX capsule works with SEMs equipped with BSE (Back Scattered Electrons) detectors. Either variable pressure or high vacuum mode can be used. Adapters are available for different stub holder dimensions. Following is a partial list of SEM models compatible with WETSEM™ technology:

QX-102 Capsule (dimensions in mm)



- FEI (XL30ESEM, XL30ESEM FEG, Quanta series, Quanta FEG)
- JEOL (5600, 5900, 6000 series)
- ZEISS/LEO (1450, 1500 Series, EVO, Supra, Ultra)
- Hitachi (2600, 3000 series, 4000 series)
- Camscan (CS3000 range, MV2300 range)

For suitability of other models and availability of Adapters, please contact us.

Q Can the capsules be used in high vacuum mode?

- A** The QX capsules are compatible with high vacuum as well as low vacuum mode. The capsules are designed to withstand a pressure difference of up to 1 atmosphere, therefore no restrictions exist on vacuum levels, and they can also be used at 1×10^{-6} Torr.

Q Will the sample in a QX capsule remain fully wet during imaging in a SEM?

- A** Yes. The membrane of the QX capsule is impermeable to water and the capsule completely isolates the sample from the vacuum. No drying of the sample occurs during imaging or storage.

Q Why is it necessary to dehydrate the sample in conventional SEM imaging, and why is no drying needed with WETSEM™ technology?

- A** In traditional SEM, the sample is placed directly in high vacuum. A wet sample exposed to vacuum will lose its water in an uncontrolled dehydration process, which often distorts or destroys the structure of the sample. To preserve the structure in vacuum, the sample must be dehydrated in a controlled manner. The sample in the QX capsule is completely isolated from the vacuum and remains at atmospheric pressure. Therefore, there is no loss of water and no drying of the sample is needed.

Q What is the resolution with WETSEM™ technology?

- A** In general the resolution is about the same as dry SEM samples, depending on the specific sample and the SEM model used. (see: Thiberge et al. PNAS Vol.101, No.10, March 9, 2004. 3346-3351 and Review of Scientific Instruments, Vol. 75 No. 7, July 2004)

Q How deep below the membrane can imaging be performed?

- A** The beam penetration depth depends on the acceleration voltage. For a sample in a water-based medium imaged with a 30 kV beam, information is retrieved from a depth of approximately 2-4 micrometer. At 10 kV this depth is reduced to a few hundred nanometers. By varying the acceleration voltage it is possible to obtain unique 3D information from your sample.

Q Does the membrane interfere with imaging?

- A** The capsule membrane is very thin and flat. It is made of material transparent to electrons with energies above a few keV. Thus, the membrane induces minimal scattering of the beam and of the back scattered electrons detected by the BSE detector. The membrane itself is flat and hence does not interfere with the imaging process. In X-ray mode, the membrane produces a constant background that can be subtracted.

Q Does the electron beam cause damage to my sample?

- A** Fluids are very good conductors of heat. Therefore, the damage by the electron beam is very small. The QX-102 Imaging Buffer is specially formulated to minimize the damage caused by the beam and should be used whenever applicable. Also, to minimize the damage it is recommended to work with lower beam currents (i.e. reduced spot size).

Q Are there any restrictions to the electron beam current?

- A** There are some considerations to the choice of beam parameters and the recommended parameters can be found in the QX-102 User Manual. Generally, higher beam currents result in stronger signals, but increase the possibility of damage to the sample and affect the resolution. Lower beam currents minimize the damage and result in better resolution at high magnifications, but may give a signal that is not satisfactory. The optimal beam current depends on the sample and is determined empirically.

Q Is there a problem of charging with QX capsules?

- A** No. Since the sample inside the QX-102 capsule is wet, and the capsule itself is conductive, there is no charging.

Q Are the QX-102 capsules compatible with light microscopes?

- A** Yes. The membrane of the QX-102 capsule, as well as the MP-10 multi-well plate, are transparent to light and allow imaging of samples with a light microscope. The imaging should be done only with the QX-102 capsules properly placed in the MP-10 multi-well plate, which is especially designed for holding the capsules during various manipulations. The plate fits into a microscope stage for standard multi-well plates.

Q Can I perform EDS with WETSEM™ technology?

- A** Yes. QX capsules can be used for EDS (energy dispersive spectroscopy) analysis of samples using a SEM equipped with anEDS system. In fact, the QX-technology uniquely suits EDS of wet samples. Note, the presence of the metal grid and polymer membrane will be taken into account in the analysis.

Q What imaging parameters should be used in WETSEM™ technology?

- A** SEM imaging with QX capsules differs from standard SEM imaging in some aspects. Also, the factors that affect imaging vary among applications. Recommendation for parameters and guidelines for optimization are found in the QX-102 User Manual. Optimization of the imaging conditions is best done using the Calibration Capsule (cat no. RT-56).

Q Can the liquid sample leak from the capsule and contaminate the detector of my SEM?

- A** The membrane of the QX capsule is vacuum-tight and impermeable to liquids and gases. Thus, when the capsule is handled correctly there is no leakage of the sample and no contamination. Correct handling relates to both physical handling during sample preparation stages and to the parameters used during imaging. All care must be taken to prevent physical contact with the membrane. Any contact (e.g. with the tip of the pipette or with the hand) can potentially tear the membrane. Imaging of capsules must begin with a low probe current (small spot size). Initial probe current should be no higher than 200 pA. If the obtained signal is not sufficiently strong, probe current can gradually be increased until the desired image is obtained. Probe current should not exceed 1nA. Initial magnification should also be low. Magnification should be increased gradually until the desired image is obtained. Probe current should not exceed 1nA.

Applications

Q Can I image any liquid with the capsules?

- A** QX capsules are suitable for imaging various types of wet samples and liquids, including cells, tissues, bacteria, emulsions, oils, food samples, cosmetics, inks, particles in solutions, etc. For solvents that should be avoided, please consult the QX-102 User Manual.

Q Are the QX capsules compatible with acidic and basic solutions?

A The QX capsules have been validated for compatibility with commonly used organic and inorganic acids and bases (5 hour exposure). Results are shown in the following table:

Solution Concentration PH Compatibility

NaOH 0.1M- 0.1mM 13 - 10 positive

NaOH >0.1M >13 negative

Tris (hydroxymethyl) aminomethane base 0.05M 10-7 (adjusted by HCl) positive

Acetic Acid <0.01M >3.5 positive

Acetic Acid >0.01M <3.5 negative

HCl 1M- 0.1mM 0 - 4 positive

Q Can I image live cells with QX-102 capsules?

A Cells can be introduced live into the SEM and short time imaging of live cells may be possible. However, the radiation absorbed by the cells during image scanning is expected to cause structural changes and to affect the viability of the cells. Also, the contrast between different constituents of native cells may be too low for high-resolution imaging, and some staining or labeling may be required. Live cells or microorganisms can be imaged either in their growth medium or in PBS.

Q Can I image lipid rich structures with WETSEM™ technology?

A WETSEM™ technology allows analysis of lipid structures in an unperturbed state. The ability to image wet samples with SEM avoids the problem of lipid extraction that occurs due to dehydration with organic solvents during lipid imaging with conventional techniques. Many lipid structures are visualized without any enhancement. If staining is required, Osmium tetroxide is well suited for lipids; for detailed protocols, see the QX-102 User Manual.

Q Can I image foams with WETSEM™ technology?

A Yes. QX-102 capsules can be used for imaging cosmetic, food or other foam samples.

Q I would like to image untreated food samples. What details can I see with QX-102 capsules?

A The imaging contrast in QX-102 capsules is created from variations in atomic numbers of sample constituents. Thus, constituents and structures that have a significant difference in atomic numbers can be visualized without any enhancement. The contrast between water and fat is especially well visualized in QX-technology, enabling analysis of fat structure and content in food, cosmetics and other samples.

Q I want to look at cosmetic cream, which has a paste-like structure. Can I do this with QX-102 capsules?

A Yes. Notice that the field you image is that closest to the capsule membrane. Therefore, the sample has to be in direct contact with the membrane.

Q If I have a sample that releases gas inside the capsule, will the membrane of the capsule withstand the pressure?

A As long as the internal pressure does not increase significantly above 1 atmosphere, the membrane will withstand the pressure.

Handling The Capsules

Q I can hear noise of loose parts inside an unopened package of capsules. Does this mean the capsules have been damaged during the shipment?

A No. The packaging of the capsules is designed to prevent the capsules from moving around and to protect them from damage during shipment. To keep the capsules in a dry environment, the package contains two cylinders of desiccants, which can cause this noise.

Q Can I use only part of the capsules from the package and store the remaining unused capsules?

A Yes. In order to maintain sterility of the capsules, open the package in a sterile environment, such as laminar flow hood. Take out the desired number of capsules, close the box and seal the top cover with tape. Store the package in a clean, dry place.

Sample Treatment In QX Capsules

Q Can I store my samples in QX capsules?

A Yes. Samples can be stored in sealed QX capsules and they remain wet. The samples can also be stored in open capsules (liquid dishes), when properly sealed in the MP-10 multi-well plate. For sealing of liquid dishes and for storage of biological samples, please refer to the QX-102 User Manual.

Q How do I apply liquids to the QX capsules?

A Liquids and samples are applied onto the liquid dishes of the capsules using standard lab pipettes. When treating multiple samples, a repetitive dispensing pipette is most convenient. It is important to apply the liquid carefully, not to touch the capsule membrane with the pipette tips.

Q How do I remove liquids from the QX capsules?

A The liquids are removed using the MA-4 multi-well aspirator designed for safe aspiration of liquids from the capsules. Other means should not be used, since they may lead to rupturing of the capsule membrane. For detailed instructions of working with the MA-4 multi-well aspirator, refer to the instructions accompanying the product. See also the QX-102 User Manual for recommendations for proper liquid handling during staining and labeling procedures.

Cell Biology with QX-102 Capsules

Q Will my cells grow on the QX-102 capsule membrane?

A The QX-102 capsule is designed to be compatible with growth of cells, including established cell lines, as well as primary cultures. Our recommendation is to coat the membrane with a suitable attachment factor prior to cell seeding.

Q Can cells be grown in the QX-102 capsules for more than one day?

A Yes. The MP-10 multi-well plate holder for the capsules is designed to maintain CO₂ and humidity levels so that the capsules can be used as standard cell culture dishes for long-term growth of cells. During long incubations, ensure that the wells on the sides of the MP-10 plate stay filled with water. Also, it is recommended to change the growth medium of the cells to fresh medium every 2 days.

Q What attachment factor should I use for my cell line?

A The QX-102 capsule membrane can be coated with various attachment factors such as Fibronectin, Collagen, Laminin, Gelatin, poly-L-lysine or with a combination of them. The factors that provide best attachment and growth will depend on the cell type. Fibronectin has been found to support growth of many types of cells, and thus in many cases will be the recommended first choice. Please consult QX-102 User Manual for coating protocols.

Q Can I use QX capsules for non-adherent cells?

A Yes. Cells in suspension, such as blood cells, bacteria and protozoa, can be attached to the capsule membrane coated with attachment factor such as poly-L-lysine or gelatin. The cells can be attached to the coated membrane by incubating or by centrifuging. For detailed protocols, see the QX-102 User Manual.

Q Are there specific stains for different cellular compartments?

A Since the imaging contrast in WETSEM™ technology is based on variations in atomic numbers, heavy metal stains give the best contrast when imaging biological samples. Due to different affinities of heavy metals to various molecules, some cellular structures stain more strongly and can be visualized. For example, osmium tetroxide has a high affinity for lipids, and can be used for staining lipid vesicles. Most of the heavy metals stain the nuclei, and some of them, such as gold chloride, can be used for staining chromosomes. However, since the heavy metal stains are usually quite non-specific, for detailed localization studies immunogold labeling may be required.

Q Can I carry out intracellular immunolabeling with WETSEM™ technology?

A Yes. Colloidal gold particles are well visualized with WETSEM™ technology and intracellular antigens can be labeled on fixed, permeabilized cells using commercially available gold conjugates. Generally, smaller gold particles (less than 10 nm) are better suited for intracellular labeling. Particles less than 10 nm need to be Silver enhanced for imaging.

Q How do I choose the fixation protocol for immunogold labeling?

A The fixation protocols generally used in immunocytochemistry are also applicable to WETSEM™ technology. The correct choice, optimal concentration and time of fixation depend on the nature of the antigen and the antibody. Optimal conditions may be established based on your prior experience with the application or by performing preliminary experiments using immuno-fluorescence labeling.



APPLICATION NOTE #1: MATERIAL SCIENCE

Energy Dispersive X-Ray Spectroscopy (EDS)
of Wet Samples with QX Capsules

EDS is most often used for qualitative elemental analysis to determine which elements are present, and to conclude their relative abundance. One of the challenges facing this technique is the ability to apply it on wet samples. The QX capsule, based on QuantomiX proprietary WETSEM™ technology, provides the solution by enabling qualitative EDS measurement and analysis of wet samples such as creams, solutions and other liquid containing specimens.

In **Figure 1**, a sample of pesticide is imaged and analyzed by EDS. The elemental composition of the particles in the sample is determined by selected area EDS. Until now, specimens such as these could not have been analyzed by EDS in their native form, and other wet chemical methods had to be used. In **Figure 2**, the image and EDS spectrum of a gel deodorant are clearly seen. The different phases are visualized and the different phases are visualized and the chemical composition is directly determined from the EDS spectrum.

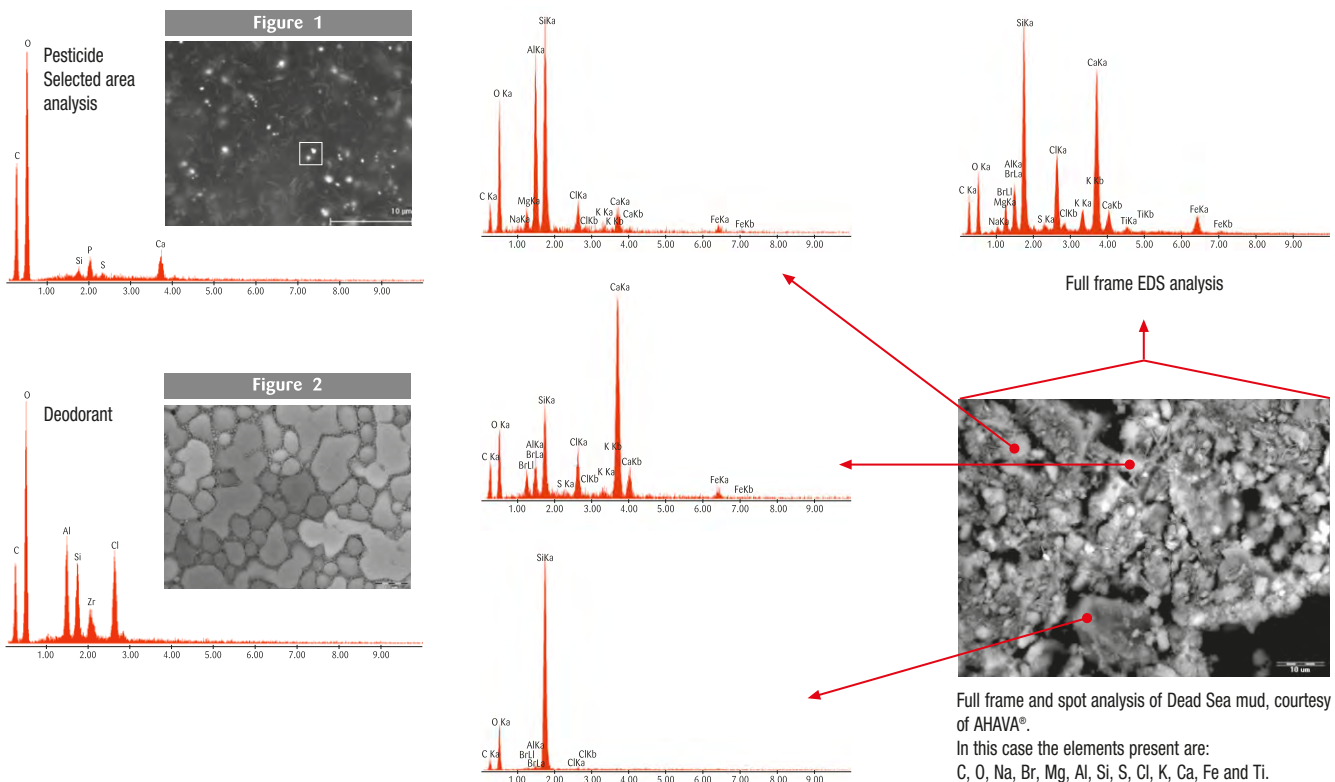
EDS with WETSEM™ Technology –
Stretching Science to New Extremes

Wet EDS provides the opportunity to image and analyze the final product without assuming homogeneity. In wet EDS, sample natural heterogeneity is retained and adjacent structures can be directly compared (see analysis below).

The QX capsules eliminate the need to dry the sample, and ensure that artifacts accumulated as a result of drying processes do not compromise sample integrity. WETSEM™ technology presents a tangible solution for formulation and quality control processes in industrial field.

Applications Include:

- Cosmetics
- Inks/Paints
- Ceramics
- Agriculture
- Pastes
- Food





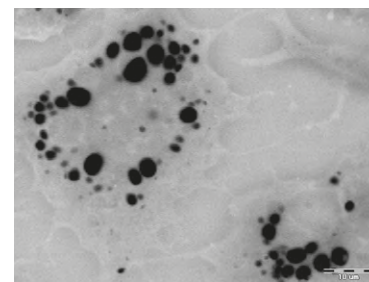
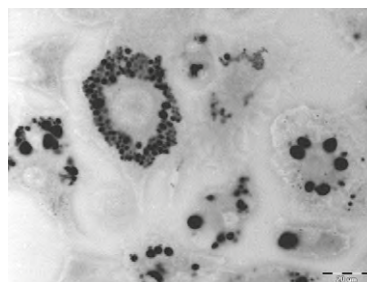
APPLICATION NOTE #2: LIFE SCIENCE

Imaging Lipid Bodies in Fully Wet Cells and Tissues

High resolution imaging of lipid bodies in biological samples is a known challenge. Preparation of tissue samples for microscopy examination typically wipes lipids off sample, making observation and interpretation of lipid bodies difficult. Lipids in cells are observed only indirectly, requiring special labeling. This has led QuantomiX to develop the QX capsules, based on WETSEM™ technology, designed for immediate and quantifiable high resolution lipid imaging. The QX capsules present a new opportunity to overcome the limitations of current methods for a better assessment of lipid in cells and tissues.

Direct Lipid Visualization with WETSEM™ Technology

The QX capsule, based on QuantomiX proprietary WETSEM™ technology, enables direct imaging of lipids in fully hydrated samples using standard scanning electron microscopes. In the pictures to the right, lipid bodies are clearly visualized in the cellular cytoplasm of 3T3-L1 pre-adipocyte cells

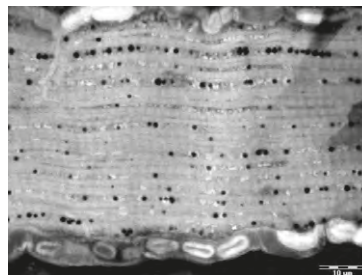


Lipid body visualization in differentiating 3T3-L1 pre-adipocyte cells.

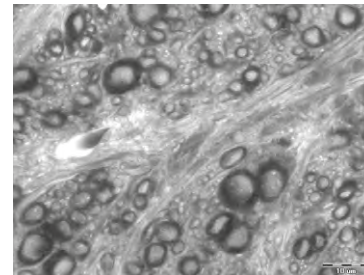
Lipid Research with QX Capsules

WETSEM™ technology is particularly suitable for lipid visualization, resulting in high signal-to-noise ratio, tailored for lipid imaging. The sample, placed in a sealed capsule, is separated from the vacuum by a thin electron-transparent membrane, allowing imaging of wet, un-embedded cells and tissues.

The direct, immediate, and reliable visualization of lipids with QX capsules is a major step forward for lipid research.



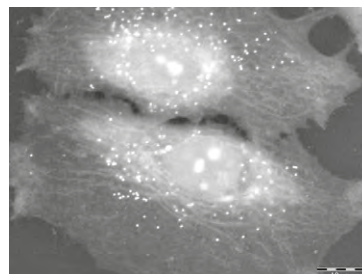
Intramyocellular lipids in diabetic skeletal muscle in rodent (unstained). In collaboration with Dr. N. Kaiser, Hadassah Medical school.



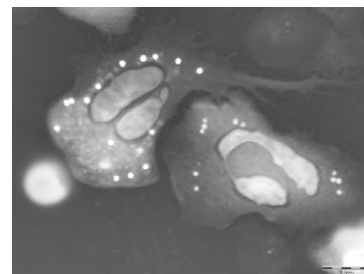
Cross-section of a mouse spinal cord. The myelin rings are shown in black (unstained). In collaboration with Teva Pharmaceuticals.

Benefits

- High-resolution imaging of wet samples
- Minimal sample preparation
- Quantifiable
- Artifact-free
- Optimal signal-to-noise ratio
- Lipid visualization



Lipid bodies in cultured HeLa cells (stained with Osmium tetroxide).



Lipid bodies in human polymorphonuclear cells of peripheral white blood cells (stained with Osmium tetroxide).



APPLICATION NOTE #3: MATERIAL SCIENCE

Imaging Particles in Their Fully Wet Environment

One of the most valuable parameters in the study of materials is particle characterization. Until today, particle imaging in Scanning Electron Microscopes was limited to dry samples only. As a result, valuable information on particles in their native state was lost due to the drying process. Furthermore, characterization of particle shape, size and dispersion in their native wet environment was not feasible at all.

WETSEM™ Technology – Revealing new perspectives in Material Science Research

WETSEM™ technology presents a breakthrough in imaging and analysis of particles in their native wet state. The QX capsule, based on QuantomiX proprietary WETSEM™ technology, enables SEM imaging of particles in suspensions, pastes, gels, emulsions, creams and liquids of all kinds.

The QX capsules eliminate the need for time-consuming preparation procedures, and ensure that artifacts accumulated as a result of drying processes do not compromise sample integrity. WETSEM™ technology presents a tangible solution for formulation and quality control processes in industrial fields.

Meeting the Needs

The QX capsules can be used for dispersion characterization of particles in liquids (including degree of aggregation, homogeneity) as well as shape characterization. They also permit imaging of emulsions, suspensions and other liquids, core shell type materials, pastes, gels, creams, foams and powders.

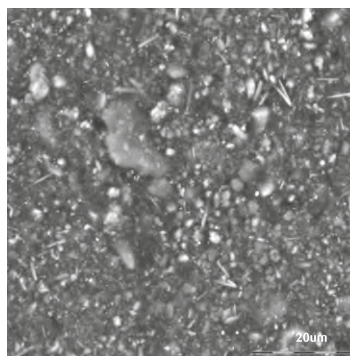
Research has shown that the capsules can provide the scientist with information regarding chemical composition by EDS of wet samples. Important information required for formulation processes in various industries, can also be obtained.

By using the QX capsule, scientists avoid potential problems of film formation and particle aggregation during the drying process. The capsules also function as isolation compartments for imaging of air- and humidity- sensitive materials

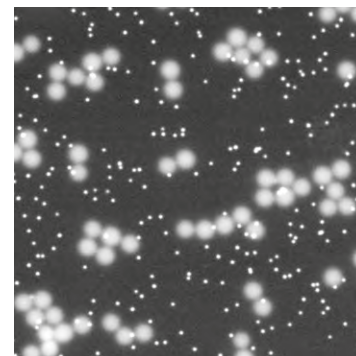
Advantages:

- Quick and easy to use
- Requires minimal sample preparation
- Enables shape, size and dispersion characterization
- Enables imaging of particles in nano and micro scales
- Allows chemical composition identification by EDS of wet samples

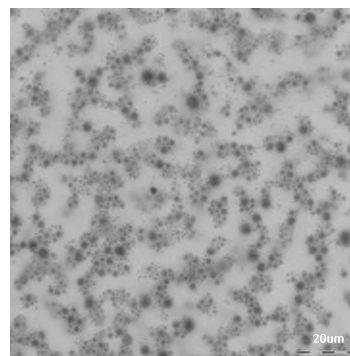
The QX line of capsules are already in use in biological research, and play a major role in the pharmaceutical, food, detergent, paint and ink industries.



Dead Sea mud (Courtesy of AHAVA®)



Silica (500nm) and gold (40nm) particles



Phase separation in organic encapsulated materials



APPLICATION NOTE #4: LIFE SCIENCE

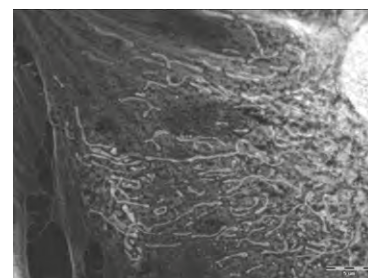
Imaging Wet Cells

Bridging the Gap between Light and Electron Microscopy

The need to dehydrate and prepare samples before imaging in an electron microscope has long been a serious limitation for cell biology research. Biological specimens are hydrated in their natural state, but current methods of imaging these specimens under high resolution require dehydration and extensive preparation. On the other hand, samples can be viewed in their native state in light microscopes, but those are limited to low resolution viewing. QuantomiX proprietary WETSEM™ technology brings together the immediate viewing capabilities of light microscopes and the high resolution capacity of electron microscopy, and provides an ideal solution for high resolution imaging of fully wet cells.

Viewing Wet Samples in Their Native State with WETSEM™ Technology

The solution offered by WETSEM™ technology enables high-resolution imaging of samples without lengthy preparation and with no dehydration artifacts. The QX capsules, based on WETSEM™ technology, are used for holding biological samples in the electron microscope. The samples are kept in a sealed, vacuumresistant capsule during the imaging process. This method has been used successfully for many types of biological samples, including nonadherent cells, and has enabled the collection of valuable information.



Mitochondria visualization in C2C12 cells that were fixed and stained with 2% PTA. Mitochondria are easily identified. Their pleomorphic forms and structural variations are clearly seen.

QX Capsules – Empowering Imaging Capabilities

Fig 1. HeLa cells cultured in the QX capsule in growth medium, were fixed with paraformaldehyde and stained with uranyl acetate. Cell-cell contact between two neighboring cells as well as filopodia are clearly visible. Clear marking of fine intracellular cytoskeletal structures is also seen.

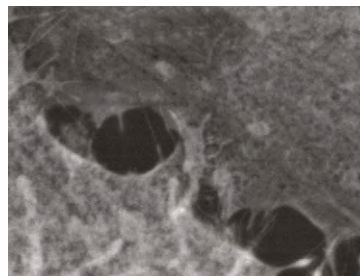


Fig 1: HeLa Cells

Fig 2. Wet mast cells were fixed with 4% paraformaldehyde and 0.125% glutaraldehyde and stained with uranyl acetate. High resolution imaging with WETSEM™ enables visualization of individual secretory granules which appear as dark holes. Some granules show high electron density.

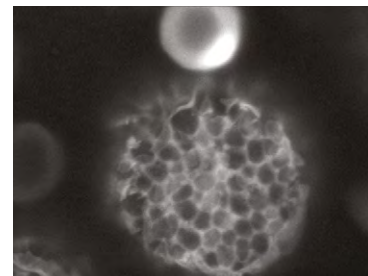


Fig 2: Mast Cells

Dr. Y. Satoh, Dept. of Cell Biology and Functional Morphology, Iwate Medical University, School of medicine, Uchimaro, Japan.

Fig 3. Epidermal growth factor receptor (EGFR) labeling of A431 cell. Anti-EGFR antibodies were visualized with 40nm colloidal gold particles. Note the very precise visualization of individual gold beads on the cell surface. This application is suitable for a variety of intracellular and extracellular immunogold labeling.

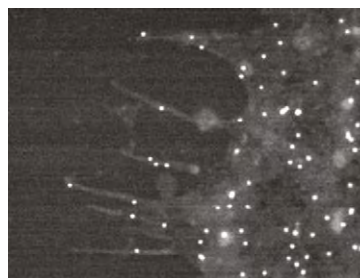


Fig 3: A431 Cells

Dr. J.Schlessinger, Dept. of Pharmacology, Yale University School of Medicine, New Haven, CT.

Fig 4. Lipid bodies in human white blood cells. After separation, cells were plated on the QX Capsule membrane. Efficient attachment and spreading of the population of interest were achieved. Fixation and consequent uranyl acetate and osmium staining enhanced visualization of cellular organelles, and highlighted the lipid bodies.

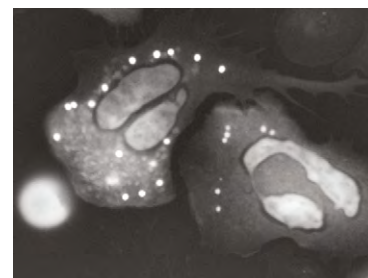


Fig 4: White Blood Cells

Advantages:

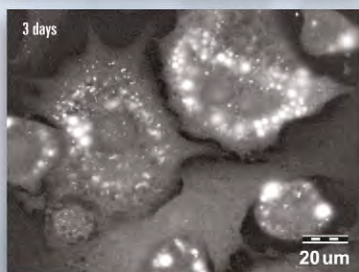
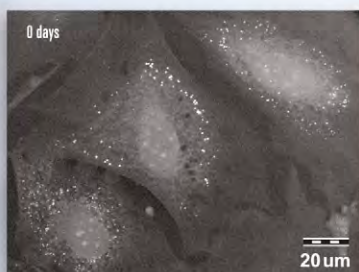
- High resolution imaging of wet samples
- Visualization of intra- and extracellular structures
- Molecular immunolabeling
- Imaging of adherent and non-adherent cells
- Minimal sample preparation
- Artifact-free



QuantomiX Lipid Imaging That Counts

New opportunities for quantitative analysis in metabolic syndrome research

Lipid accumulation in differentiating 3T3-L1 pre-adipocyte cell line (days in culture)



IMAGINE BEING ABLE TO PRODUCE MEANINGFUL IMAGES OF LIPIDS IN CELLS AND TISSUES. THE POSSIBILITIES ARE ENDLESS. QUANTOMIX WETSEM™ TECHNOLOGY ENABLES POWERFUL IMAGING AND ANALYSIS OF HYDRATED LIPIDS IN CELLS AND TISSUES – FOR FAST AND RELIABLE QUANTIFICATION.

Monitor lipid accumulation in cells

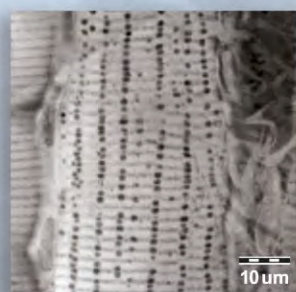
By examining hydrated cell samples, you can set up cell-based assays that mimic metabolic processes that enable reliable mapping of cell differentiation. Your lipid accumulation cell assays do not have to be modified in any way, resulting in unprecedented accuracy.

EM scanning of hydrated fat cells and tissues for:

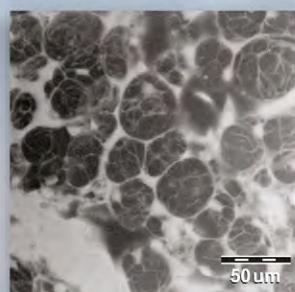
- Fast implementation with minimal preparation requirements
- Reliable, reproducible and quantifiable results
- High resolution imaging

Image fat in tissues

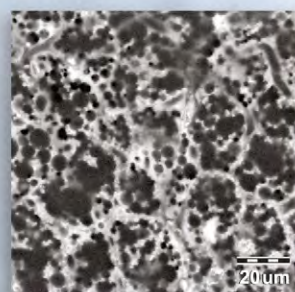
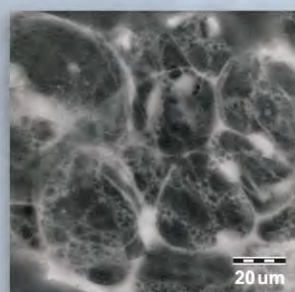
Fat cell size distribution and lipid droplet examination in tissues have never been so clear and easy to do. Just apply the sample in the QX-capsule and expand the horizons of advanced obesity and diabetes research.



Lipid droplets in rat skeletal muscle



Lipids in porcine white adipose tissue



Lipids in multilocular brown adipose tissue (with Prof. S. Cinti, Italy)

Electron microscopy – right from the cell culture dish

The QuantiMiX QX-capsule product line enables direct imaging of fully hydrated samples in conventional scanning electron microscopes (SEMs). Wet samples can be examined, eliminating the need for arduous preparation, such as, critical point drying, coating, embedding, and sectioning. Simply place tissue samples directly in the QX-capsule, or grow cells inside it, to achieve high-resolution imaging and analysis.



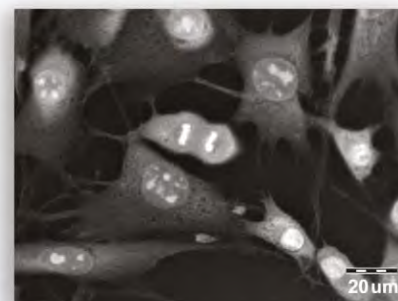
QX-Capsule Walk-through



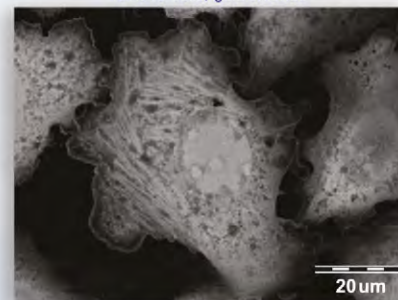
1. Prepare multi-well plate for QX-capsules /
2. Apply sample via conventional pipetting /
3. Quick seal the single-use QX-capsule /
4. Place the QX-capsule in the SEM chamber

A new approach to cell and tissue imaging and analysis

QuantiMiX WETSEM™ technology leads to a better understanding of biomedical and metabolic processes, for more effective medical, chemical, biological and industrial research. An ultra-thin membrane completely isolates hydrated samples from the microscope chamber's vacuum. This unique receptacle permits electron microscopy of samples held in a liquid medium. By combining the functionality of a cell culture dish or tissue specimen holder with an electron-transparent, vacuum-tight window, QX-capsules enable high resolution imaging of fully hydrated samples of human, animal and plant cells, tissues and fluids, microbial cells and other types of fluids.



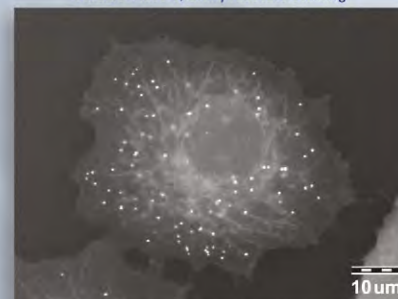
NIH3T3 cells, gold chloride



HeLa cells, uranyl acetate staining



Cardiac muscle, uranyl acetate staining



HeLa cells, osmium staining

A new approach to cell and tissue imaging and analysis

Eliminate timely sample preparation

Achieve reliable, reproducible and quantifiable results

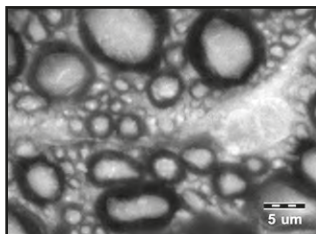
Attain EM-level resolution for all types of hydrated samples

QUANTOMIX™

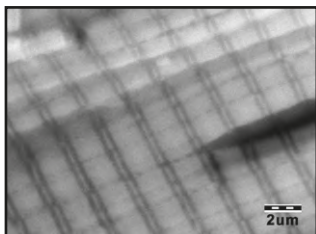
QUANTOMIX™

IMAGES:

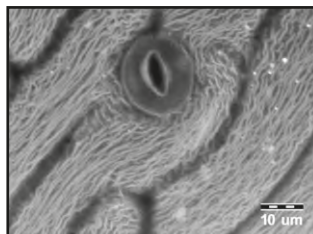
Cross section of mouse spinal cord, uranyl acetate ▼



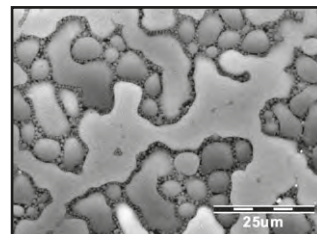
Porcine skeletal muscle, uranyl acetate ▼



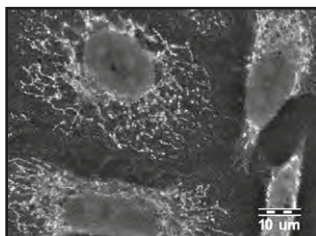
Arabidopsis thaliana stigma, osmium tetroxide ▼



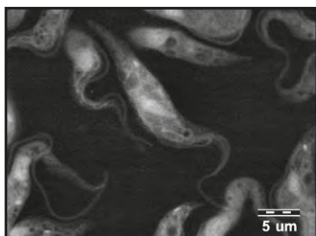
Deodorant, EDS ▼



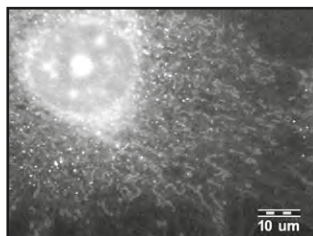
Mitochondria gold-immunolabeled in HeLa cells ▼



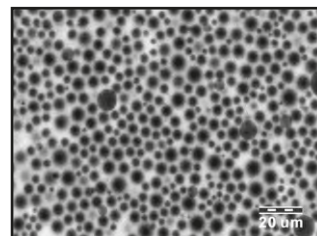
Trypanosoma brucei, uranyl acetate ▼



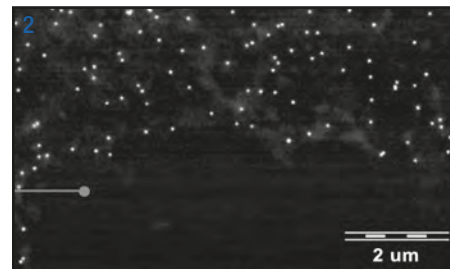
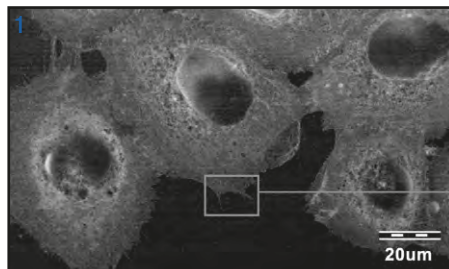
NIH-3T3 cell, osmium tetroxide ▼



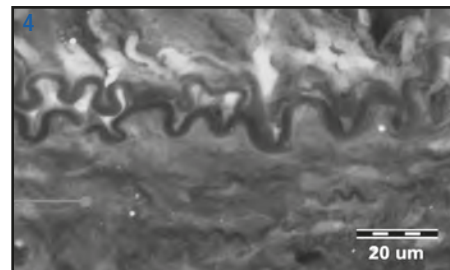
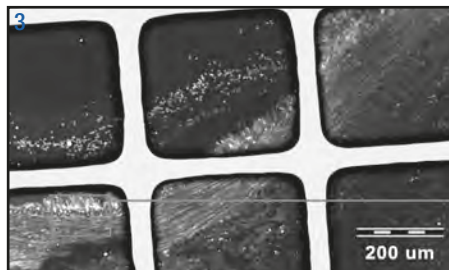
Maternal Milk ▼



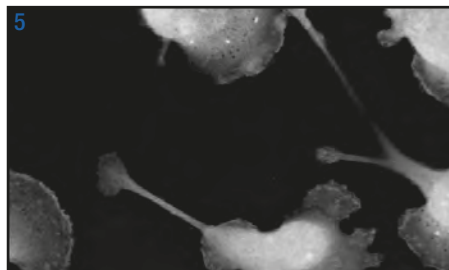
1 & 2 ▶ Epidermal growth factor receptors immuno-labeled with 40 nm gold nanoparticles on A431 cells (imaged at 30 kv). The distribution of the receptors on the cell membrane is shown by counterstaining with uranyl acetate. In collaboration with Professor Joseph Schlessinger, Department of Pharmacology, Yale University School of Medicine.



3 & 4 ▶ Cross section of rabbit aorta counterstained with uranyl acetate. Elastin in the tissue is seen in black (imaged at 30 kv). In collaboration with Professor Elazar Edelman, Harvard-MIT, Biomedical Engineering Center



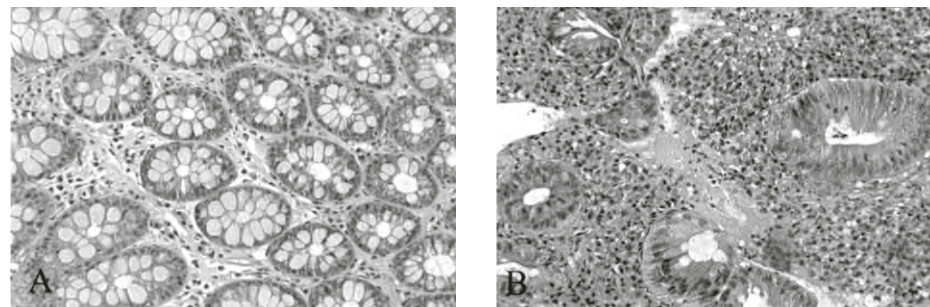
5 ▶ Ruffled borders in macrophage A-21 cells, counterstained with uranyl acetate (imaged at 20 kv). In collaboration with Professor Paul Matsudaira, Whitehead Institute For Biomedical Research, MIT.



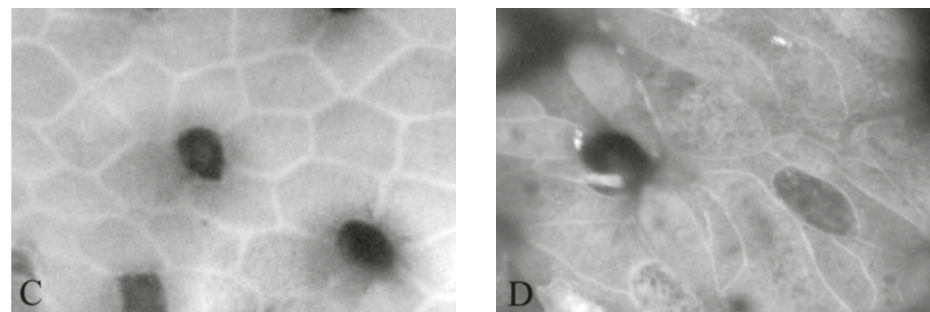
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IMAGES:

A & B ▶ 5Hematoxylin and eosin stain of normal colon (A) and IBD (B), x200.



C & D ▶ Using wet tissue for SEM: (C) "en face" SEM photograph of normal colon; (D) "en face" SEM photographs of colon affected by Crohns Disease show marked irregularity of the cell borders with elongation of the crypts' orifices, x3200.



SKIN WITH MINERALIZED ELASTIC FIBERS (Pseudoxanthoma elasticum)

Fixed and stained sample

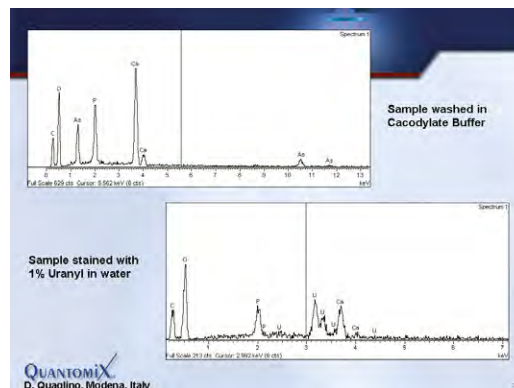
C: collagen
Arrows: mineralized elastin

QUANTOMIX
D. Quaglino, Modena, Italy

SKIN WITH MINERALIZED ELASTIC FIBERS (Pseudoxanthoma elasticum)

Unfixed and unstained sample

QUANTOMIX
D. Quaglino, Modena, Italy



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QUICK USE GUIDE FOR IMAGING

Important Notes

- WETSEM™ images can be obtained with various detectors. With most SEM configurations, best images are obtained with a BSE detector positioned at the end of the SEM column (located under the pole piece).
- High probe currents, especially when scanning at high magnifications, may damage the QX capsule membrane and sample. To prevent damage, avoid scanning the same area at high magnifications for prolonged periods. See Table 1 for the maximum recommended probe current for your SEM configuration.

Table 1: Suitable Parameter Range for WETSEM™ Imaging

Parameter	Recommended Range	Comments
Acceleration Voltage	15 - 30 kV	Not lower than 10 kV
Probe Current (based on source type)		
Tungsten filament	0.4 - 1.0 nA	Not higher than 1.0 nA
FEG	0.1 - 0.5 nA	Not higher than 0.5 nA
Working Distance (based on detector type)		
Semiconductor (BSE)	6 - 10 mm	Acceptable: 4 - 15 mm
Robinson (BSE)	10 - 20 mm	Better efficiency at high keV
Scintillator (BSE)	6 - 10 mm	Acceptable: 6 - 10 mm
Everhart-Thornley (SE)	8 - 12 mm	Acceptable: 6 - 15 mm
In-lens/Through the lens (all detectors)	2 - 4 mm	Manufacturer dependent

Recent Publications

- ▶ Iris Barshak et al.
"Wet SEM: A Novel Method for Rapid Diagnosis of Brain Tumors"
Ultrastructural Pathology, 28:255-260, 2004.
- ▶ Vered Behar
"Applications of a Novel SEM Technique for the Analysis of Hydrated Samples"
Microscopy and Analysis, 2005 "In-Press".
- ▶ Quaglino Daniela et al.
"Identification of Mineralized Elastic Fibres on WET Samples by SEM" "In-Press".
- ▶ Stephan Thiberge et al.
"An apparatus for imaging liquids, cells and other wet samples in the scanning electron microscope." *Review of Scientific Instruments*, Volume 75 no. 7, July 2004.
- ▶ Irit Ruach-Nir
"An Innovative Method for Imaging and chemical Analysis of Wet Samples in Scanning Electron Microscopes." "In-Press".
- ▶ Abraham Nyska et al.
"Electron Microscopy of Wet Tissues: A Case Study in Renal Pathology"
Toxicologic Pathology, Volume 32 no. 3, May 2004.
- ▶ Stephan Thiberge et al.
"Scanning electron microscopy of cells and tissues under fully hydrated conditions."
PNAS, March 9, 2004. *Applied Physical Sciences, Applied Biological Sciences*, Volume 101 no. 10.
- ▶ Iris Barshak et al.
"A Novel Method for 'Wet' SEM." *Ultrastructural Pathology*, Volume 28, Number 1 / January-February 04.
- ▶ Opher Gileadi et al.
"Squid Sperm to Clam Eggs: Imaging Wet Samples in a Scanning Electron Microscope." *Biol. Bull.* 205: 177-179. October 2003, *Marine Biological Laboratory*.

Calibration Capsule Use

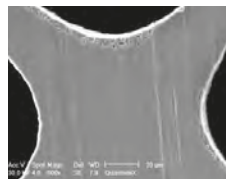


Figure 1

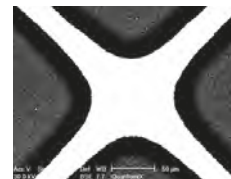


Figure 2

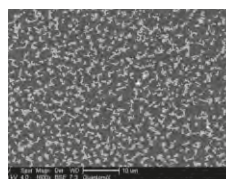


Figure 3

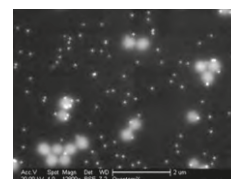


Figure 4

FOR FIRST TIME IMAGING, ALWAYS USE THE CALIBRATION CAPSULE.

01. Reconstitute the Imaging Buffer with 1ml of double distilled water.
02. Place the Calibration Capsule in the Multi-well Plate, and remove the sealing stub.
03. Apply 15ml of Imaging Buffer into the Calibration Capsule, and seal with the stub.
04. Place the hydrated Calibration Capsule in the SEM.
05. Set the acceleration voltage to 30kV.
06. Set the spot size at 35% of the spot size range.
07. See Table 1 for a working distance suitable for your SEM configuration.
08. Initially, use the SE detector and focus on the metal support grid (see Figure 1).
09. Once focused, change to the BSE detector.
10. It is recommended to start sample imaging with a slow scan speed (a few seconds per frame).
11. Increase contrast drastically. The grid should give a strong, white signal (see Figure 2).
12. Move from the grid to one of the windows.
13. Increase magnification until the 500nm silica beads are visible (see Figure 3).
14. If no beads are visible, increase the contrast further.
15. If no beads are visible yet, gradually increase the spot size. (Note that spot size correlates to probe current. See Table 1 for the maximum probe current that should be used for WETSEM™ with your SEM configuration).
16. Once the silica beads are visible, improve the focus and zoom in.
17. Identify the 40nm gold beads, focus and correct astigmatism. The gold beads should appear perfectly round after the correction (see Figure 4).
18. Obtain a slow-scan image and save.

SAMPLE IMAGING

01. Apply steps 1-12 in the above procedure to your sample.
02. Adjust contrast and brightness until features of interest are visible.
03. If no features are visible, gradually increase spot size.
04. Once features are identified, focus, adjust contrast and brightness, and obtain the required images.
05. Zoom in as required, adjusting focus and correcting astigmatism.

► Magnification Reference Standards – SPM, AFM, SEM Calibration Standards

EMS offers a series of calibration standards with one and two dimension calibrated patterns. The standards come in two grid spacings – 300 nanometers and 700 nanometers. These standards are created utilizing holographic interference of a particular laser frequency. They are typically accurate to <1% across the entire surface of the standard.

Background

EMS MXS "CE" and "BE" Series SEM magnification reference grating and grids set new standards for sub-micron accuracy and ease-of-use. Designed to meet the requirement for a reasonable cost, accurate sub-micron reference standard, "CE" Series Reference Standards can be tailored to meet a variety of needs. They are ideal for student practice and instruction, testing new ideas or applications, or other uses where you need a good quality standard but don't want to put an expensive sample at risk. **Exceptional accuracy, repeatability, and uniformity are assured since each individual standard is an original or master produced directly from a holographic interference pattern.** These reference standards are remarkably durable under typical operating conditions. The surface contamination behavior is also very good. There are no better submicron reference standards available in this price range.

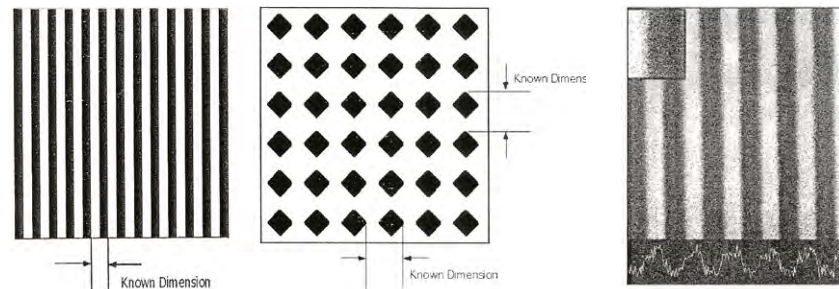
"One test site indicated that on a scale of 1 to 5 with respect to ease of use, contrast/brightness, durability, and accuracy, "CE" Series Reference Standards earn a 4.7 in comparison to other available standards. Comments from various other test sites included "very good contrast/brightness levels at all voltages used," "easy to use," and "could become my secondary standard of choice."

Application

EMS's MXS "CE" Series Reference Standards provide a calibrated dimension of either 300 or 700 nm nominal length. ("BE" series available only 300 nm).

- The larger dimension provides accurate, multiple period measurement from about 5000X to over 45,000X, while
- The smaller dimension is useful from about 10,000X to over 100,000X.

Throughout this magnification range, these standards provide excellent image contrast, an enormous useful calibration area, and a 3-sigma accuracy of at worst 3%, with typical values around 1%. MXS "CE" and "BE" Series Reference Standards are available as un-mounted 3x4 mm pieces to be mounted by the microscopist. Mounting one of these calibration standards is easy. The front surface of the sample and the



White area material: Tungsten.

Black area material: Tungsten or other metal.

Materials: The calibration specimen consists of a silicon chip with a thin (100nm) thick polymer layer containing the pattern and a thin tungsten film over-coating the entire surface. The tungsten film varies from 20nm to 60nm in thickness, depending on the particular model.

This structure has been proven under a wide variety of beam conditions, from 30kV to sub 12 kV. Dimensions: 300nm or 700nm nominal (exact dimension will be provided with sample).

Measurements are made from leading edge to leading edge, etc. Width of individual bars and spaces is not calibrated.

silicon substrate are conductive. Experience indicates that there is, in general, no need to make a special effort to ground the front surface. The use of conductive silver or carbon-loaded paint, conductive epoxies, conductive tape, etc. has all been used to successfully mount "CE" Series standards.

With EMS's MXS "CE" and "BE" Series Reference Standards, you can:

- Quickly check dimensional measurements by mounting one on your specimen stage;
- Perform periodic calibration and performance checks of your microscope;
- Obtain high magnification, sub-micron scale dimensional accuracy for the first time;
- Accurately determine dimensions from 0.3µm to 30µm all with one calibration artifacts;
- Analyze your images for pincushion distortion, small-scale vibration, or small magnetic field distortions.

The accuracy of the "CE" Series allows the microscopist to use them as a secondary standard. Their accuracy and uniformity make it easy to obtain and document traceability of measurements without placing an expensive, hard to obtain, difficult to use primary calibration standard at risk of contamination or damage.

Certification and Accuracy

MXS "CE" Series Reference Standards provides a calibrated dimension of either 300 nm or 700 nm nominal lengths. The actual dimensions of the artifact as delivered will generally not be exactly these values. Both the fabrication process determines the actual dimension and by a second, independent measurement after the calibration artifact is manufactured. The expected accuracy of

the holographic technique used in the manufacturing process is ±0.1%. Unfortunately, subsequent processing steps degrade this initial accuracy, leading to the 3-sigma accuracy of 3% for the finished product. The second, independent measurement technique has an expected 3-sigma accuracy of 1% or better. Our experience is that the two measurements technique applied to a particular artifact will agree with each other to within 0.5mm.

It is important to remember that the certified dimension in an MXS "CE" and "BE" Series Reference Standard is not just at one unique position on the artifact, but is known at all locations on the standard.

Durability and Charging Effects

EMS MXS "CE" and "BE" Series have been tested and evaluated over a broad range of operating conditions, from those found in a tungsten filament system to the highest resolution FEG system. These standards have been found remarkably durable during use, with no beam-induced distortion in the calibrated pattern after as much as one-half hour of imaging time at 50,000X and 20 kV. Charging is minimal to nonexistent, though edge effect can be seen under some conditions. The high contrast and brightness, which can be obtained using these reference standards guarantees good contamination tolerance.

► Magnification Reference Standards – SPM, AFM, SEM Calibration Standards (continued)

► 1. 301CE and MXS 701CE

The calibrated dimension is the spatial period of a series of parallel ribs running across the sample. The significant height of the ribs (>100nm) provides excellent image contrast. The top surface of the rib structures is somewhat rounded rather than completely flat. The edges of the ribs are readily discernible, with over 75% of the 3mm by 4mm sample area exhibiting an edge location variation, which is less.

Use and Imaging

The exceptionally clean and uniform pattern provided in an MXS 301CE and MXS 701CE standard displays few imperfections, which can be used as focusing and stigmation aids. For this reason, taking care in setting up the image before measurement is important. To assist in the set up process, an instruction sheet is provided with each standard. This sheet provides several example images, which can be used to determine if the image of the sample is correctly set up. Especially with the MXS 301CE and MXS 701CE line-space pattern standards, obtaining the proper stigmation is crucial since improper stigmation is not readily apparent when imaging a pattern of straight line. Once a proper focus and stigmation are obtained, the image can be shifted to an appropriate area and the desired measurements made.

► 2. MXS 302CE and MXS 702C

The calibrated dimension is the spatial period of a series of a 2-dimensional grid spread across the surface of the sample. This grid consists of a series of cylindrical posts rising from the surface of the sample. The significant height of the ribs (>100nm) provides excellent image contrast. The top surface of these posts is somewhat rounded rather than flat and there are also slight departures from a perfect circle in the shape of some posts. Measurement techniques must be used which take these characteristics into account. The center-to-center distance of any pair is the most accurate measurements.

Use and Imaging

The exceptionally clean and uniform pattern provided in an MXS "CE" series 2-dimensional calibration standard displays few large scale imperfections. For this reason, taking care in setting up the image before measurement is important. To assist in this process, an instruction sheet is provided with the standard. This sheet provides several example images, which can be used to determine if the image of the sample is correctly set up. *The characteristics of the MXS 302CE and MXS 702CE standards make them easier to image than the 1-dimensional standards.* The 2-dimensional grid facilitates setting the stigmation of the image properly. Once proper focus and stigmation are obtained, the image can be shifted to an appropriate area and the desired measurements made. Since the pattern covers the entire sample area, it is possible to make over 1,000,000 measurements utilizing the standard without using the same area twice.

Cleaning for "CE" Series

Cleaning is possible using dry air or other clean gases, high purity distilled or deionized water, and soft brushes. **Rubbing with soft tissues, or any other firm physical contact, or the use of solvents, such as acetone or alcohol will damage the surface of the reference standard.**

► 3. MXS 301BE

The calibrated dimension is the spatial period of alternating lines of Titanium and Silicon. The use of two different elements provides excellent image contrast, and the titanium layer thickness is kept to 20 nm to control edge distortion effects in the SEM image. These physical characteristics make the edges sharp and readily discernible. The calibrated pattern covers the entire sample, providing over 1,000,000 measurement sites. Because the pattern is a direct recording of a laser-generated interference pattern which has been transferred into the 20 nm thick Titanium film, these calibration samples are the most accurate available.

Imaging and Applications

The exceptionally clean and uniform pattern provided in a EMS MXS "BE" series calibration standard displays few imperfections. For this reason, taking care in setting up the image before measurement is important. To assist in this process, an instruction

sheet is provided with each standard. This sheet provides several example images, which can be used to determine if the image of the sample is correct. Once a proper focus and stigmation are obtained, the image can be shifted to an appropriate area and the desired measurements made.

The full screen image provided by a EMS calibration sample provides a unique advantage. Most calibration standards really verify accuracy of one portion of the image, while the entire screen is part of the measurement tool. With an image that fills the screen, you can quickly diagnose all types of image distortions, including problems due to vibrations, external fields, etc. A common problem is distortion caused by miss-adjusted CRT's or scanners in which the magnification in one part of the image is different from another part of the image. Such problem are easily found and corrected using these calibration samples.

Cleaning for "BE" Series

Titanium on Silicon produces a very durable calibration pattern. The calibration standard can be cleaned using common solvents such as acetone or alcohol, detergents, deionized water, etc. Gentle physical rubbing with soft tissues, brushes, etc., should not damage the sample. In extreme cases, cleaning by oxygen plasma is possible.

Specifications

Product Data	301CE & 701CE	302CE & 702CE	301BE**
Substrate	Silicon Wafer	Silicon Wafer	Silicon Wafer
Top Surface	60 nm Tungsten Film	60 nm Tungsten Film	Ti pattern on Si
Physical Size	3mm x 4mm x 0.5mm	3mm x 4mm x 0.5mm	3mm x 4mm x 0.5mm
Accuracy	± 3%	± 3%	± 1%
Nominal Dimensions	(x)	(x, y)	(x)
	300nm for MXS-301CE	300nm for MXS-302CE	300nm
	700nm for MXS-701CE	700nm for MXS-702CE	
Availability or mounted*	un-mounted or mounted*	un-mounted or mounted*	un-mounted

*There is a cost for Mounted samples, using standard aluminum pin type stubs (EMS #75200). Please call us for all mount types.

** MXS 301BE Calibration sheet provided with standard contains actual dimensions to 3 significant figures. NPL traceability is also available with an additional cost.

Each traceable standard is individually measured in comparison with a similar specimen calibrated at PTB.

Ordering Information

Application	Product	Pattern	Nominal Pitch	Material	Mounting	Catalog #
SEM	701CE	Parallel Ridges	700 nm	W-Coated Photoresist on Si	unmounted mounted	80110-71 80110-71M
SEM	301CE	Parallel Ridges	300 nm	W-Coated Photoresist on Si	unmounted mounted	80110-31 80110-31M
SEM	702CE	Array of Posts	700 nm	W-Coated Photoresist on Si	unmounted mounted	80110-72 80110-72M
AFM, SEM, TOF-SIMS, Auger, etc.	301BE	Parallel Ridgse	300 nm	Ti Lines on Si	unmounted mounted	80111-31 80111-31M

Special Services (Needs to be added to the standard price)

SS-301	301BE Certification	each
SS-SEM	Mount Certified Specimen for SEM	each

► SPM Calibration Specimens

Features and Benefits:

- Easier testing of your SPM.
- Improved accuracy of critical dimension measurements.
- Accuracy: 0.5% (1 std. dev.).
- Holographic fabrication - assures high accuracy and precision.
- Pattern height > 100nm - provide excellent image contrast.
- Uniform coverage of entire chip - save time (can image anywhere).

Description:

Nominal calibrated dimensions: 300 or 700nm.

Calibration certificate: supplied with each sample, stating the dimension to the nearest 1nm.

Pattern types: 1- or 2-Dimensional. The calibrated dimension is the same for both axes for the 2-D standard.

Feature geometry:

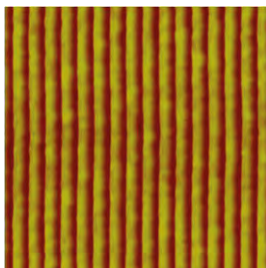
- parallel ridges (1-D, 300 or 700nm)
- cylindrical posts (2-D 300nm)
- diamond-shaped posts (2-D 700nm)

Physical Size: 3 mm x 4 mm x 0.5mm

Substrate: Silicon wafer

Top Surface: Tungsten film

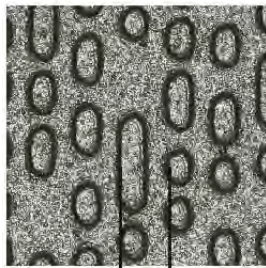
The 1-D standards can be scanned using any AFM mode, including contact mode. The 2-D standards can be scanned using modes such as Tapping Mode™, intermittent contact, and non-contact.



Model 150-1D

► Model 150-1D

Accurate measurements of sub 0.5 micron features are increasingly important as nanotechnology develops and as conventional microfabricated structures (semiconductors, magnetic data storage devices, optical data discs) shrinking. The model 150-1D with a nominal period (pitch) of 150nm, one dimensional, fabricated on a transparent substrate (Aluminum lines on glass) is the new tool to support this work.



Model 750-HD

► Model 750-HD

High Durability Calibration Reference Specimen for AFM and STM

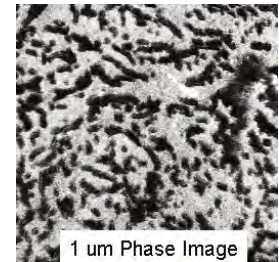
Each specimen is supplied with a calibration certificate.

Can be used for AFM, STM and SEM. Has been used successfully in a hot water AFM.

Nominal pattern dimensions:Pitch 750 nm
 Height 100 nm
Nominal specimen dimensions:6.35 m diam.,
 0.3 mm thick
Composition:Solid Nickel

► Model PT

Phase Imaging Test Specimen (verify Tapping-Mode™ phase contrast and resolution). Phase Imaging is a sharp probe, which is brought into proximity with the specimen surface. The probe is oscillated vertically near its mechanical resonance frequency. As the probe lightly taps the surface, the amplitude of oscillation is reduced and the AFM uses this change in amplitude in order to track the surface topography. In addition to its amplitude, the probe motion can be characterized by its phase relative to a driving oscillator. The phase signal changes when the probe encounters regions of different composition. Phase shifts are registered as bright and dark regions in phase images, comparable to the way height changes are indicated in height images.

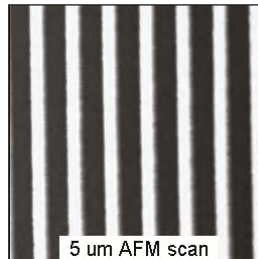


1 um Phase Image

Phase images often show extraordinary contrast for many composite surfaces of technological and scientific interest. These include contamination deposits, discontinuous (i.e. defective) thin films, devices built of composite materials (e.g. magnetic recording heads), and cross-sectional specimens of composite materials. Both inorganic and organic materials can be examined. We have found that phase imaging is more convenient and gentler than other methods, which are based on contact mode operation. It routinely achieves lateral resolution of 10 nm.

► Models 300-2D, 300-1D, 700-2D and 700-1D

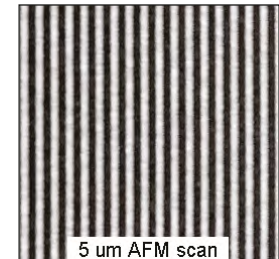
All mounted on 15 mm steel disk.



5 um AFM scan

300-1D

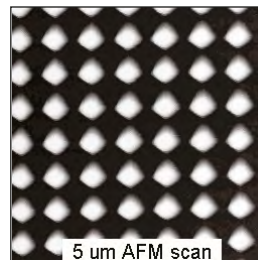
Parallel Ridges, Pitch 288
 W-coated Photoresist on Si
 Use contact or TappingMode



5 um AFM scan

300-2D

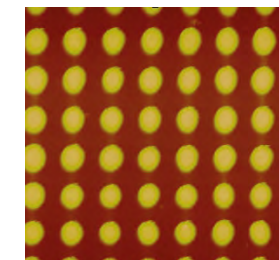
Array of Posts, Pitch 297
 Al bumps on Si
 Use contact or TappingMode



5 um AFM scan

700-1D

Parallel Ridges, Pitch 700
 W-coated Photoresist on Si
 use contact or TappingMode



700-2D

Array of Posts, Pitch 700
 W-coated Photoresist on Si
 use TappingMode

References:

1. Pereira, D.E.D. & Claudio-da-Silva, Jr., E. "Improvement of AFM as an analytical Instrument for Residual Lignin Characterization" in: Proceedings International Symposium on Wood and Pulp Chemistry, Helsinki, Finland, June 1995.
2. Pereria, D.E.D, Chernoff, D., Claudio-da-Silva, Jr. E., & Cemuner, B.J., "The use of AFM to investigate the delignification process: Part I -AFM performance by differentiating pulping processes", to be published.

► SPM Calibration Specimens (continued)

► Model 150-2D — Very High Reference and Traceable Standard for Resolution Calibration AFM, SEM, Auger, and FIB

General Purpose – High Precision

A precision, holographic pattern provides accurate calibration in the horizontal plane for very high resolution, nanometer-scale measurements.

Period: 144 nm pitch, two-dimensional array. Accurate to ± 1 nm. Refer to calibration certificate for actual pitch.

Surface: Aluminum bumps on Silicon, 4x3 mm die. Bump height (about 90 nm) and width (about 75 nm) are not calibrated.

For AFM, use in contact, intermittent contact (TappingMode™) and other modes with image sizes from 250 nm to 10 mm. Available un-mounted or mounted on 12 mm steel disks.

For SEM, an independent analytical lab has tested this specimen in a FE-SEM (field emission scanning electron microscope). They found that the pattern was very uniform and the specimen was easy to image. No significant charging was observed in the voltage range 1-20 kV.

Usability: the calibrated pattern covers the entire chip. There is sufficient usable area to make tens of thousands of measurements without reusing any areas altered or contaminated by previous scans.

► MODEL 150-2D:

This Calibration Reference specimen comes with a non-traceable, manufacturer's certificate. These states the average period, based on batch measurements.

► MODEL 150-2DUTC:

This traceable, Certified Standard is a select grade. Each standard is individually measured in comparison with a similar specimen calibrated at PTB. (PTB, Physikalisch-Technischen Bundesanstalt, is the German counterpart of NIST). The uncertainty of single pitch value is typically $\pm 1,4$ nm (95% confidence interval). Multi-pitch measurements provide the usual square-root of N improvement in precision.

Easy to use

We recommended Model 150-2D because of its unique characteristics which make it especially easy to use. The specimen is durable and it allows you can scan in contact mode, offering you faster calibration and measurements. This is the only high resolution 2D calibration specimen we have seen that offers the following characteristics:

- 2-dimensional array for simultaneous calibration of X and Y axes.
- Pitch <500 nm.
- Array of pumps mean the image contrast is high even when the probe tip is slightly dull.
- High contrast in contact mode scans.
- The pattern covers the entire die so that you don't have to hunt for the scan area.

Ordering for Calibrator only:

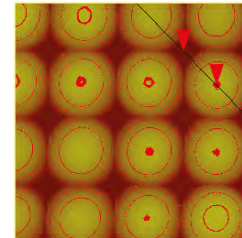
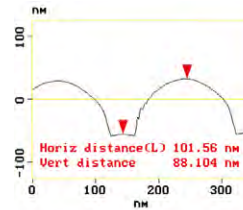
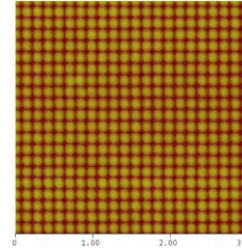
Available in the following ways: unmounted, 15mm steel disk(for AFM), SEM pin stub, or any other type of SEM stub.

ASM Model#	EMS Part#
150-1D	80125-1D Unmounted
	80125-1D-Pin
	80125-1D-AFM
	80125-1D-X (Choose mounting)
150-2D	80125-2D Unmounted
	80125-2D-Pin
	80125-2D-AFM
	80125-2D-X
150-2DUTC	80126-2D Unmounted
	80126-2D-Pin
	80126-2D-AFM
	80126-2D-X

ASM Model#	EMS Part#
300-1D	80123-1D Unmounted
	80123-1D-Pin
	80123-1D-AFM
	80123-1D-X
300-2D	80123-2D Unmounted
	80123-2D-Pin
	80123-2D-AFM
	80123-2D-X
301BE	80111-31 Unmounted
	80111-31-Pin
301CE	80110-31 Unmounted
	80110-31-Pin

ASM Model#	EMS Part#
302-edu	80124-EDU Unmounted
	80124-EDU-Pin
302CE	80110-32 Unmounted
	80110-32-Pin
700-1D	80122-1D Unmounted
	80122-1D-AFM
700-2D	80122-2D Unmounted
	80122-2D-AFM
701CE	80110-71 Unmounted
	80110-71-Pin
702CE	80110-72 Unmounted
	80110-72-Pin
750-HD	80124-HD Unmounted
PT	80124-PT

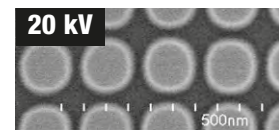
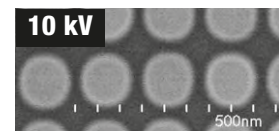
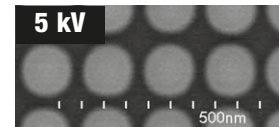
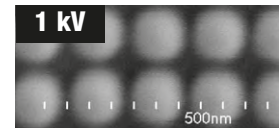
AFM Tapping Mode Scan



The bump height is about 90 nm. This specimen is not recommended as a height reference because it is not easy for the standard AFM probes to reach the substrate level between the pumps.

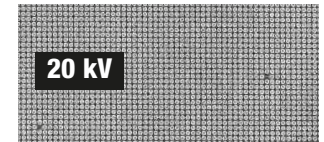
SEM High Magnification

The following image was captured with a magnification setting of 100kX and accelerating voltage 10 kV



SEM Medium Magnification

At 5 kX, the individual bumps were still well resolved. Large fields of view show how few defects are present. The most common defects are single missing bumps or a single extra bump inserted between lattice positions. Two vacancies are present in the image shown here.



► Very High Resolution Calibration Reference and Traceable Standard for AFM, SEM, Auger, and FIB

For General Purpose and Metrology Microscopes

A precision pattern providing accurate calibration in the horizontal plane for very high resolution, nanometer-scale measurements.

Period: 70 nm pitch, one-dimensional array. Accurate to +/- 0.25 nm. Refer to calibration certificate for actual pitch.

Surface: Silicon Oxide ridges on Silicon, 4x3 mm die. Ridge height (about 35 nm) and width (about 35 nm) are not calibrated.

For AFM, use in contact, intermittent contact (TappingMode™) and other modes with image sizes from 100 to 3000 nm. Available unmounted or mounted on steel disks.

For SEM, this specimen works well at a wide range of accelerating voltages (1 kV to 20 kV have been tested) and calibrates images from 25 kX to 1000 kX. Normally supplied unmounted. Can be mounted on a stub of your choice.

Usability: The calibrated pattern covers a 1.2x0.5 mm area. There is sufficient usable area to make thousands of measurements without reusing any areas altered or contaminated by previous scans.

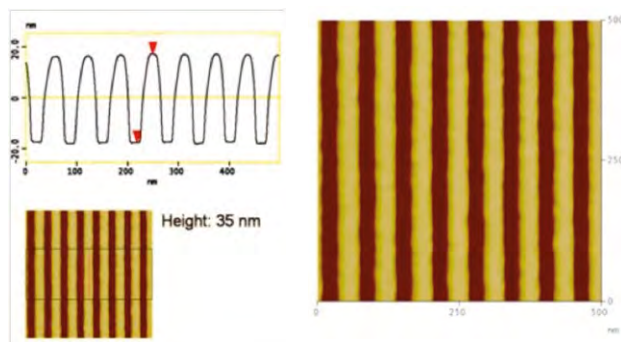
► Model 70-1D.

This Calibration Reference specimen comes with a non-traceable, manufacturer's certificate. This states the average period, based on batch measurements.

► Model 70-1DUTC.

This Traceable, Certified Standard is measured in comparison with a standard calibrated at PTB. (PTB, Physikalisch-Technischen Bundesanstalt, is the German counterpart of NIST. The standard is "NIST-Traceable" by virtue of the mutual recognition agreement between NIST and PTB.) The uncertainty of single pitch values is typically +/- 0.5 nm (95% confidence interval). Multi-pitch measurements provide the usual square-root of N improvement in precision.

AFM Tapping Mode Scan

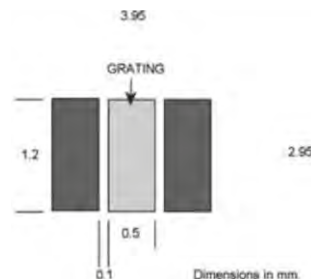


The ridge height is about 35 nm. This specimen is not recommended as a height reference because the standard AFM probes may not always reach the substrate level between the ridges. Nevertheless, the image contrast is high, even when the probe tip is slightly dull. You can scan in contact mode, which means you can calibrate and measure faster.

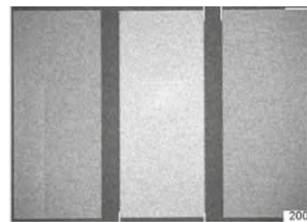
Easy to find Patterned area

The patterned area is easy to find. The three rectangles shown in the sketch below are visible in reflected light, with either the unaided eye or an optical microscope. In a low magnification SEM image, the contrast is reversed. The central rectangle, which is the grating pattern, is relatively bright. The grating lines are parallel to the long side of the rectangle, as suggested by the high magnification SEM image.

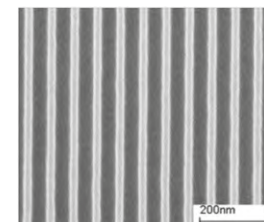
Die and location of pattern within die:



Low magnification SEM image:



SEM High Magnification Image



Magnification= 200 kX
Voltage= 5 kV.

Ordering for the Very High Calibration and Traceable Standard:

Available in the following ways: unmounted, 15mm steel disk (for AFM), SEM pin stub, or any other type of SEM stub.

Cat.#	Description	Qty
80127-1D	Calibration Standard, Model 70-1D Unmounted	each
80127-1DC	Calibration Standard, Model 70-1D with Cert, Unmounted	each
80127-1D-PIN	Same as 80127-1D but mounted on Pin Stub	each
80127-1DC-PIN	Same as 80127-1DC but Mounted on Pin Stub	each
80127-1D-AFM	Same as 80127-1D but mounted on Steel Disk for AFM	each
80127-1DC-AFM	Same as 80127-1D but mounted on Steel Disk for AFM	each
80127-1D-X	Same as 80127-1D, Choose Mount	each
80127-1DC-X	Same as 80127-1D Choose Mount	each

► MeX – Turn Your SEM Into a 3D Measurement Device

3d Surface Metrology With The SEM

MeX turns any SEM into a measurement device

MeX is a stand alone software package that turns any SEM with digital imaging into a true surface metrology device. Using stereoscopic images the software automatically retrieves 3D information and presents a highly accurate, robust and dense 3D dataset which is then used to perform traceable metrology examination. The results are obtained irrespective of the SEM magnification providing metrology at macro and micro levels.

The software is self installing and is extremely easy to use. The modular design of the package allows flexibility in use; it also permits users, with a single repetitive task to perform, to purchase modules according to requirements. The analysis modules allow measurement of profile, roughness, area, volume and "Z" height. All measurements are traceable, can be calibrated and conform to ISO standards.

The performance of MeX has been proved by many customers in leading companies and universities throughout the world providing imaging and analysis previously unobtainable with SEM images.

Unique Features Allow New Applications

Robust and highly accurate at any magnification

The core of MeX is formed by its innovative 3D reconstruction algorithms. The research and development team of Alicona Imaging have invented methods that generate highly accurate, dense and robust results. This unique performance becomes obvious in images of complex structures with steep edges and drop offs in addition to demanding samples with low texture and signal-to-noise-ratio. This high quality is achieved irrespective of image magnification.

Automatic calibration allows traceable 3D measurement

Conventional approaches rely on the use of two images. This comes with the major drawback that the overall accuracy of the 3D measurement is partly dependent on the accurate reading of the tilt angle. It is also commonly known that this reading maybe error-prone and can only be achieved to a certain level of accuracy. Latest developments of Alicona have extended this stereoscopic approach to a third image. As a result the user defined parameters, such as the tilt angle, are automatically calculated. This omits the influence of the user and allows, for the first time, traceable 3D measurement in the SEM.

Easy to use, easy to install

No additional hardware is necessary to run MeX. As a pure software solution MeX can be operated with any SEM requiring only images in common formats. The software is self-installing and works completely independently of any third party drivers or components. The user interface of the overall package is very user friendly and self-explanatory. Data is obtained quickly and effectively. A wizard guides the user through the reconstruction process which then automatically converts the information to a 3D data set. The consecutive analysis is again intuitive and the user is not confronted with unnecessary functionality. The user finds exactly what is expected from a 3D metrology package.

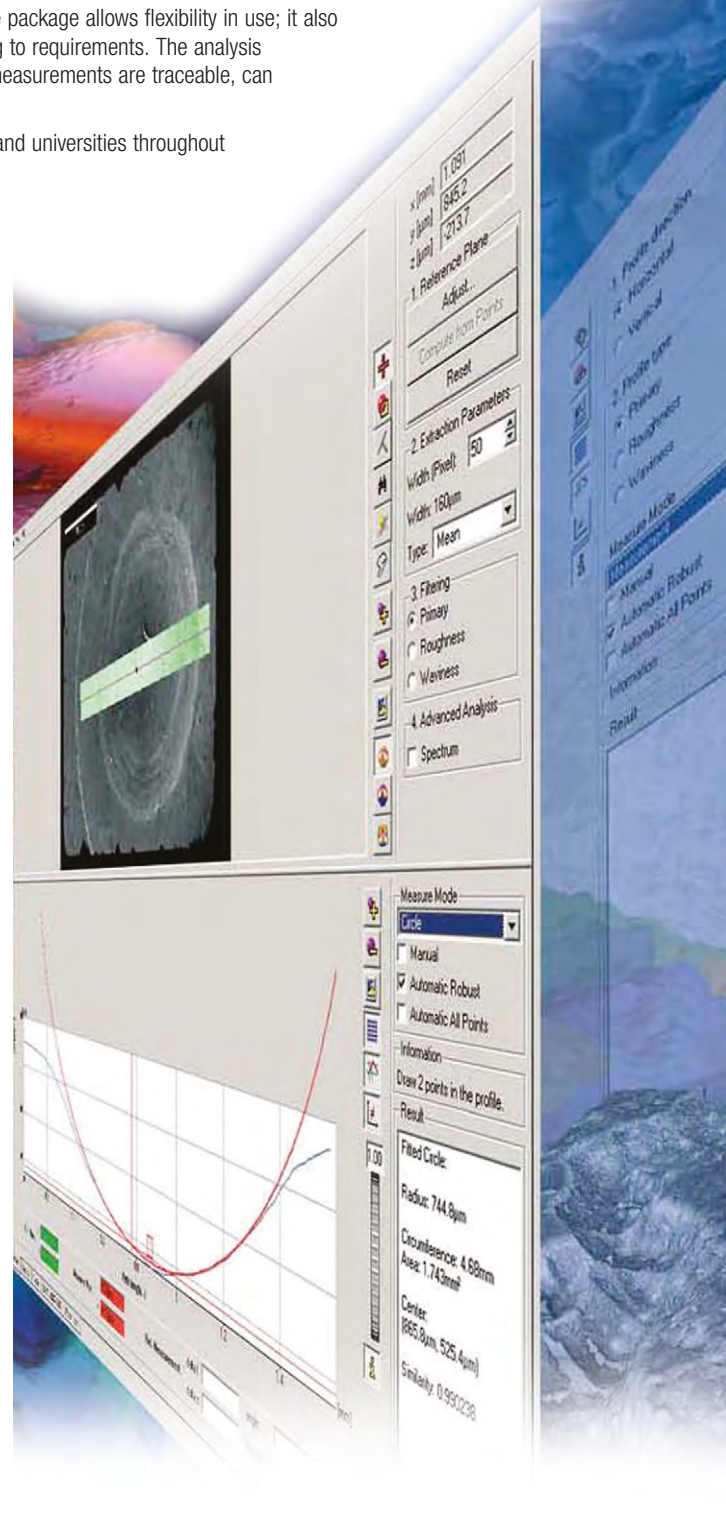
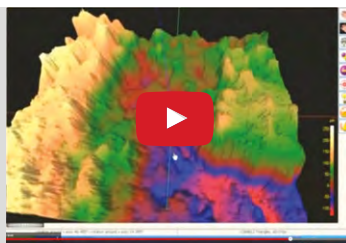
Comprehensive depth analysis

The uniqueness of MeX is in its accuracy and robustness. But in order to perform appropriate measurements, beyond conventional visualization, analysis following international standards must be available. In MeX, the easy to use, roughness and area analysis are provided to EN/ISO standards. Measurements are performed directly on the SEM image. Printing and exporting the actual representations of an image are a one-click operation. The visual link between

See how it works... Learn how to do it...

We've added video content to our website to help you get to know our latest products even better!

Stop by and see what it's all about.



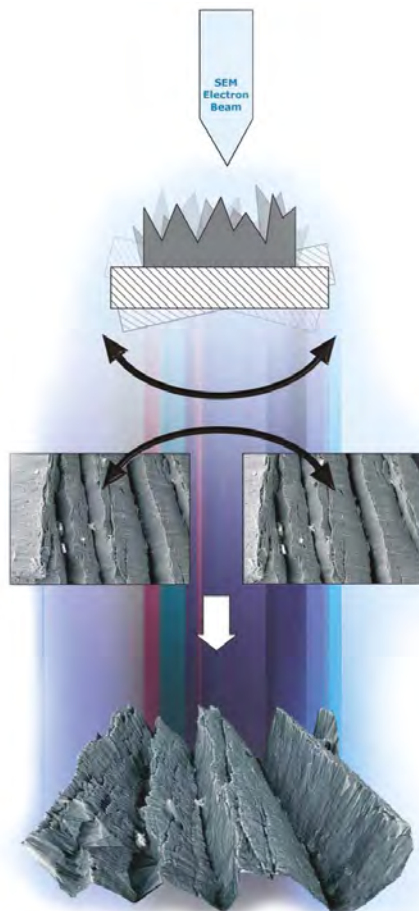
► MeX – The Technical Principle Of MeX

the surface and the image enable precise and flexible measurements. Even volumetric analysis is conveniently feasible. Therefore MeX is the only software package that turns a SEM into a true 3D metrology device.

3D measurement based on stereo images

The image formation process in the SEM is based on perspective projection. Similar to a conventional light microscope the three dimensional object is projected onto a two dimensional image plane and information about the third dimension is lost. Note, the large depth of focus in SEM provides full depth of focus images, but does not allow to measure depth. Only two dimensional measurements in the image plane are feasible.

An eucentric tilting of the stage, meaning that the intersection of the primary electron beam with the specimen define the centre of tilting, yield a second image of the specimen observed from a different viewpoint. A so called stereoscopic image is generated. Overlay techniques such as red-green coloring provide anaglyph viewing and thus depth perception but again no quantitative analysis. The leading technology of Alicona now automatically identifies points in each of the images that belong to the same point on the specimen. From these so called homologous points the true three dimensional coordinates of the homologous point can be recovered. This demanding task is robustly solved for each pixel in each of the images and thus a dense 3D model of the specimen is obtained. An additional third image captured from a third tilt position allows to automatically refine given calibration data. Thus traceable results are obtained.



Automatic Calibration

Verification of measurements through height step

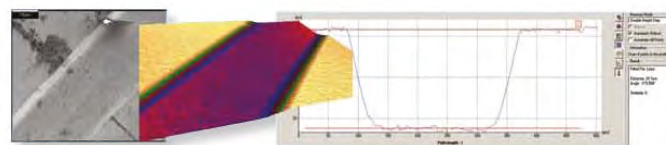
Height measurements with the AutoCalibration can be verified using a micro-contour-artefact that is calibrated by the PTB (Physikalisch Technische Bundesanstalt, Braunschweig). The depth measurement standard from the PTB contains grooves of different depth (from 240nm to 50µm).



Micro- contour-artefact, calibrated by PTB

- The unique AutoCalibration works fully automatically. Alicona is the only supplier able to offer this technology.
- MeX is the only real metrology package that allows numerically accurate measurements independent on the magnification.
- MeX allows extended analysis features such as ISO conform roughness analysis and extended form analysis.

Reconstructions And Analysis In The SEM



Input image, 3D reconstruction and height measurement with the AutoCalibrator. The AutoCalibrator refines the calibration data and allows more accurate measurements.

Measurement results in comparison		
PTB	Stereo Creator	AutoCalib
24.04µm ±0.07µm	25.3µm	24.10µm

Angle refinement with AutoCalibration Stereo Creator		
	-9,5°	9,5°
AutoCalib	-10,05°	10,00°

Verification of measurements through radius measurement

Measurements of the pure software solution MeX can be verified using a micro-contour-artefact that is calibrated by the PTB (Physikalisch Technische Bundesanstalt, Braunschweig). The artefact contains different regions including steep flanks, height steps and cylindrical elements.

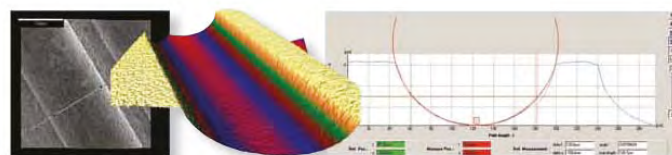


PTB calibrated micro artefact with steep flanks, height steps and cylindrical elements.

The following measurements can be verified:

- Circle measurements
- Steep flanks
- Depth measurements

Reconstructions And Analysis In The SEM



Verification of circle measurements. One of the input images (SEM) obtained from the region with the cylindrical valleys. The radius of the circle was measured with MeX – AutoCalibration.

Measurement results in comparison		
PTB	Stereo Creator	AutoCalib
80µm ± 2µm	75.11µm	81,14µm

Angle refinement with AutoCalibration Stereo Creator		
	-10°	10°
AutoCalib	-10,86°	11.01°

► MeX – Comprehensive Analysis Capabilities For Surface Measurement And Characterization

Height & Roughness Analysis

Profile measurement enables virtual cutting of specimen. The user defines a path on the optical image and receives the corresponding 3D profile. Roughness and contour measurements conform to recognized EN ISO 4287/4288 international standards. The profile analysis also allows the fitting of primitives such as circles, angles or others. Further, manual and semi automatic measurement possibilities are provided.

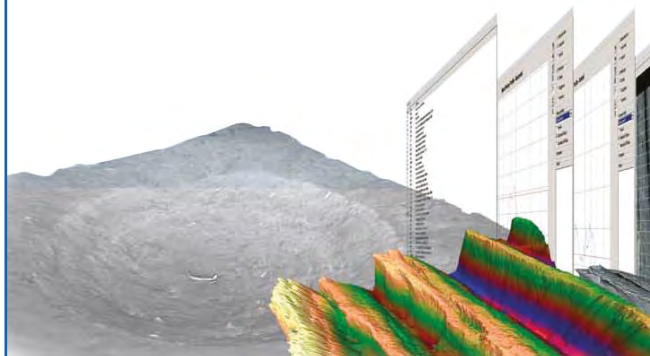
- Profile extraction with different width
- Filtering of the profile with selectable Lc value with ISO 4288 conformity information
- Manual cursor measurement
- Automatic measurements of lines, parallel lines, single height steps, double height steps, ISO 5436 conform height steps, angles, 2 line angles and circles
- ISO 4287 conform calculation of the following primary parameters: Pa, Pq, Pz, Pp, Pv, Pc, PSm, Psk, Pku, Pdk
- ISO 4287 and ISO 11562 conform calculation of the following roughness parameters: Ra, Rq, Rz, Rp, Rv, Rc, RSm, Rsk, Rku, Rdk
- ISO 4287 conform calculation of the following waviness parameters: Wa, Wq, Wz, Wp, Wv, Wc, WSm, Wsk, Wku, Wdk
- Calculation of fourier spectrum of profiles
- Calculation of bearing ratio curve
- Calculation of statistical parameters of profiles



Area Analysis

Area analysis provides the determination of Ra, Rq and Rz. Parameters like roughness, waviness and the fractal dimension of user defined surface patches are achieved. The user defines a region of interest such as a rectangle or polygon and MeX automatically calculates the values. For the visual representation of the surface a grey scale or pseudo colored depth map can be used. It is also possible to display ISO-lines to highlight depth variations.

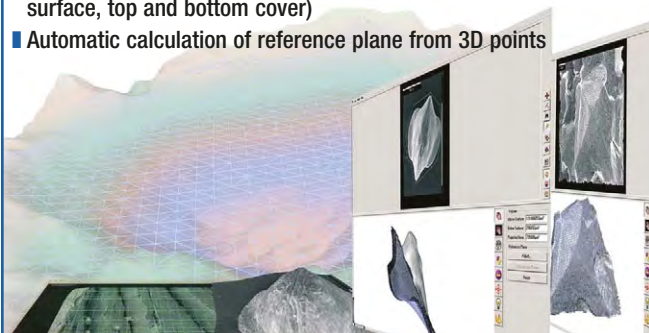
- Calculation of surface parameters like Sa, Sq, Sz, Sp, Sv
- Calculation of fractal dimension
- Extraction of horizontal and vertical profiles
- Filtering of profiles
- Calculation of mean of the primary, roughness and waviness values of the horizontal and vertical profile
- Calculation of the primary, roughness and waviness parameter of the mean horizontal and vertical profile
- Calculation of bearing ratio curve
- Calculation of bearing area curve



Volume Analysis

Volume analysis calculates the volume of voids and protrusions. The measurement area is defined directly on the optical image. The volume is determined throughout the computation of a soap film model. For the 3D boundary of the selected area MeX calculates a covering surface that behaves like a soap film.

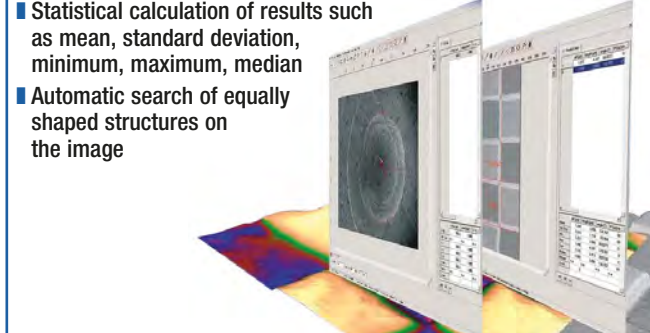
- Selectable area for volume measurement
- Selectable reference surface (plane, minimum spanning surface, top and bottom cover)
- Automatic calculation of reference plane from 3D points



2D Image Analysis

2D image analysis allows the performance of manual and semi automatic measurement of simple primitives. Also, the ability to write on the images as well as saving measurement results in a comprehensive and easy to use database is provided.

- Manual measurement of lines, parallel lines, arcs, circles, ellipses, polygons, polylines, freehand, marker
- Automatic measurement of lines, parallel lines, circles, arcs
- Statistical calculation of results such as mean, standard deviation, minimum, maximum, median
- Automatic search of equally shaped structures on the image

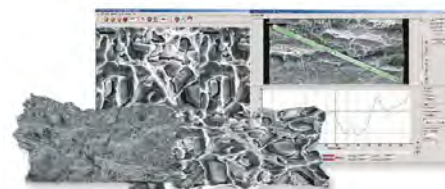


► MeX – Practical Solutions With MeX

Fracture Analysis

Quantitative surface analysis with the SEM is often used to investigate damage evolution in materials in addition to assisting in the design of more fracture resistant materials. The optimization of materials is complicated by the fact that the material properties may need to vary locally within the component. An example of this is cutting tools that need to be very hard at the cutting edge but be tough in the interior of the material. MeX is used to study deformation and fracture behaviour to optimize the performance of inhomogeneous materials. Dense, robust and accurate 3D reconstructions are created to allow measurement of fracture surface profiles, roughness parameters and fractal dimensions.

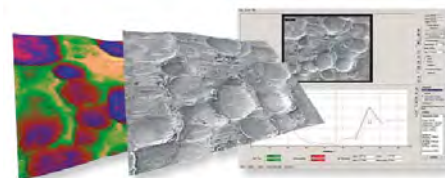
3D measurement results computed by MeX lead to significant understanding of parameters such as fracture toughness, crack growth and propagation or fracture resistance.



Steel Production

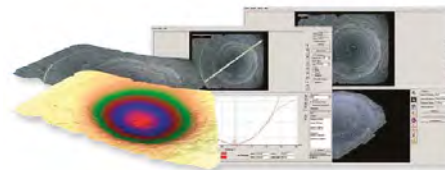
Modern high-tech steel is one of today's most important materials in all kinds of industries, transportation or medicine. The surface characteristics can relate to appearance, conductivity, corrosion resistance, wear or many other properties. MeX is an essential tool to assist with surface characterization for quality assurance and failure analysis. The 3D measurement capabilities provide robust and accurate results on properties such as fracture and compression strength, notch bar impact value or creep strength.

MeX is also used to evaluate faults in steel production. The overall quality of steel is dependent on the topography of the roller used in its production. As soon as the roller exhibits any kind of surface defects the surface of the steel will show dimples and inclusions. Using the measurement capabilities of MeX these faults can be analysed and the source of the defect traced.



Forensic Studies

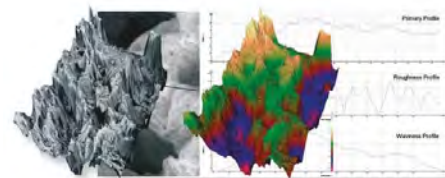
Every gun leaves distinctive marks and traces on the bullet cartridge and projectile, similar to fingerprints. These traces on a gun, found at a crime scene, can be instrumental to prove guilt of suspects. Conventional methods are based on the analysis of 2D images to identify which bullet has been fired from which weapon. However, the 3D visualization and measurement of the firing pin and cartridge indentation is far more precise. It is here that MeX offers unique capabilities providing a highly accurate, dense and robust 3D reconstruction with full depth of focus taken over a large field of view. Using MeX a user can, for example, measure the volume of a firing pin impression along with profile that can be related directly to the firing pin. This leads to a numerical evaluation independent from any subjective point of view, providing rapid and understandable analytical data for interpretation.



Crater Shape Measurement

MeX can be used for the measurement of diameters, depths, angles of slope and volumes of craters created by impact of mineral grains on metals. This is part of the calibration work that has been done to help interpret cometary dust impacts on the stardust spacecraft, which returned to earth recently, carrying the first comet samples ever collected.

MeX has been used as a measurement tool to interpret the size, density and composition of particles responsible for making micrometre-scale craters. The ease of use of MeX, with its intuitive graphical interface, has enabled the quick and simple measurement of the required parameters. Data input and the range of easily interpreted reconstructions make MeX to a most suitable tool for quantified reconstruction of crater shapes from tilted stereo-pair electron micrographs.



Cancer Research In Life Science

MeX turns any SEM, in biological and non biological applications, into a full 3D measurement device.

Until MeX, the biological user has had limited methods that could provide accurate and robust measurements of surface texture, volumes and area of bulky irregular samples. In recent research MeX has been used to characterise the topography of the extracellular matrix (ECM) underlying colon cancer cells at various stages. Also, the enhanced visualization and roughness measurement capabilities of MeX has provided additional information, not previously available, about the cancers' behaviour. These findings have implications not only for improving the general understanding how colon cancer and metastasizes grow, but, also lead to a better understanding of the role of the ECM topography in cancer.



► MeX – Requirements for Sample Images for Mex 3D Software

Mex is a very easy to use package for the creation of 3D images for subsequent measurement with the SEM. The software will do nothing to correct faulty images nor will it allow you to see features that are not on the sample. But by following a few simple procedures the results will be both spectacular and contain significant data, these simple procedures are shown below.

- 1) All images must be in TIFF or BMP format
- 2) The magnification chosen must reflect the size of the features to be viewed; the software will not allow features to be measured that are not visible.
- 3) Tilt Angle: Mex will take either 2 or 3 images and these are divided by tilt angle, the choice of 2 or 3 images is specimen dependent. In the first case please supply a pair of images which have a differential tilt angle of 5 degrees.
- 4) Eucentric Tilt: Please ensure that the images are eucentric, this means that a single chosen spot on the image should be in the same position on each image (see note)
- 5) Tilt Direction: Please ensure that the tilt direction, when viewed on the SEM screen runs East to West and not North South or diagonal. If images run at an angle this will result in image rotation which will reduce the size of the image that can be viewed.
- 6) Working Distance. To construct the image we need to know the working distance
- 7) Calibration: Please ensure that a scale bar is on the image.

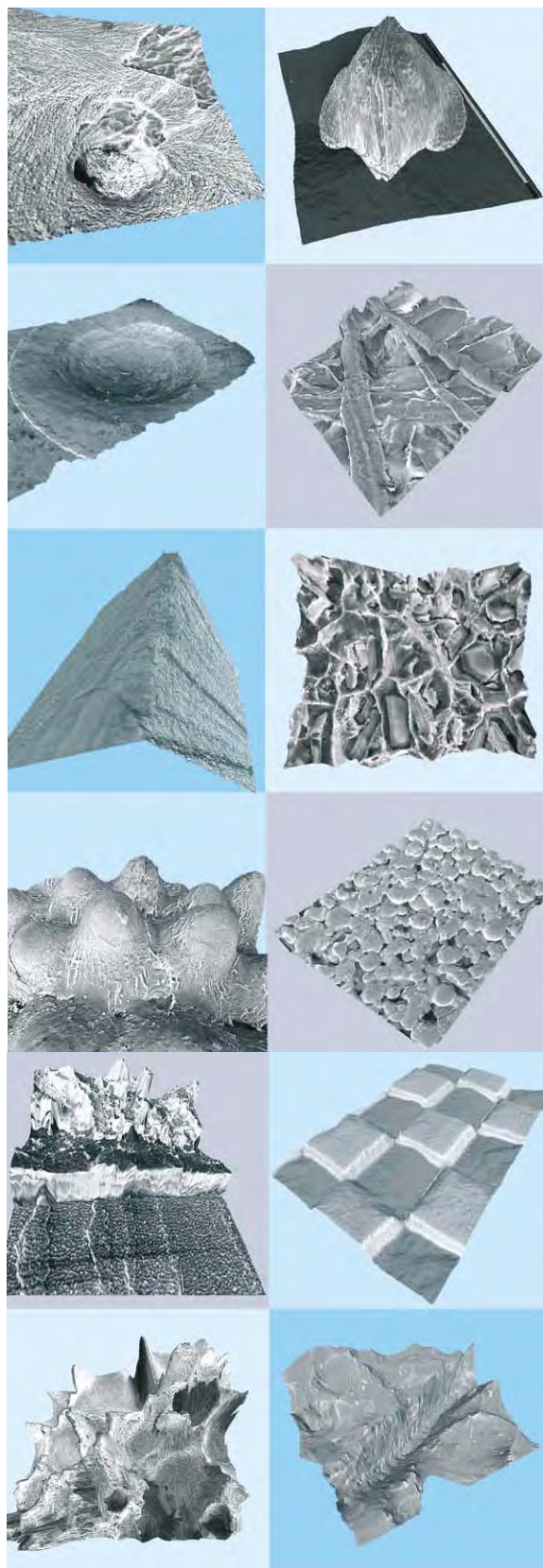
Note:

To take images for MeX it is necessary to have Eucentric Images, it is not necessary to have a Eucentric Stage to take Eucentric Images. What is also important is that when tilt is applied the image moves east to west (or west to east) and not north to south or any diagonal from that.

A simple method without a Eucentric Stage is

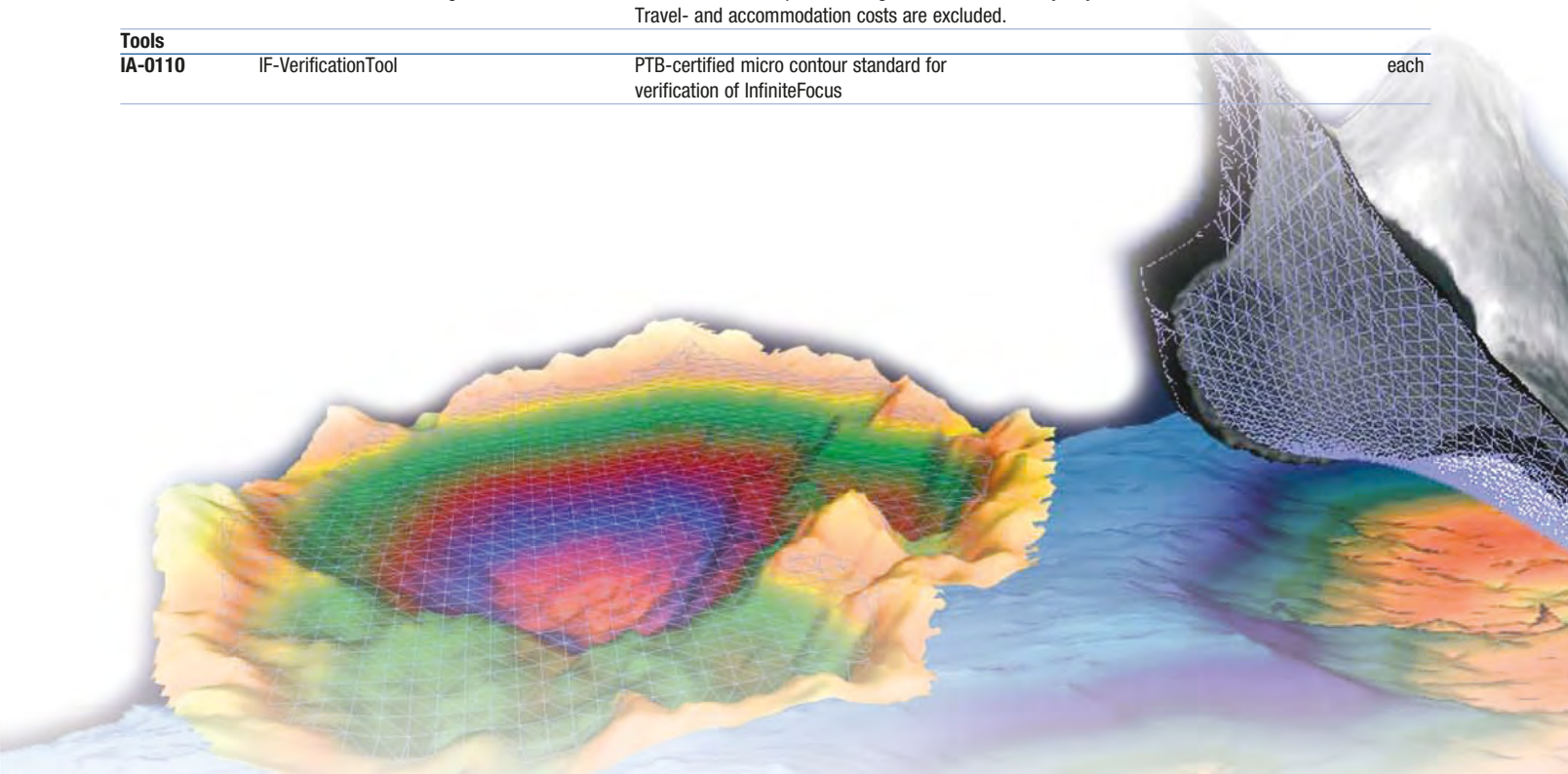
- 1) Find and identify a feature on the image that can be used as a reference
- 2) Either turn on the cross wires built into the SEM or stick a corner of a post it note on the feature
- 3) Decide which magnification the image is to be taken at, then go 2 magnification steps above that and align the feature
- 4) Drop the magnification down and take the image
- 5) Reduce magnification to a level where the bulk of the feature is still visible (this makes it easier to track when tilt is applied)
- 5) Apply tilt bringing the feature back into the frame with X or and Y
- 6) Either turn on the cross wires built into the SEM or stick a corner of a post it note on the feature
- 7) Then go 2 magnification steps above the magnification selected in #3 and align the same feature
- 8) Drop the magnification down and take the second image

If a third image is required simply repeat the process



► MeX – Ordering Information

Cat#	Product Name	Description	Qty.
Packages			
MP-0101	MeX-Standard	MeX-Database, MeX-3DViewer, MeX-Creator, MeX-AutoCalibration, MeX-Profile, MeX-Area, MeX-Volume, MeX-SCS for one year	Package
MP-0102	MeX-Professional	all available MeX modules: MeX-Database, MeX-3DViewer, MeX-Creator, MeX-AutoCalibration, MeX-Profile MeX-Area, MeX-Volume, MeX-StereoComparator, MeX-3DReader inclusive two years of e-mail support and free updates	Package
Modules			
MM-0109	MeX-3DReader	Importing 3D datasets obtained from other devices such as AFM (ask for supported machines and formats)	each
MM-0104	MeX-3DViewer	Visualizing generated 3D-data in an intuitive, easy-to-use viewer	each
MM-0106	MeX-Area	Area analysis including roughness measurements	
MM-0103	MeX-AutoCalibration	Extension to MeX-Creator - using three images, calibration data are refined and a much higher accuracy is achieved	each
MM-0102	MeX-Creator	Automatic surface measurement from stereoscopic images - the core module of MeX (requires MeX-Database and MeX-3DViewer)	each
MM-0101	MeX-Database	Graphical database for storing and maintaining the captured stereoscopic images	each
MM-0105	MeX-Profile	Profile extraction, visualization and analysis including EN/ISO roughness and waviness measurements	each
MM-0108	MeX-StereoComparator	Manual pointwise 3D measurement for stereoscopic images	each
MM-0107	MeX-Volume	Volume extraction, visualization and analysis	each
Options			
MA-0101	MeX-FloatingLicence	Dongle to allow network version of MeX: provides the use of MeX in a local network with only one dongle	each
Service & Support			
MS-0104	MeX-Installation	Shipping, installation and training for one day at your location (excl. travel expenses and accommodation).	each
MS-0103	MeX-OfflineReconstruction	Measurement of your specimen in our lab, including a CD with results and demo version	each
MS-0102	MeX-OnlineReconstruction	Measurement of your stereoscopic images; the result can be viewed and analyzed by MeX-Demo	each
MS-0101	MeX-SCS ServiceContractSoftware	One year of e-mail support and free updates; continuous MeX-ServiceContractSoftware required for upgrades/updates	each
MS-200	MeX 6.1 Professional Upgrade	An upgrade to MeX Professional Module (for service contracts that have expired within 1 year).	each
MS-250	MeX 6.1 Professional Upgrade	An upgrade to MeX Professional Module (for service contracts that have expired over 1 year).	each
MS-0106	MeX-Installation&TrainingContinued	installation and adoption training for one additional day at your location. Travel- and accommodation costs are excluded.	each
Tools			
IA-0110	IF-VerificationTool	PTB-certified micro contour standard for verification of InfiniteFocus	each



► Scanning Electron Microscope Digital Imaging

► SEM Digi-CAM 2

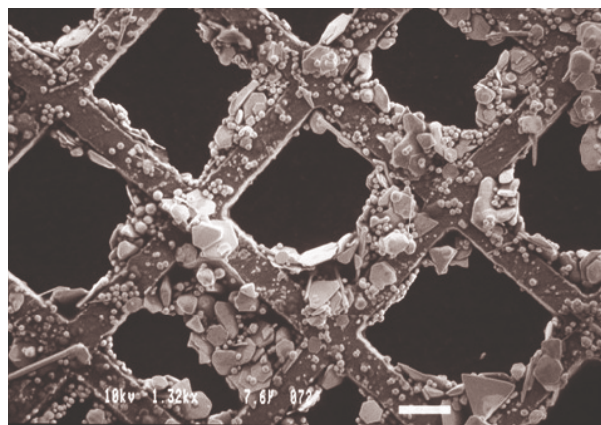
The easy, inexpensive way to upgrade your scanning electron microscope or STEM to digital imaging just got better with an increase in camera resolution to 14 MP!!



By now you've heard: Polaroid is no longer producing film for it's cameras. With the existing supply of Polaroid film decreasing every day, the price has been skyrocketing. How will you document the samples you are imaging in the future? Sure, you could digitize your entire SEM but these conversions are time consuming and can cost in the range of \$15,000 or more!

Originally designed to solve our own in-house digitization needs, the **SEM Digi-CAM 2** is easy to set up and is less expensive than a frame grabber and higher resolution in most cases. If you want us to supply a dedicated mini PC an additional charge will apply, but to the best of our knowledge almost any PC or MAC will suffice.

But what about quality? You be the judge! The image at right is an actual images taken using the SEM Digi-Cam 1 with 6.1 MP.



SEM DIGI-CAM FEATURES:

- 14 MP Nikon SLR Digital Camera - Custom Configured for this application!
- Images can be transferred wirelessly to the PC, or MAC, without need to use WiFi or any other in house network. This overcomes restrictions many customers had regarding security issues when using their normal Institutions network. This has an ad hoc system. You will need an internet connection for initial setup or registration.
 - A USB cable is also included if you do not wish to transfer images wireless
- Remote Controlled Shutter Operation - accommodates even the longest CRT searl times
- Includes software or use your own imaging program such as Photoshop, iPhoto, etc.
- One year warranty on camera. Ext. warranty available.
- AC Adapter for Digital Camera
- Mounting hardware for your particular instrument

Advantages over other digital imaging acquisition systems:

- Resolution is actually better than many more expensive frame grabbers!
- Much lower cost!
- Easily setup & installed - No Service Technician needed!
- Camera can be removed from adapter and used as you like!
- Works on STEM's and slow scan instruments.
- Free One Year Technical Support included!

95200	SEM Digi-CAM	each
95210	SEM Digi-CAM with PC included	each

SECTION 17

Cryo Supplies and Accessories

Cryo Chambers

Cryo Accessories including aprons, gloves, tissue freezing medium, cryogen spray, and dewars

Cryo Vials, Tubes, Storage and Racks

Cooling Chambers and Ice Baths

Freeze Substitution

Cryo Dewars and Flasks

Dry Ice Makers

Cryogenic Labels, Tags and Markers



**Electron
Microscopy
Sciences**



► EMS UVC3 Ultraviolet Cryo Chamber

The EMS UVC3 Cryo Chamber has been specifically designed to provide an economical yet precisely controlled low temperature environment for polymerization of polymers and resins for cryo specimen preparation. It can also be used for dehydration and infiltration of cryo specimens. This simple and functional unit has a large insulated chamber and comprises fully automatic temperature control for the polymerization process of embedding resins and polymers.



FEATURES:

- Liquid crystal display and PLC control
- Fan cooled electronic ballast for UV lamp tubes
- Temperature range can be set from -10°C to -40°C (14°F to -40°F)
- Includes memory function for Min/Max temperatures during any run
- 365nm ultraviolet lamps thermally shielded by dual pane Plexiglas®
- Holds up to 66 samples with BEEM® Cryo Capsule Holders
- Perfect for Unicryl, LR White, LR Gold, Lowicryls, JB-4, Quetols and all other resins cured by 365nm UV radiation
- Universal voltage

OPERATION

- Add dry ice to the chamber
- Set temperature (-10°C to -40°C / 14°F to -40°F)
- Turn on UV lamp and cure embedding resins

SPECIFICATIONS

UV Light Source....Two 15-watt self-filtering long wavelength tubes
1600 µW/cm² of 365nm UV radiation at 15cm (6")

Temperature Control-10°C to -40°C (14°F to -40°F)
Typically +/- 1.5 °C

Control Type.....LCD Display with PLC with function buttons

Exterior Dimensions.....64.1 L x 36.8 W x 48.9cm H
.....(25.25" L x 14.50" W x 19.25" H)

Interior Dimensions.....56.5 L x 30.5 W x 33.7cm H
.....(22.25" L x 12" W x 13.4" H)

Power Requirements110 - 240VAC, 50/60Hz (240V-0.5A, 110V-1A)

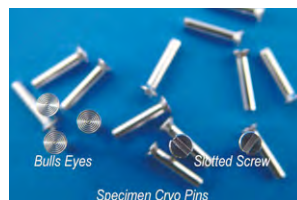
Weight11.4 kg (25 lbs.) / Shipping weight: 18.2kg (40 lbs.)

70445-10	EMS UVC3 Cryo Chamber, 120 VAC	each
70445-20	EMS UVC3 Cryo Chamber, 220 VAC	each
70022-04	EMS Embedding Capsule Holders	4/pk
70120-04	Gelatin "00" Capsule Holder	4/pk

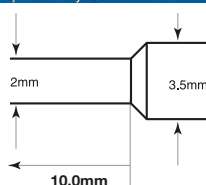
► Specimen Pins; Ultra Microtomy

Aluminum specimen mount pin for mounting samples for cryoultramicrotomy.

Available in two types:
Slotted Screw and Bulls Eye.



70446	Aluminum Specimen Pins; Bullseye	50/pk
70447	Aluminum Specimen Pins; Slotted Screw	50/pk



► Tissue-Tek® O.C.T. Compound

Sakura Finetek - This is a well known water soluble glycol's and resins compound that provides an excellent specimen matrix for cryostat sectioning at temperatures of -10°C and below. It leaves no residue during the staining procedure.

Cat. No.	Tissue-Tek	Description	Pack
62550-01	4583	O.C.T. Compound	4 oz
62550-12	4583	O.C.T. Compound	12/cs



► Tissue Freezing Medium; TFM™

An embedding matrix for frozen sections. TFM™ is an ultra pure formulation of water-soluble glycols and resins that provides a solid bond between the tissue and the object holder with the following features:

- **Less Ice Artifacts:** TFM's reduced water content minimizes freeze-fracturing.
- **Less Curling:** TFM allows you to pick up flat serial sections with ease.
- **Freezes Faster:** TFM freezes very fast and offers better turn-around time.
- **Completely water soluble:** TFM reduces tissue dislodging.
- **Now available in 5 colors:** clear, yellow, green, red and blue.



RT	72592	Tissue Freezing Medium, Clear	4 oz
RT	72593	Tissue Freezing Medium, Clear	12x4 oz
RT	72592-Y	Tissue Freezing Medium, Yellow	4 oz
RT	72593-Y	Tissue Freezing Medium, Yellow	4x4 oz
RT	72592-G	Tissue Freezing Medium, Green	4 oz
RT	72593-G	Tissue Freezing Medium, Green	4x4 oz
RT	72592-R	Tissue Freezing Medium, Red	4 oz
RT	72593-R	Tissue Freezing Medium, Red	4x4 oz
RT	72592-B	Tissue Freezing Medium, Blue	4 oz
RT	72593-B	Tissue Freezing Medium, Blue	4x4 oz

► Cryogenic-Gel

- Replaces the messy "runny" embedding media.
- Easy to use.
- Sticks to where you want it.
- Will not run – No waste.

It is a highly viscous, water-soluble embedding medium for frozen sections that "stays put". The gel is packaged in a pump-dispenser bottle that can instantly dispense the gel in any position. The dispenser has a built-in "guillotine" that cleanly severs the gel from the pump spouts and prevents any "stringy" medium from pulling away when the bottle is removed. To use, simply dispense gel on a room temperature block-holder. Use a cold heat extractor to form a base layer. Dispense additional gel. Place the tissue on top of the gel. Use a cold heat extractor to freeze tissue and form a block.



Cat. #	Description	Pack
62806-01	Cryo-Gel™, 4.3oz	each
62806-06	Cryo-Gel™, 4.3oz	12/cs

► **Quick Freeze; Shur/Freeze, Environmentally Safe**

A high purity 1,1,1,2 - Tetrafluoro-ethane (R134a) that you can rely on to solidify paraffin sections or fresh tissue without disrupting cellular structure. A short spray burst will instantly freeze small area to -45°C/-5°F. Environmentally Safe and non-flammable.



72595	Quick Freeze	10 oz
72596	Quick Freeze	12x10 oz

► **CytoCool II**

For the Flash freezing of tissue specimens in the Cryostat as well as being used to harden difficult to cut tissue on a microtome during the sectioning. CytoCool II is an aerosol that does not contain any ozone depleting (CFC'S). Controlling the tissue freezing is simply done by varying the finger pressure on the trigger nozzle. This unique feature helps to prevent over cooling of the specimen.



72597	CytoCool II Aerosol	11 oz
72597-12	CytoCool II Aerosol	12x11 oz

Frostbite® Rapid Coolant

Ozone-safe but just as effective

Frostbite Rapid Coolant contains no CFCs yet maintains the ability to rapidly cool paraffin blocks and tissue. Two quick bursts will ensure deep penetration into both paraffin blocks and fresh tissue specimens.



- The trigger nozzle and needle tube help to localize spray, reducing excess coverage and eliminating waste

■ **Nonflammable**

Cat. #	Description	Pack
72594-01	Frostbite® Rapid Coolant 10 oz. (300ml) Can	each
72594-10	Frostbite® Rapid Coolant 10 oz. (300ml) Can	6/case
72594-20	Frostbite® Rapid Coolant 10 oz. (300ml) Can	12/case

► **LV CryoOil™**

Oils are widely used in crystallography – as cryoprotectants when samples are flash cooled, and as barriers to the dehydration, solvent evaporation, and oxidation, that may occur in air near and above room temperature. LV CryoOil™ is the best solution to your oil needs. It has the lowest viscosity of any available perfluoropolyether oil (1/10 that of Paratone oil and compatible to that of vegetable oil) and very low surface tension (less than 1/3 that of water). Consequently, a dip in this oil followed by gentle tapping to shake off excess can yield protective oil films on your crystals of as little as 10 µm thick.



LV CryoOil™ has extremely low vapor pressure, excellent chemical inert and excellent thermal stability.

LV CryoOil™ comes in each vial 1.5 ml, enough to protect hundreds of crystals.

For more information, see page 840-843 >>>>

60166	LV CryoOil™	1.5 ml
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► **Cryo Gloves**

We now offer cryogenic personal protective garments of the highest quality. Cryo-Gloves®, Waterproof Cryo-Gloves®, Cryo-Aprons®, and Cryo-Industrial® are essential accessories for those working in ultra cold environments. Providing effective protection in a wide variety of applications .

FEATURES:

- Protection from -135°C to 150°C
- Superior thermal protection
- Water-resistant
- Comfortable/Lightweight/Excellent dexterity
- Breathable/Stay-dry lining.

APPLICATIONS:

- Ultra low and Blast freezers
- Cold rooms
- Dry ice handling
- Liquid Nitrogen, liquid oxygen, liquid helium

ENVIRONMENTS

- Clinical Laboratory
- Bio-Medical
- Blood Banks
- Frozen food processing
- Pharmaceutical



Cat. #	Description	
71070	Wrist, size Small, 12" long	each
71071	Wrist, size Medium, 12" long	each
71072	Wrist, size Large, 12" long	each
71072-X	Wrist, size Extra Large, 12" long	each
71073	Mid-Arm, size Small, 14 – 15" long	each
71074	Mid-Arm, size Medium, 14 – 15" long	each
71075	Mid-Arm, size Large, 14 – 15" long	each
71075-X	Mid-Arm, size Extra Large, 14 – 15" long	each
71076	Elbow, size Small, 18 – 20" long	each
71076-M	Elbow, size Medium, 18 – 20" long	each
71077	Elbow, size Large, 18 – 20" long	each
71078	Elbow, size Extra Large, 18 – 20" long	each
71079-S	Shoulder, size Small, 27 – 28" long	each
71079-M	Shoulder, size Medium, 27 – 28" long	each
71079-L	Shoulder, size Large, 27 – 28" long	each
71079-XL	Shoulder, size Extra Large, 27 – 28" long	each

► **Cryo Apron**

These aprons are 100% waterproof with adjustable straps for the neck and the waist.



Cat. #	Description	
71080	Apron, 36" (90.85cm) long	each
71081	Apron, 42" (106.4cm) long	each
71082	Apron, 48" (121.75cm) long	each
71082-X	Apron, 54" (137.0cm) long	each

► **Safety Goggles**

64475-01	Safety Goggle, 4 Plastic Vent	each
64475-10	Safety Goggle, 4 plastic Vent	10/pk
64476-01	Safety Goggle, Perforated Frame	each
64476-10	Safety Goggle, Perforated Frame	10/pk
64477-01	Safety Goggle, Perforated Frame, Small Size (5 ¾" x 2 ½")	each
64477-10	Safety Goggle, Perforated Frame, Small Size (5 ¾" x 2 ½")	10/pk

► CryoVial®

Specially Formulated Polypropylene, is certified RNase-free, DNase-free, Pyrogen-free, and DNA-free.

- Designed for storage of biological material, human or animal cells, at temperatures as low as -190°C.
- The cap features a long skirt for one hand aseptic technique. A super fast thread design that allows tightening or removal with a mere 1/4" turn, and an inside thread design that will not contribute to possible contamination.
- Tubes are provided with white marking area for sample identification, and can be color-coded by the use of a CAPINSERT®.
- These CRYOVIALS® are compatible with most storage systems.
- Vials are sterilized by gamma irradiation, and are packaged in unique tempered-proof, reseal-able, safety-lock-bags of 100, and 10bags to a case.
- The closures and tubes are both manufactured of polypropylene having the same coefficient of expansion, which further enhances the leak-proof qualities of these vials at changing temperatures.

Tubes are available in three series:

► Series T309

- LIP-SEAL DESIGN TUBE
- TUBE WITH EXTERNAL THREADS

► Series T310

- SILICONE WASHER SEAL
- TUBE WITH EXTERNAL THREADS

► Series T311

- SILICONE WASHER SEAL
- TUBE WITH INTERNAL THREADS



Ordering: All Cryovials® are sold by case quantity (10x100 per case)

Series T309

Catalog #	Series #	Vol (ml)	Style	Size (mm)
61800-1A	T309-1A	1.2	Self-Standing	12.5 x 43
61800-02	T309-2	2	Round-Bottom	12.5 x 48
61800-2A	T309-2A	2	Self-Standing	12.5 x 49
61800-3A	T309-3A	3	Self-Standing	12.5 x 72
61800-4A	T309-4A	4	Self-Standing	12.5 x 78
61800-5A	T309-5A	5	Self-Standing	12.5 x 92

Series T310

Catalog #	Series #	Vol (ml)	Style	Size (mm)
61801-1A	T310-1A	1.2	Self-Standing	12.5 x 43
61801-02	T310-2	2	Round Bottom	12.5 x 48
61801-2A	T310-2A	2	Self-Standing	12.5 x 49
61801-3A	T310-3A	3	Self-Standing	12.5 x 72
61801-4A	T310-4A	4	Self-Standing	12.5 x 78
61801-5A	T310-5A	5	Self-Standing	12.5 x 92
61801-10A*	T310-10A	10	Self-Standing	17 x 84

* This size is packaged only 50x10 per case

Series T311

Catalog #	Series #	Vol. (ml)	Style	Size (mm)
61802-1A	T311-1	1.2	Self-Standing	12.5 x 43
61802-02	T311-2	2	Self-Standing	12.5 x 49
61802-2A	T311-3	2	Round Bottom	12.5 x 48
61802-3A	T311-4	4	Round Bottom	12.5 x 72
61802-4A	T311-4A	4	Self-Standing	12.5 x 72
61802-5A	T311-5	5	Round Bottom	12.5 x 92

Certified RNase, DNase, Pyrogen and DNA-free

	T309-1A	T309-2	T309-2A	T309-3A	T309-4A	T309-5A
Volume (ml)	1.2	2	2	3	4	5
Size (mm)	12.5 x 41	12.5 x 46	12.5 x 48	12.5 x 70	12.5 x 76	12.5 x 90
Self-Standing	•	•	•	•	•	•
Round Bottom		•				
Qty/Bag	100	100	100	100	100	100
Qty/Cs	1000	1000	1000	1000	1000	1000

Certified RNase, DNase, Pyrogen and DNA-free

	T310-1A	T310-2	T310-2A	T310-3A	T310-4A	T310-5A	T310-10A
Volume (ml)	1.2	2	2	3	4	5	10
Size (mm)	12.5 x 43	12.5 x 48	12.5 x 49	12.5 x 72	12.5 x 76	12.5 x 93	17 x 84
Self-Standing	•	•	•	•	•	•	•
Round Bottom		•					
Qty/Bag	100	100	100	100	100	100	50
Qty/Cs	1000	1000	1000	1000	1000	1000	500

Certified RNase, DNase, Pyrogen and DNA-free

	T311-1	T311-2	T311-3	T311-4	T311-4A	T311-5
Volume (ml)	1.2	2	2	4	4	5
Size (mm)	12.5 x 41	12.5 x 48	12.5 x 48	12.5 x 70	12.5 x 72	12.5 x 90
Self-Standing	•	•	•	•	•	•
Round Bottom			•			
Qty/Bag	100	100	100	100	100	100
Qty/Cs	1000	1000	1000	1000	1000	1000

► CAPINSERT™ for Cryovial® Tubes

Made from polypropylene. Color-coded inserts fit precisely into the cap of the CRYOVIAL® above for color identification. CAPINSERTS® are sold 500 per bag.



ORDERING:

Cat. #	Color	Cat. #	Color
61805-W	White	61805-GR	Gray
61805-B	Blue	61805-L	Lilac
61805-R	Red	61805-V	Violet
61805-G	Green	61805-P	Pink
61805-Y	Yellow	61805-O	Orange

Wide Mouth Cryogenic Vial

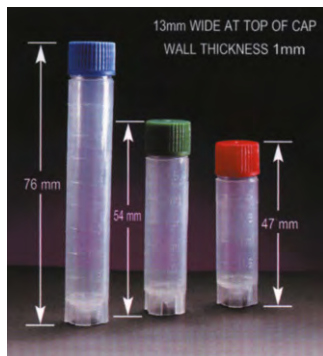
A wide mouth vial with 15 ml capacity. Useful for the storage and retrieval of solid specimens, such as bone, tumor, and organ samples. Made from polypropylene with high-density polyethylene screw closures. Self-standing. Radiation sterilized, non-cytotoxic, non-pyrogenic. Caps are attached in 15 bags of 5 vials each or 75 per case.



61850-15 Wide Mouth Cryogenic Vial 75/case

Cryo-Lok Cryogenic Vials

CYO-LOK vials are ideal for storage or transport of material of extremely low temperatures. The vials have external threads, providing a smooth and uniform inner surface. This eliminates the problem of air born contamination and/or sample loss so common when vials with internal threads are used. The screw top incorporates a molded-in sealing ring, which assures a tight leak-proof seal.



- Graduated in 0.5ml increments
- Conical bottom with slotted skirt
- For use in vapor phase of liquid nitrogen
- Color Caps also Available*

Cat. #	Description	Qty
72650	2.0ml Vials, with Blue Cap, non-sterile	1000/cs
72651	2.0ml Vials, with Blue Cap, Sterile	500/cs
72652	2.5ml Vials, with Blue Cap, non-sterile	1000/cs
72653	2.5ml Vials, with Blue Cap, Sterile	500/cs
72654	3.5ml Vials, with Blue Cap, non-sterile	1000/cs
72655	3.5ml Vials, with Blue Cap, Sterile	500/cs

*Cap color Red, Yellow, Orange and Green are available upon request.

Cryogenic Vial Rack

Made from durable polycarbonate. Its unique design with slotted cavities accepts vials with slotted skirts. When placed in the holes the vials become locked in position, enabling the user to attach or remove the cap with one hand. It accommodates up to 50 vials (1/2" or 13.5mm diameter) in a 4x10 array with alphanumeric indexing. Autoclavable at 121°C.



Measures: 7½"x4¼"x¾" (190x108x22mm)

62015-01	Cryogenic Vial Holder	each
62015-04	Cryogenic Vial Holder	4/pk

Cryostore® Boxes

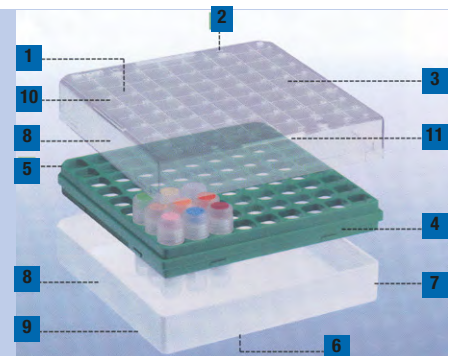
Made from strong Polycarbonate, these durable cryogenic storage boxes are designed to be used at temperatures between **-190°C and +121°C** and are auto-clavable. Different models are available to accommodate either **81 or 100 Cryovial® tubes** from 1ml to 5ml.

A **transparent cover** allows the user to see the contents of the box, and is keyed to the base to prevent misalignment. Being printed with a series of squares (numbered from 1 to 81, or from 1 to 100), the surface accepts writing with markers for better inventory control.

A unique **color-coding** system uses color plastic grids inserted to separate the cover from the base of the 81-place box. Boxes are made to accept 100 tubes have a colored base instead of grid. A choice of four popular colors is available: blue, green, red and yellow.

Removal of vials is facilitated by an innovative tool called the **Vial Picker**, which is supplied with each storage box.

- 1) Writing surface has numbered squares for easy sample identification
- 2) Stackable
- 3) Vials readily visible through transparent cover
- 4) Four colors available for better color-coding
- 5) Cover and base are keyed to prevent misalignment
- 6) Drain holes under base
- 7) Made to fit freezer metal racks
- 8) Writing surface for identifying base and/or cover
- 9) Autoclavable at 120°C, 15 psig (1 bar) for 20 minutes
- 10) Numeric identification of each vial
- 11) Air vents minimizing condensation



Catalog #	Series #	For Tubes Cryogenic	Color	Qty /Pk	Qty /cs
Series T314- 281: Size: 76 x 76 x 52 H (3" x 3" x 2⅞"H) 25 Positions					
61809-B	281B	1 to 2ml	Blue	8	—
61809-G	281G	1 to 2ml	Green	8	—
61809-R	281R	1 to 2ml	Red	8	—
61809-Y	281Y	1 to 2ml	Yellow	8	—
Series T314- 281: Size: 133 x 133 x 52 H (5¼" x 5¼" x 2⅞"H) 81 Positions					
61810-B	281B	1 to 2ml	Blue	4	24
61810-G	281G	1 to 2ml	Green	4	24
61810-R	281R	1 to 2ml	Red	4	24
61810-Y	281Y	1 to 2ml	Yellow	4	24
Series T314-481: Size: 133 x 133 x 76 H (5¼" x 5¼" x 3"H) 81 Positions					
61811-B	481B	3 to 4ml	Blue	6	12
61811-G	481G	3 to 4ml	Green	6	12
61811-R	481R	3 to 4ml	Red	6	12
61811-Y	481Y	3 to 4ml	Yellow	6	12
Series T314-581: Size: 133 x 133 x 95 H (5¼" x 5¼" x 3⅞"H) 81 Positions					
61812-B	581B	3 to 5ml	Blue	5	10
61812-G	581G	3 to 5ml	Green	5	10
61812-R	581R	3 to 5ml	Red	5	10
61812-Y	581Y	3 to 5ml	Yellow	5	10
Series T314-2100: Size: 133 x 133 x 52 H (5¼" x 5¼" x 2⅞"H) 100 Positions					
61813-B	2100B	1 to 2ml	Blue	4	24
61813-G	2100G	1 to 2ml	Green	4	24
61813-R	2100R	1 to 2ml	Red	4	24
61813-Y	2100Y	1 to 2ml	Yellow	4	24

► Cryo Storage Boxes

Made from heavy-duty chip-board. These boxes store vials neatly and fit most standard rack systems. They come with dividers and are slotted for cross-ventilation. The small box is 5¼" (132mm) square, 2" (50mm) high and contains divided spaces for up to 81 2ml vials. The medium box is 5½" square, 3" high and contains divided spaces for up to 81 2.5 and 3.5ml vials. The jumbo storage box is 6" (152mm) square, 3" high, and contains divided spaces for up to 100 vials.



62010-10 Small Cryo Storage Box 4/pk

► Cryo Transport Box

Made from high impact polystyrene

- Ideal for transporting Cryo Vials
- Durable construction
- Organizes small amounts of Cryo Vials
- Holds 1.0 – 2.0ml Cryo Vials



Catalog #	Description	Qty
62004-05	Cryo Transport Box for 5 Tubes	20/pk
62004-10	Cryo Transport Box for 10 Tubes	10/pk

► Cardboard Cryogenic Vial Boxes and Partitions

Economical storage solutions in a box

Store cryogenic vials in liquid -nitrogen, or in mechanical freezers in our freezer storage boxes. Box footprint is 133 x 133 mm. Select a box and a partition that fit the size and number of vials for your needs. Colored cardboard boxes are ideal for identification and sorting purposes. Choose blue, red, yellow or assorted pack (four each of blue, red, and yellow).



Cat. #	Description	Color	Height	Qty.
41110	Vial Box and Lid	White	50 mm	12/pk
41111	Vial Box and Lid	White	75 mm	12/pk
41112	Vial Box and Lid	Assorted	50 mm	12/pk
41113	Vial Box and Lid	Blue	50 mm	12/pk
41114	Vial Box and Lid	Red	50 mm	12/pk
41115	Vial Box and Lid	Yellow	50 mm	12/pk
41117	100-Cell Partition (10 columns x 10 rows)			12/pk
41118	81-Cell Partition (9 columns x 9 rows)			12/pk
41119	64-Cell Partition (8 columns x 8 rows)			12/pk
41120	49-Cell Partition (7 columns x 7 rows)			12/pk

► NovaRack™ and NovaChamber™

Unique Cone-Shaped Storage Racks For Easy Sample Viewing

Organize – Easily view, organize and track up to 46 tubes including 24 - 0.5 to 2.0ml tubes, 14 tubes up to 8ml in size including cryovials and 12x75mm culture/blood collection tubes, 7 - 15ml tubes and 1 - 50ml tube

Durable – Constructed of durable polypropylene and autoclavable

Stackable – Use the Stacking Adapter to double available bench space

Freezable – Turn the rack over and fill with water for freezing. A non-slip rubber bottom (included with each NovaChamber) keeps the water/ice contained for a portable ice chamber rack.

Molded numbers – For easy sample tracking each rack rack has molded numbers.



Cat #	Description	Color	Qty
61610-1	NovaRack	Red	each
61610-2	NovaRack	Teal	each
61610-3	NovaRack	Yellow	each
61610-4	NovaRack	Pink	each
61610-5	NovaRack	Purple	each
61611-1	NovaChamber	Red	each
61611-2	NovaChamber	Teal	each
61611-3	NovaChamber	Yellow	each
61611-4	NovaChamber	Pink	each
61611-5	NovaChamber	Purple	each
61610-50	Stacking Adapter	Purple	each

► 4-Way Microtube Racks

Create as large a rack as you need by linking together multiple racks.

Heavyduty polypropylene racks feature a unique system of tabs and slots, that facilitate easy connection and sturdy fit. Autoclavable. Assorted colors or natural.

Measurements: 174 x 95 x 52 mm

Cat #	Description	Qty
61615-00	4-Way Microtube Rack, Assorted	5/pk
61615-20	4-Way Microtube Rack, Natural	5/pk





▶ Work2Store™ Expanding Storage Rack

Single rack, double function

Reduce sample handling time and the need for several racks when working with samples for cold temperature storage with the Work2Store expanding storage rack.

The opening and closing mechanism allows the rack to expand, creating needed room for sample manipulation. Then simply collapse the rack back to its compact form and it is ready for the freezer. Temperature range -80 to 121°C.



U.S. PATENT PENDING.

- Holds up to 64 x 1.5/2.0 mL micro-centrifuge tubes and/or most standard cryogenic vials up to 2.0 mL
- Clear lid locks the rack together for safe handling and transportation
- Wells have a center depression to stabilize conical tubes and a cryogenic vial lock for one handed cap removal
- Stackable, autoclavable and with alphanumeric well identification
- Will fit into standard 2" (52 mm) freezer racking
- Open dimensions 310 x 128 x 33.5 mm
- Closed dimensions (with lid in place) 133 x 133 x 53 mm

Cat No.	Wells	Open L x W x H, mm	Closed L x W x H, mm	Qty
41002	64	310 x 128 x 33.5	133 x 133 x 53	each

▶ Rota-Rack™ Tube Racks

Connect up to 4 interlocking racks. Twist and turn to suit your application!

Rotate each of the four modules independently. Use several sizes of test tubes, culture tubes, centrifuge tubes, or microcentrifuge tubes at the same time. Click each module into place, load with tubes, and carry! Rack maintains its orientation until you twist it again. Comes fully assembled.

Autoclavable. Each module of the Rota-Rack for large tubes holds two 50 ml tubes, eight 15 ml tubes, six 20 mm tubes, or ten 10-13 mm tubes. Each module of the Rota Rack for microtubes holds six 15 ml tubes, nine 1.5/2.0 ml tubes, twelve 0.5/0.6 ml tubes, or thirty-two 0.2 ml PCR* tubes or four 8-tube strips.



61604-10	Rota-Rack for Large Tubes	each
61604-20	Rota-Rack for Microtubes	each

▶ 80-Well Microtube Rack

Popular fraction-collector-plate style rack. Rack holds 1.5 to 2.0 ml microtubes in a 5 x 16 array. Tubes sit in large wells with conical bottoms. Polypropylene rack is ideal for freezer storage. Autoclavable. Rack measures 8.875 x 2.625 x 1.125".

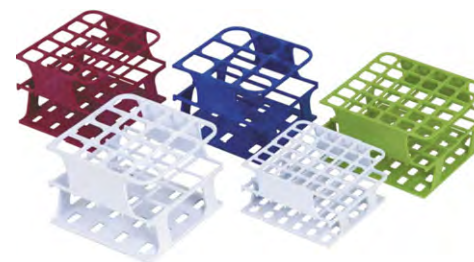


Cat #	Description	Color	Qty
61603-A	80-Well Microtube Rack	Assorted Colors	5/pack
61603-B	80-Well Microtube Rack	Blue	5/pack
61603-G	80-Well Microtube Rack	Green	5/pack
61603-N	80-Well Microtube Rack	Natural	5/pack
61603-O	80-Well Microtube Rack	Orange	5/pack
61603-P	80-Well Microtube Rack	Pink	5/pack
61603-Y	80-Well Microtube Rack	Yellow	5/pack

▶ One-Rack® Test Tube Racks

These durable racks are molded in a single, continuous piece - no assembly required and no detachable pieces. Racks are made of Delrin® fiberglass-reinforced polyoxymethylene, an engineered polymer developed by DuPont to have exceptional chemical and heat resistance. Molded index coordinates and flat labeling areas keep samples organized. Delrin® is a registered trademark of E.I. du Pont de Nemours and Company

Temp. Range: -40°C to 140°C



One-Rack® Test Tube Racks for 16mm Tubes, 36-place 127x250x70mm

Cat #	Color	Qty
61617-01	Blue	each
61617-02	Green	each
61617-03	Magenta	each
61617-04	White	each

One-Rack® Test Tube Racks for 20mm Tubes, 20-place 100x252x83mm

Cat #	Color	Qty
61618-01	Blue	each
61618-02	Green	each
61618-03	Magenta	each
61618-04	White	each

One-Rack® Test Tube Racks for 30mm Tubes, 9-place 110x282x85mm

Cat #	Color	Qty
61619-01	Blue	each
61619-02	Green	each
61619-03	Magenta	each
61619-04	White	each

► 81-Well Freezer Storage Rack

Durable polypropylene rack fits in standard 5.25" square freezer modules and holds 1.5 to 2.0 ml microtubes and cryovials. Features molded grid lines on the lid, imprinted coordinates on the bottom of base, and a molded reference point on the lid. Rack measures 5.125 x 5.125 x 1.75".



Cat #	Description	Color	Qty
61600-A	81-Well Storage Rack	Assorted Colors	5/pack
61600-B	81-Well Storage Rack	Blue	5/pack
61600-G	81-Well Storage Rack	Green	5/pack
61600-N	81-Well Storage Rack	Natural	5/pack
61600-O	81-Well Storage Rack	Orange	5/pack
61600-P	81-Well Storage Rack	Pink	5/pack
61600-Y	81-Well Storage Rack	Yellow	5/pack

► 96-Well Reversible Rack

Polypropylene rack has 96 wells to accommodate 0.5 ml micro centrifuge tubes on one side, or 96 wells for 1.5 to 2.0 ml micro centrifuge tubes on the other side. Arranged in standard 8 x 12 array. Handy lid snaps into place in the tabs on each end of rack. Grid lines are molded on the side of the rack that accommodates the smaller tubes making it easier to see the wells. Raised rings are molded on the opposite side of the rack making it easier to replace the 1.5 to 2.0 ml tubes from those wells. Rack measures 9.75 x 4.75 x 1.875".



Cat #	Description	Color	Qty
61602-A	96-Well Reversible Rack	Assorted Colors	5/pack
61602-B	96-Well Reversible Rack	Blue	5/pack
61602-G	96-Well Reversible Rack	Green	5/pack
61602-N	96-Well Reversible Rack	Natural	5/pack
61602-O	96-Well Reversible Rack	Orange	5/pack
61602-P	96-Well Reversible Rack	Pink	5/pack
61602-Y	96-Well Reversible Rack	Yellow	5/pack

► 100-Well Microtube Storage Rack

Polypropylene rack features durable three point hinges and clasp for secure lid closure. Holds 1.5 to 2.0 ml microtubes and cryovials. User friendly rack features molded gridlines on the lid, imprinted coordinates on the bottom of base, and imprinted and raised coordinates on the box. Rack measures 5.625 x 5.875 x 2.25".



Cat #	Description	Color	Qty
61601-A	100-Well Storage Rack	Assorted Colors	5/pack
61601-B	100-Well Storage Rack	Blue	5/pack
61601-G	100-Well Storage Rack	Green	5/pack
61601-N	100-Well Storage Rack	Natural	5/pack
61601-O	100-Well Storage Rack	Orange	5/pack
61601-P	100-Well Storage Rack	Pink	5/pack
61601-Y	100-Well Storage Rack	Yellow	5/pack

► True North™ Slide Box



These purple unique boxes which are made from durable polycarbonate and rugged stainless steel will protect your slides in ultra-low temperatures (as low as -80° C). These boxes provide for safe storage and transport of 25x75mm and 1x3" Slides. With temperature

sensitive foam lining and grooved slide slots which separate the slides there is always protection for slide contact.

For easy slide retrieval, identification sheet, lining, and grooved slots are numbered. These boxes are stackable and autoclavable. They measure 208x175x34mm.

Cat. #	Description	Qty
71485-01	True North™ Slide Box	each

► 15 and 50 mL 2 x 3 Upright Freezer Rack

High-durability, corrosion-resistant stainless steel

Stainless steel racks can accommodate various sizes and styles of storage boxes. Rack features high-durability, corrosion-resistant stainless steel material and handles for easy removal.

Stainless steel racks can accommodate various sizes and styles of storage boxes. Rack features high-durability, corrosion-resistant stainless steel material and handles for easy removal. Designed to fit most freezer models and makes.



■ 15 mL and 50 mL Cardboard Cryogenic Box HS2860M (Holds 6 each/1 per compartment)

■ Transformer™ Cube HS23271A (Holds 6 each/1 per compartment)

Cat No.	Configuration	Opening	Overall	Qty
		Dimensions L x W x H mm	Dimensions L x W x H mm	
41000	2 x 3	152 x 157 x 134	459 x 159 x 271	each

► 15 and 50mL Cardboard Cryogenic Boxes and Dividers

Low-cost choice with excellent low-temperature storage properties



One-size box safely stores 15 and 50 mL tubes in LN₂ or mechanical freezers.

Two partitions to choose from. Measures: 145 x 145 x 122 mm.

Cat. #	Description	Qty.
41004		Case of 40
41005	15 and 50 mL Box and Lid	Pack. of 10
41006		Case of 20
41007	50 mL, 16 Cell Partition	Pack. of 10
41008		Case of 20
41009	15 mL, 36 Cell Partition	Pack. of 10

► **Electropolished Stainless Steel Freezer Racks**

High Quality, Ultra-Durable Freezer Racks for Long Term Sample Storage

No Sharp Edges - All edges have been ground down to remove the sharp surfaces that plague standard freezer racks

Electropolished - This step cleans up all weld points that, over time, may be the starting points for corrosion.

Superior Construction - Superior construction and design have created a more sturdy rack than what is currently available on the market

Durable - Racks are designed and finished to last longer in the demanding freezer environment where samples are housed

Surgical Finish - Electropolishing leaves racks ultra-shiny and free from any surface contaminants

Multiple Sizes - Several vertical and horizontal options are available to fit a variety of freezer configurations

- A superior design was chosen to increase structural integrity.
- All weld points have been ground down to eliminate sharp points and areas where corrosion can occur.
- Structural edges and shelves have been ground and racks have been electropolished to remove sharp edges.

Cat. No.	Description	Dimensions	Qty
61615-25	4 x 4 Freezer Rack, holds (16) 3" boxes	22.125" L x 5.50" W x 12.625" H	1 Rack
61615-30	3 x 4 Freezer Rack, holds (12) 3" boxes	16.625" L x 5.50" W x 12.625" H	1 Rack
61615-35	3 x 3 Freezer Rack, holds (9) 3" boxes	16.625" L x 5.50" W x 9.625" H	1 Rack
61615-40	3 x 4 Freezer Rack, holds (12) 2" boxes	16.318" L x 5.50" W x 8.875" H	1 Rack
61615-45	4 x 4 Freezer Rack, holds (16) 2" boxes	21.625" L x 5.50" W x 8.875" H	1 Rack
61615-50	4 x 5 Freezer Rack, holds (20) 2" boxes	21.625" L x 5.50" W x 11.063" H	1 Rack
61615-55	1 x 9 Freezer Rack, holds (9) 3" boxes	5.63" L x 5.63" W x 28.875" H	1 Rack
61615-60	1 x 9 Freezer Rack, holds (9) 2" boxes	5.63" L x 5.63" W x 19.25" H	1 Rack

► **Cardboard Freezer Boxes and Dividers**

For Use With Stainless Steel Freezer Racks

Store cryogenic vials in liquid nitrogen or in mechanical freezers in our freezer storage boxes. Box footprint is 133 x 133 mm. Select a box and a partition that fit the size and number of vials for your needs. Cardboard boxes can be labelled with Cryo-Tags for easy identification. Both the boxes and dividers are available in packs of 12.



Cat. No.	Description	Dimensions	Qty
61615-65	2" Freezer Boxes	133mm x 133mm, 50mm	12/Pack
61615-70	3" Freezer Boxes	133mm x 133mm, 75mm	12/Pack
61615-75	Freezer Box Divider, 64 Hole	8 Columns, 8 Rows	12/Pack
61615-80	Freezer Box Divider, 81 Hole	9 Columns, 9 Rows	12/Pack
61615-85	Freezer Box Divider, 49 Hole	7 Columns, 7 Rows	12/Pack
61615-90	Freezer Box Divider, 100 Hole	10 Columns, 10 Rows	12/Pack



Racks For 3" Boxes — 61615-55 Racks For 2" Boxes — 61615-60



61615-50

61615-45



61615-40

61615-35



61615-30

61615-25

► **Cryogenic Labels**
see pages 694-698 >>>>

► **Wet Grip Labels for Moist, Frosty or Frozen Tubes** see page 698 >>>>

► **Hi/Lo Write-On Temperature Tape** see page 1140 >>>>

► Cooling Chambers and Ice Baths

► The CoolSafe™

The World's Most Versatile and Effective Benchtop Cooling and Storage System

Complete CoolSafe Systems

Versatile – Designed for 0.2ml tubes (strips or trays), 96- well and 384- well microplates, 0.5ml, 1.5ml, 5ml tubes

Specially Formulated – Cool Bricks maintain a constant temperature (1°C or -10°C) for up to 10 hours

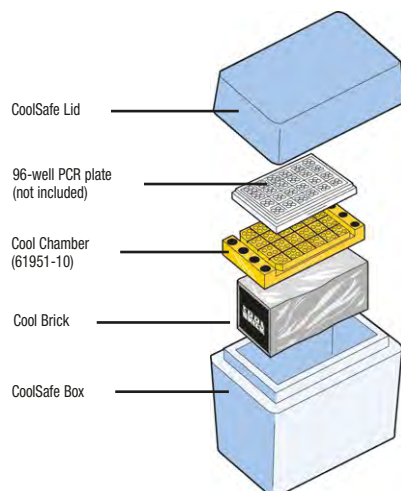
Quality Engineering – Each aluminum Cool Chamber surrounds tubes to guarantee sustained cold temperatures

Durable – The CoolSafe box is made of triple

density expanded polystyrene and molded under extreme pressure creating a durable container that guarantees temperature stability.

Easy to Use – Easily interchange Cool Chambers and Cool Bricks for different sized tubes.

No Mess – Messy ice buckets are now a thing of the past!



"Surround-a-Tube" Engineering

Super temperature-conducting solid metal surrounds the vast majority of the surface area of the microtube, keeping the entire sample or tray of samples cool.



Ordering the Complete CoolSafe Systems

Each complete CoolSafe System includes:

- 1 CoolSafe box with lid
- 1 Cool Chamber
- 2 Cool Bricks (1°C & -10°C)

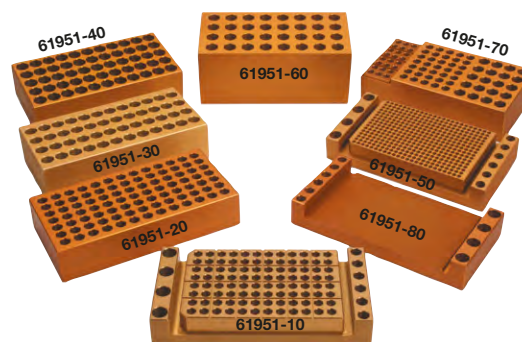
Cat. #.	Description	Holes	Unit
61950-10	For 0.2ml PCR plates or tubes	96**	kit
61950-20	For 0.5ml tubes	91	kit
61950-30	For 1.5ml tubes	48	kit
61950-40	For 1.5ml Cryogenic tubes	55	kit
61950-50	For 384-well plates	384**	kit
61950-60	For 5ml tubes	32	kit
61950-70	For 0.2ml, 0.5ml, 1.5ml tubes	79	kit
61950-80	For flat-bottom microplates	None**	kit

**These Chambers also include 4 holes for 1.5ml tubes and 6 holes for 0.5ml tubes

► CoolSafe Individual Components

► Cooling Chambers

Each Cooling Chamber is a solid aluminum block that surrounds inserted tubes to guarantee sustained hot or cold temperatures.



Cat. #	Dimensions	Ideal Use
61951-10	6 1/8"(L) x 3 1/8"(W) x 1"(H)	0.2ml tubes
61951-20	6 1/2"(L) x 3 1/8"(W) x 1 1/4"(H)	0.5ml tubes
61951-30	6 1/8"(L) x 3 1/8"(W) x 1 1/2"(H)	1.5ml tubes
61951-40	6 1/8"(L) x 3 1/8"(W) x 1 1/2"(H)	1.5ml Cryogenic tubes
61951-50	6 1/8"(L) x 3 1/8"(W) x 1"(H)	384-well microplates
61951-60	6 1/8"(L) x 3 1/8"(W) x 2 1/2"(H)	5ml tubes
61951-70	6 1/2"(L) x 3 1/8"(W) x 1 1/2"(H)	multi-tube format
61951-80	6 1/8"(L) x 3 1/8"(W) x 1"(H)	Microplate Chamber

► Cool Bricks

Each Cool Brick allows up to 10 hours of benchtop temperature stability. Two temperature zones are available: 1°C and -10°C.



Cat. #.	Ideal Use	Temp	Qty
61952-10	For 5ml tubes	1°C	each
61952-20	For 0.2ml, 0.5ml, 1.5ml & 5ml tubes	-10°C	each
61952-30	For 0.2ml, 0.5ml & 1.5ml tubes	1°C	each

► CoolSafe Box

The CoolSafe Box is made of triple density expanded polystyrene and is molded under extreme pressure to create a durable container that guarantees temperature stability.

► CoolBag

The CoolBag is an insulated cooler for added coolness of critical samples. Use the shoulder strap for easy transporting from lab to lab.



Cat. #.	Description	Qty
61953-01	CoolSafe Box	each

► The CoolSafe™ (continued)

► The CoolSafe™ Deluxe

- Additional sample protection
- Improved portability
- Smaller bench-top footprint
- Clear lid for sample visibility

Each complete CoolSafe Deluxe system includes:

- 1 CoolSafe Deluxe box
- 1 Cool Chamber
- 2 Cool Bricks (1°C & -10°C)



**These Chambers also include 4 holes for 1.5ml tubes and 6 holes for 0.5ml tubes

Cat. #	Description	Holes	Unit
61954-10	For 0.2ml PCR plates or tubes	96**	Kit *
61954-20	For 0.5ml tubes	91	Kit *
61954-40	For flat-bottom microplates		Kit *
61954-55	CoolSafe™ Deluxe box	None**	each

► Stand Alone Specialty Cooling Chambers

Ideal for Ice Pans, Ice Buckets, and Cold or Hot Plates

Multiple Uses – Ideal for use on hot or cold plates or for temperature sensitive liquid transfers

Durable – Anodized aluminum blocks will not rust or corrode

Ideally Sized – A variety of options are available to accommodate PCR tubes and trays, 1.5ml tubes, 15ml and 50ml conical tubes

A variety of Specialty Chambers are available to keep samples cool and on ice while you work. Freeze these Chambers overnight for added cooling convenience.

These Chambers do not fit the CoolSafe system; use separately (*61955-30 not pictured)

► 15ml & 50ml

Chambers

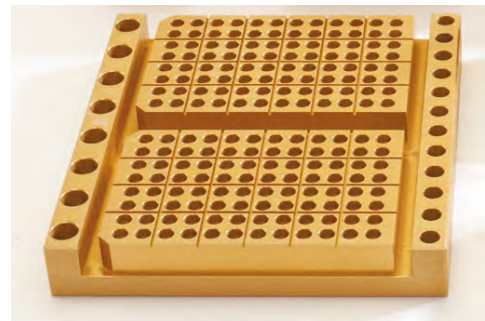
Each Chamber is an anodized aluminum block. Excellent temperature conductors. Use with hot plates or with our Ice Pans & Ice Buckets.



Cat. #	Dimensions	Ideal Use	Holes	Qty
61951-10	6 1/8" (L) x 3 1/2" (W) x 1" (H)	15ml tubes	6	each
61955-21	3 1/2" (L) x 3 1/2" (W) x 3 1/2" (H)	15ml tubes	12	each
61955-40	3 1/2" (L) x 1 3/4" (W) x 3 1/2" (H)	50ml tubes	2	each
61955-41	3 1/2" (L) x 3 1/2" (W) x 3 1/2" (H)	50ml tubes	4	each

► Double Chamber for 0.2ml tubes

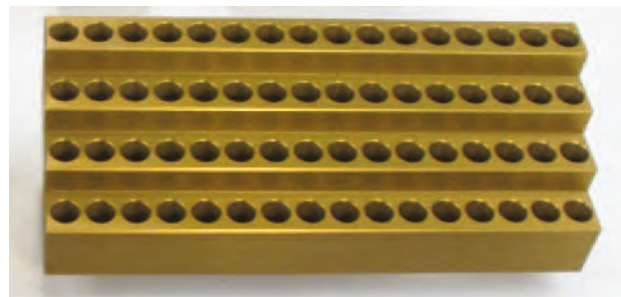
The Double Chamber fits two 96-well PCR trays or individual tubes and strips. Each edge can accommodate up to (12) 0.5ml and (8) 1.5ml tubes.



Great for temperature sensitive liquid transfers. It measures 6 3/16" x 1 1/2" x 1".

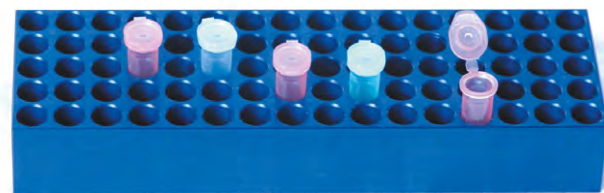
Cat. #	Dimensions	Ideal Use	Holes	Qty
61955-10	6 3/16" (L) x 6 3/4" (W) x 1" (H)	0.2ml PCR Plates, tubes	192	each

► 64-Place Step Chamber



Description: Anodized aluminum block sized to fit 64 1.5ml microtubes (16 holes per 'step') for easy viewing of samples when in the freezer, on the bench-top or in an ice pan or ice bucket.

Cat. #	Dimensions	Ideal Use	Holes	Qty
61955-30	8 1/4" (L) x 3" (W) x 2 1/2" (H)	1.5ml tubes	64	each



► 80-Well Chamber

The 80-well Chamber is a solid, anodized aluminum block sized to fit 1.5ml microtubes. An excellent temperature conductor for use with hot plates and ice buckets. It measures 8.25" x 2.625" x 1.25".

Cat. #	Dimensions	Ideal Use	Holes	Qty
61955-80	8 1/4" (L) x 2 5/8" (W) x 1 1/4" (H)	1.5ml tubes	80	each

► Cooling Chambers and Ice Baths (continued)

► CryoVial® Cooling Chamber

Each well in the Chamber contains locking ridges that do not allow the cryovial to turn.

This unique feature allows for one handed cap removal.

"Locks In" CryoVials For Easy Cap Removal

One-Hand Operation – Locking base holds vial in place as cap is removed

Universal – Fits most major cryogenic vial brands

Preserve Cells – Minimize cell loss from exothermic reactions by preparing samples inside chambers

Quality Engineering – Each aluminum CryoVial Cooling Chamber surrounds tubes to guarantee sustained cold temperatures

Durable – Each Chamber is anodized clear to protect from rust and corrosion ensuring longevity

Versatile – Use with Cool Bricks to maintain a constant temperature (1°C or -10°C) for up to 10 hours



Cat. #	Dimensions	Ideal Use	Holes	Unit
61956-1	6½" x 3½" x 1"	1.2ml cryovials	32	each
61956-2	6½" x 3½" x 1½"	2.0ml cryovials	32	each
61956-3	6½" x 3½" x 2½"	3.0-4.0ml cryovials	32	each

Complete CryoVial CoolSafe System includes:

- 1 CoolSafe box with lid,
- 1 CryoVial Cooling Chamber and
- 2 Cool Bricks (1°C & -10°C)

61956-31	CryoVial CoolSafe System* (1.2ml cryovials)	each
61956-32	CryoVial CoolSafe System* (2.0ml cryovials)	each

► Mini-Cooling Chambers

Ideal for Ice Pans and Ice Buckets

Ideally Sized - For use when only a small number of microtubes are required.

Maximize Work Area - Each Mini-Chamber will fit in our 1L Glacierbrand™ Ice Pan(6.13" x 6.13" x 3.61").

Minimize Ice - Less Ice is needed to cool these chambers. Less ice means less mess.

Same Great Engineering - Mini-Chambers are anodized aluminum and utilize our "Surround-A-Tube" cooling technology.



Cat. No.	Dimensions	Ideal Use	Holes	Qty.
68600-10	3" x 1½" x 1½"	1.5- 2.0ml Tubes	6	each
68600-20	4" x 2½" x 1½"	1.5- 2.0ml Tubes	15	each
68600-30	4 11/16" x 4" x 1½"	1.5- 2.0ml Tubes	30	each

► GLACIERbrand™ Ice Pans

No Sweat – Thick pan walls will not sweat or leave puddles of condensation on the benchtop

Durable – Made of triple density expanded polystyrene creating a durable container that is virtually unbreakable

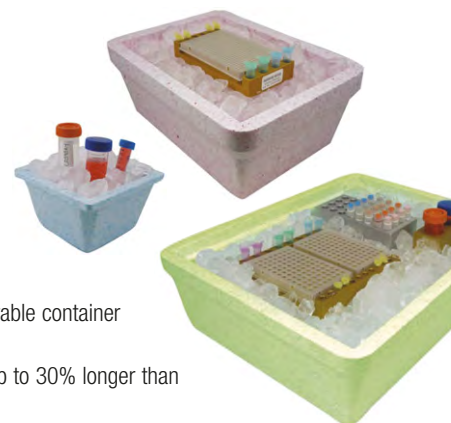
Super Insulating – Preserves ice up to 30% longer than conventional ice pans

Stackable – Designed with an inner edge enabling the pans to stack on top of one another for easy storage and to minimize bench-top space

Lightweight – Ice pans are extremely lightweight (1.1oz, 4.7oz. and 11.4oz) and easy to handle. They feature a molded lip around the edge for carefree moving and carrying

Chemically Resistant – Resistant* to mild chemicals as well as ice-alcohol slurry, dry ice and liquid nitrogen.

(*Not recommended for long-term exposure to harsh chemicals or corrosives)



Cat #	Dimensions	Vol.	Color	Qty
Small Ice Pan				
63311-1s	6.13" x 6.13" x 3.61" (15.6cm x 15.6cm x 9.17cm)	1L	Icy Blue	each
63311-2s	6.13" x 6.13" x 3.61" (15.6cm x 15.6cm x 9.17cm)	1L	Icy Green	each
63311-3s	6.13" x 6.13" x 3.61" (15.6cm x 15.6cm x 9.17cm)	1L	Icy Pink	each
Medium Ice Pan				
63311-1m	12.25" x 8.75" x 4.75" (31.12cm x 22.2cm x 12.1cm)	4L	Icy Blue	each
63311-2m	12.25" x 8.75" x 4.75" (31.12cm x 22.2cm x 12.1cm)	4L	Icy Green	each
63311-3m	12.25" x 8.75" x 4.75" (31.12cm x 22.2cm x 12.1cm)	4L	Icy Pink	each
Large Ice Pan				
63311-1L	17.25" x 13.50" x 4.96" (43.8cm x 34.3cm x 12.63cm)	9L	Icy Blue	each
63311-2L	17.25" x 13.50" x 4.96" (43.8cm x 34.3cm x 12.63cm)	9L	Icy Green	each
63311-3L	17.25" x 13.50" x 4.96" (43.8cm x 34.3cm x 12.63cm)	9L	Icy Pink	each

► GLACIER brand™ Ice Buckets

Excellent Insulation - Made of the same triple density expanded polystyrene as our popular Ice Pans. Preserve ice 30% longer!

Won't Sweat - Thick insulating walls will not sweat.

Easy Grip - Robust handles make buckets easy to carry.

Includes Lid - Use the supplied lid to maximize cooling.

Heavy Duty - Solidly constructed to be unbreakable under normal laboratory conditions.

Resistant to mild chemicals* as well as ice-alcohol slurry, dry ice and liquid nitrogen.

(*Not recommended for long-term exposure to harsh chemicals or corrosives)



Cat #	Dimensions	Vol.	Color	Qty
Small Ice Bucket				
68600-40	10.625" x 4.375" (26.9cm x 11.1cm)	2.5 L	Blue	each
68600-50	10.625" x 4.375" (26.9cm x 11.1cm)	2.5	Green	each
Large Ice Bucket				
68600-60	10.625" x 6.250" (26.9cm x 15.8cm)	5L	Blue	each
68600-70	10.625" x 6.250" (26.9cm x 15.8cm)	5L	Green	each

► True North® Cool Containers

These rigid single mold polyurethane provides durability for chilling your temperature sensitive samples. Excellent insulation properties for ultra cold--use with ice, LN₂, ice-salt slurries, and more.



They come with a convenient lid which nests beneath bucket or pan. They are available in either a bucket or pan and come in a multiple size assortment.

Rigid single mold polyurethane provides durability for chilling your temperature sensitive samples. Excellent insulation properties for ultra cold--use with ice, LN₂, ice-salt slurries, and more. Minimize evaporation loss with snug fit lid. Easily remove with comfortable recessed knobs. Keyed lid and base fit together to conveniently store lid under base. Use handy pour spout with melted ice, water, and solutions. Ergonomic handles safely transport bucket or pan from work area to sink. Deep internal cavity has enough room to add one of your racks. Tapered sides make stacking and storage compact.

Cat. #	Capacity	Style	Color	Units
62013-04	4L	Bucket	Black Onyx	each
62013-10	1L	Pan	Emerald	each
62013-40	4L	Pan	Arctic Blue	each
62013-90	9L	Pan	Ruby	each

► Liquid Nitrogen-Cooled Mortar

A stainless steel mortar is suspended by three brackets above a stainless steel bowl which holds the liquid nitrogen. The bowl is nested in a well insulated poly-ethylene housing. The 4" (102mm) insulated handle is removable for saving space. The housing measures 6½" (165mm) in diameter x 4½" high and has 3 suction cup-feet. Now frozen tissue samples can be ground without the hazard of liquid nitrogen droplets flying onto personnel.



64470	Liquid Nitrogen-Cooled Mortar	set
64471	Spare mortar bowl	each
64472	Ceramic pestle only, 180 mm Long	each

► True North® Mini Coolers

Protect temperature-sensitive samples at the bench or in the freezer

Ideal for keeping PCR® reagents, enzymes and other biochemical reagents cool while working at the bench. Filled with insulating gel, the Mini Coolers can also be used for controlled freezing of samples longer temperature retention.

- Polycarbonate construction with rubber non-slip feet
- Gridded and keyed one-position lids for easy sample identification
- 0.5 mL tube adapters supplied as standard with the 0.5–2.0 mL tube size versions

- Temperature-retention graph supplied with each of the 7 styles available
- Versions available for 0.5 and 1.5/2.0 mL microcentrifuge tubes and cryogenic vials and a 96-place version for 0.2 mL tubes and assay plates

Cat. No.	Temp.	No. Tubes Held/Size	Tube Array	Dimensions	Lid Type	Temp. Retention	Qty.
41130	0°C	12 x 0.5/2.0 mL	3 x 4	145 x 105 x 100	Clear	1°C for 4 hr*	each
41132	0°C	32 x 0.5/2.0 mL	4 x 8	245 x 105 x 100	Clear	1°C for 5 hr*	each
41133	0°C	32 x 0.5/2.0 mL	4 x 8	245 x 105 x 100	Gel-Filled	1°C for 7.5 hr*	each
41134	-20°C	12 x 0.5/2.0 mL	3 x 4	145 x 105 x 100	Clear	-15°C for 2.5 hr*	each
41135	-20°C	32 x 0.5/2.0 mL	4 x 8	245 x 105 x 100	Clear	-15°C for 3.5 hr*	each
41136	-20°C	32 x 0.5/2.0 mL	4 x 8	245 x 105 x 100	Gel-Filled	-15°C for 5 hr*	each
41137	-20°C	96 x 0.2 mL	8 x 12	225 x 165 x 110	Clear	-15°C for 2.5 hr	each

*Inside rows

► Tru North® Chilling Jar

Quick freeze samples at -1°C minute rate

Designed to rapidly chill cryogenics vials in freezer –alcohol filled jar speeds freezing rate. Fill jar to visible level with isopropanol. Sample vials are not in contact with liquid – insert provides barrier while alcohol is securely contained. When samples are removed from freezer, the insulating foam holder decreases warming rate and extends working time.



Holds eight 1.2 to 2.0 ml cryogenic vials, fits most brands. Lift with arrow tab to remove insert from jar- float insert in water bath to warm samples after freezing if needed. Unit includes polycarbonate jar, high density polyethylene lid and insert, and polyurethane foam jacket. Measures: 123 mm (dia) x 105 m (H).

64475	Tru North™ Chilling Jar	each
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► ChillDown

Rapidly Cool Agarose Mixtures and Other Solutions

Quick - Chill molten agarose down to 60°C in minutes

Improve Results - Rapid cooling of agarose prevents an early-polymerized layer on top of the solution, which interferes with results

Versatile - Use ChillDown whenever cooling of solutions is desirable

Universal - Fits any 250ml beaker

Easy-To-Use - Simply leave your ChillDown in the freezer overnight and it will be ready for you when you need it



77518-01	ChillDown	each
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► Cryogenic Workstation

Coming® Cryogenic Workstation features a reusable cryogenic vial rack with a removable storage tray. Rack holds 30 vials. The tray can be used to hold water or crushed ice. The racks and trays are made of auto-clavable polycarbonate. Overall measurement: 14½"(L) x 6"(W) x 3"(H)



62040	Cryogenic Workstation	each
62041	Reusable Vial Rack Only	each
62042	Reusable Storage Tray Only	each



► Cryogenics Liquid Nitrogen Transfer Vessels

Bench-top Storage!

- For Clinical, industrial, or educational applications
- Different sizes and styles to fit your needs
- Light-weight design is ideal for everyday laboratory use.

The Thermo-Flask® features inner vessels of borosilicate glass evacuated to 1×10^{-5} mm Hg to provide maximum coolant retention and

excellent extended temperature retention for samples stored in liquid nitrogen or solid CO₂. These flasks are available in stainless steel, enameled steel or plastic exteriors – select models feature vented, clamped lids, carrying handles, and rubber cushioned bases.

► 1. Stainless Steel Thermo-Flask® with Handle and Lid

- Durable, corrosion-resistant stainless steel exterior construction with carrying handle and vented lid secured by toggle clamps.
- Recommended for the safe transport of liquid nitrogen.

Catalog #	Model	Capacity Liter	Inside Dia. Inches (cm)	Outside Dia. Inches (mm)	Height Inches (mm)	Ship Wt. Lbs (kg)
61891-01	2122	1.0	3½ (8.5)	4½ (11.6)	9 (22.9)	6 (2.7)
61891-02	2123	2.0	4¼ (10.8)	5½ (13.9)	10½ (26.7)	8 (3.6)
61891-04	2124	4.5	6 (15.2)	7¼ (18.4)	13¼ (34.9)	10 (4.5)
61891-07	2125	7.0	8 (20.3)	9¼ (23.5)	13¼ (33.7)	14 (6.4)



61891-Series

► 2. Shallow Wide Mouth Flasks

- Convenient dish-shaped design is ideal for bench top use with crushed ice, dry-ice, or alcohol.
- Also great as a hot liquid container.
- Stainless steel jacket and cushioned base (lids not included) will provide years of trouble-free use.
- Excellent for use as a cold trap.

Catalog #	Model	Capacity ml	Inside Dia. Inches (cm)	Outside Dia. Inches (mm)	Height Inches (mm)	Ship Wt. Lbs (kg)
61892-02	2126	20	3 (7.6)	4½ (10.6)	3 (7.6)	4 (1.8)
61892-03	2127	30	4 (10.2)	5½ (13.2)	3½ (8.9)	6 (2.7)
61892-05	2128	500	4½ (11.4)	6 (15.2)	3½ (9.5)	6 (2.7)
61892-10	2129	1000	5½ (13/6)	7 (17.8)	4½ (10.6)	8 (3.6)
61892-19	2130	1900	6 (15.2)	7¼ (18.4)	5½ (14.0)	10 (4.5)



61892-Series

► 3. Enameled Steel Thermo-flasks®

- Safe storage of liquified gases, temperature retention, and versatility at an economical price.
- Enameled steel exteriors, borosilicate glass liners and cushioned bases.
- Models 2118 – 2121 (62026-62029) include insulated lids and fold-down carrying handles.
- Ideal for cold traps.

Catalog #	Model	Capacity ml	Inside Dia. Inches (cm)	Outside Dia. Inches (mm)	Height Inches (mm)	Ship Wt. Lbs (kg)
Without Lids and Carrying Handles						
62020	2113	0.2	1½ (3.8)	2¼ (6.9)	8½ (21.6)	4 (1.8)
62021	2114	0.6	2¼ (5.7)	3¼ (8.3)	13¼ (34.9)	5 (2.3)
62022	2115	0.7	2½ (6.4)	3½ (9.5)	11¼ (28.6)	5 (2.3)
62023	2116	1.1	3 (7.6)	4¼ (10.8)	11 (27.9)	6 (2.7)
62024	2117	1.5	3½ (8.9)	5 (12.7)	11½ (29.2)	7 (3.2)
With Lids and Carrying Handles						
62029	2121	10.0	8 (20.3)	9¼ (23.3)	17¼ (343.7)	16 (7.3)



ARTICLE OF INTEREST

1. Electron Microscopy of vitrified ultrathin sections allows the cell structure to be studied in the hydrated state. Richter, Karsten., Gnagi, Helmut., Dubochet, Jacques. (1991). A Model for Cryosectioning Based on the Morphology of Vitrified Ultrathin Sections. J. of Microscopy 163, 19-28.
2. It is demonstrated that cryosectioning with a diamond knife in conjunction with an ionization electrode can produce good cryosections by optimizing the cutting parameters (i.e. sectioning temperature, mechanical stability of the sample, and sectioning velocity). Michel, M., Gnagi, H., Muller, M. (1992). Diamonds are a Cryosectioner's Best Friend. J. of Microscopy 166, 43-56.

► **The CoolSafe – The World's Most Versatile and Effective BenchTop Cooling and Storage System, see pages 686-687 >>>>**

► **Nalgene® Polyethylene Dewar Flask**

High density polyethylene Dewar flasks with vented, insulated HDPE covers. They are unbreakable, chemically resistant, and withstand temperatures from (-196°)-(-100°C) (-321°-+212°F). Double walls are filled with foamed urethane to minimize heat exchange. May be used for short term storage of dry ice-solvent, liquid nitrogen, or for use as a hot bath. They are ideal for storing frozen biological specimens. All available sizes feature molded-in-ribs for stability and a carrying handle on the 1, 2 and 4 liter sizes.



Catalog Number	Capacity (L)	Overall Hgt. mm/in.	Mouth I.D. mm/in.	Qty
62038-01	1	229/9	95/3¾	each
62038-02	2	260/10¼	121/4¾	each
62038-04	4	324/12¾	146/5¾	each
62038-10	10	457/18	197/7¾	each

► **Narrow Mouth Dewars**

Lab grade dewars. Made from borosilicate glass and vacuumed to 10⁻⁷ torr, without pads between walls, eliminating heat transfer for maximum efficiency. They come with low evaporation stopper and weighted base.



► **Spherical Dewar Flask**

Metal casting body does not extend the full length of the flask. Florence flask design, offers the most efficient way of holding liquid nitrogen. Available with an optional Fiber Glass Caddy for safety, easy carrying, and decanting liquids from the above flasks.

Catalog Number	Vol. L	Neck (mm)		Depth (mm)	
		I.D.	O.D.	Int.	Ext.
62019-20	2 L	32	174	335	386
62019-50	5 L	53	255	370	456

62019-22	Dewar Caddy for 62019-20	each
62019-52	Dewar Caddy for 62019-52	each

► **CryoFlex® Tubing**

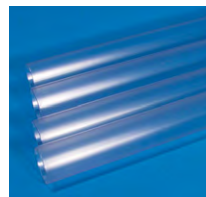
CryoFlex® is a hollow tube from polyethylene which is useful for encasing and sealing cryo vials, when storing samples immersed in liquid nitrogen. The tubing measures ¾" diameter x 19 1/8" long (1.4 x 50cm)



Cat #	Description	Pack
61083-10	CryoFlex® Tubing	15/pk

► **CryoSleeve®**

Clear polyvinyl chloride. Ideal for enclosing Cryo Storage Canes (EMS #61080-10) for extra security during handling and storage. Fits over most other canes. Will not become brittle during freezing or thawing. Will not shred or tear after repeated use like cardboard. Length: 10 3/8" (27.5cm L).



Cat #	Description	Pack
61082-10	Cryo Sleeve®	100/pk

► **Cryogenic Vial Canes**

Organize cryogenic samples in Dewars

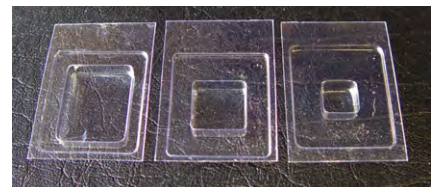
Aluminum canes hold vials for freezer storage or immersion in LN₂ Dewar. For use in liquid phase, use approved vials only. Canes bend to fit all major cryogenic vial brands.



Cat. #	Length	Number of Vials	Vial Size	Qty.
61067-03	290 mm	5	Up to 2.0ml	12/pk
61067-13	300 mm	6	Up to 5 ml	12/pk

► **Tissue-Tek® Cryomold®; Sakura Finetek**

These disposable plastic Cryomolds produce a uniformly shaped flat surface specimen block with tissue freezing medium (O.C.T.) for frozen sectioning. Standard Cryomold fits directly into Cryobar® freezing wells of the Tissue-Tek® II microtome/cryostat. Use a Cryomold® adapter to adapt smaller biopsy and intermediate Cryomold® molds to freezing wells on the Cryobar® unit.



Cat. No.	Tissue-Tek	Description	Pack
62534-25	4557	Standard, 25x20x5mm	100/pk
62534-10	4565	Biopsy, 10x10x5mm	100/pk
62534-15	4566	Intermediate 15x15x5mm	100/pk
62535-15	4568	Intermediate Cryomold Adapter	12/pk

► **Cryogenic Grid Storage Box**

This specimen grid box is a tool for storing or transferring cryogenic TEM specimen grids.

- Four diamond shaped slots
- Non-static cover is held in place with stainless steel screw, which is tapped in the center of the box.
- Box fits the FEI Vitrobot™, Gatan 626™, Gatan 3500™.



Available with lid or without lid.

71166-10	Cryo Grid Box, Round, w/Lid	each
71166-20	Cryo Grid Box, Square, w/Lid	each
71166-30	Cryo Grid Box, Round, wo/Lid	each

► **Cryogenic Grid Box Handling Tool**

This tool has one end which is threaded and fits into the center hole of the Cryogenic Grid Storage Box (where the screw goes in to secure the lid) for moving the box in and out of the cryogenic chamber.



71165-50	Cryogenic Grid Box Handling Tool	each
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► EMS Freeze Substitution Kit

Overview

Freeze Substitution is a process for low temperature dehydration and fixation of rapidly frozen cells that usually takes days to complete. With the amazing work of K.L. McDonald and R.I. Webb¹ they have now introduced a new method for freeze substitution with a basic kit that we are proud to offer.

With this unique kit researchers are now able to achieve excellent freeze substitution results in as little as 90 minutes for cells of small volume such as bacteria and tissue culture cells. For those cells of greater volume or that have significant diffusion barriers such as cuticles or thick cell walls, one can extend the time to 3 hours simply by putting a lid on the box.

Kit Features

EMS 111 Platform Shaker
 EMS 002 Ice Chest
 EMS 003 Heater Block
 EMS 004 Temperature Probe
 EMS 005 Cryo Tubes
 EMS 006 Data Logger



EMS 111 Platform Shaker



EMS 002 Ice Chest



EMS 003 Heater Block



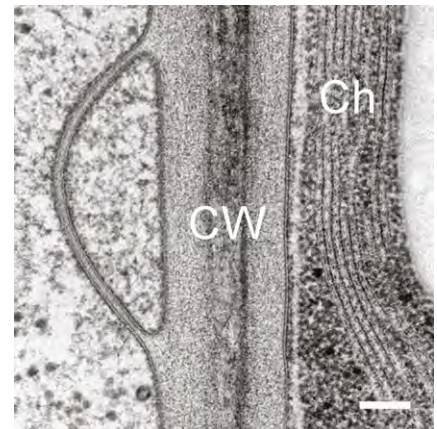
EMS 004 Temperature Probe



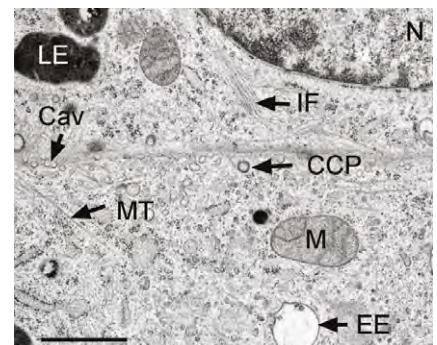
EMS 005 Cryo Tubes



EMS 006 Data Logger



Tobacco leaf prepared as above showing details of the cell wall (CW) and chloroplast (Ch) and cell membranes. Bar = 100 nm.



A BHK cell processed in 90 minutes by the quick FS method. Abbreviations: CCP = clathrin-coated pit, Cav = caveolae, EE = early endosome, IF = intermediate filaments, LE = late endosome, M = mitochondrion, MT = microtubule. Bar = 1 µm. Modified from McDonald and Webb (2011).

Process of Freeze Substitution

- Cool the metal block by submerging completely in liquid nitrogen in the ice bucket. Leave for 5 minutes or until the "boiling" stops.
- In a separate box, transfer samples into cryovials with frozen fixative, keeping everything at liquid nitrogen temperatures. Seal tightly and be very sure that there is no liquid nitrogen trapped in the vial. Trapped liquid can cause the vials to explode upon warming. It is best to use a room temperature lid when sealing the tube.
- Put the vials with samples into holes in the cooled metal block.
- Go to a PC (Macs won't work) that has the Lascar datalogger software installed and name and start the program.
- Pour off the liquid nitrogen from the block and box, making sure not to let the cryovials come
- out of the holes in the block.
- Arrange the block so the cryovials are horizontal and put the tops of the vials against one side of the foam box. Use a piece of foam or wadded up paper behind the block so it keeps the vials from falling out of the block during shaking.
- Turn on the shaker at 100-125 rpm and allow it to gradually warm until the temperature is at least 0°C before removing the vials for rinsing and resin infiltration. This operation should take place in a fume hood in case there is any leakage of osmium-acetone from poorly sealed vials. Freeze substitution will take about 2 hours with the lid off, and about 3 hours with the lid on (though this may vary from lab to lab).
- Remove the vials from the metal block and place them onto a rocker at room temperature and wait until they come to about 20°C, then

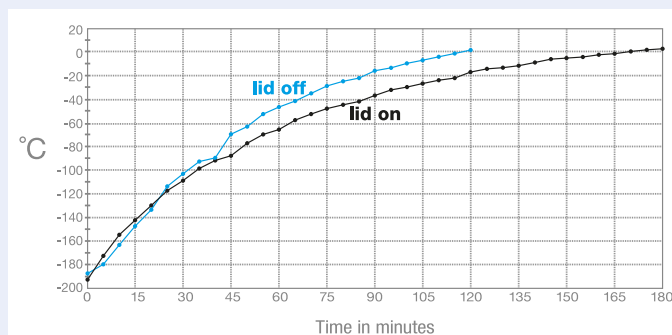
stop the datalogger and save the files.

- Rinse out the fixative with 3-4 rinses in acetone and proceed to infiltration and embedding. Take care opening the vials as pressure built up inside can cause a spray of the freeze substitution media.

**NOTE: No dry ice is required for this procedure

Why does it work?

- In well-frozen samples the water molecules are not likely to move around very much, even as the temperatures rise to a point where you would expect hexagonal ice (Dubochet, 2007).



Warming Curve With and Without Use of Lid

Typical temperature curves using the EMS Freeze Substitution Kit. With the lid OFF the time to 0°C is about 2 hours. With the lid ON the time is about 3 hours. Results may vary depending on the particular setting of the shaker. For example, hood air flow can have a definite influence on the shape of the curves.

C. elegans Cross-section through nerve cells in the head of *C. elegans*. A BHK cell processed in 90 minutes by the quick FS method. Abbreviations: CCP = clathrin-coated pit, Cav = caveolae, EE = early endosome, IF = intermediate filaments, LE = late endosome, M = mitochondrion, MT = microtubule. Bar = 1 µm. Modified from McDonald and Webb (2011). yeast Mitotic spindle microtubules and spindle pole bodies in the budding yeast, *Saccharomyces cerevisiae*.

► **EMS Freeze Substitution Kit (continued)**

- Agitation should speed up the substitution of acetone for water molecules in much the same way that agitation speeds up development of film.
- Water in the substitution mixture does not appear to slow down substitution as was once believed. In fact, it is known to help membrane contrast (Buser and Walther, 2008)..

Does it work for all samples?

If a sample can be successfully freeze substituted by the old methods, then the quick FS method should work just as well.

McDonald and Webb have used this procedure with complete success for over a year and a half for all the samples they have freeze substituted.

If samples show evidence of ice damage then it is because they were damaged during freezing and not during freeze substitution.

Safety Reminders

The equipment should be used in a fume hood in case there is a leak of osmium-acetone during a run. We suggest doing a trial run with acetone only in the cryovials to make sure that they are sealed correctly.

When sealing cryotubes that contain frozen fixative and sample, use a warm cap so that the O-ring is flexible and gives a good seal.

Take care when removing the caps after a FS run because there is some pressure built up inside the cryotubes and you can spray osmium/acetone on your hands if you are not careful. Cover the cap with a piece of lab tissue when removing and wear gloves.

Ordering Information

34500	EMS Freeze Substitution Kit with Shaker	kit
34500-S	EMS Freeze Substitution Kit without Shaker	kit
34502	EMS 111 Platform Shaker, 115 Volt	each
62013-10	EMS 002 Ice Chest	each
34504-B	EMS 003 Heater Block, 12mm	each
34504-R	EMS 003 Heater Block, 13mm	each
34505	EMS 004 Temperature Probe	each
34506	EMS 005 Cryo Tubes	100/pk
34507	EMS 006 Data Logger	each

Acknowledgements:

K.L. McDonald* and R.I. Webb**, *Electron Microscope Laboratory, University of California, Berkeley, CA and ** Centre for Microscopy and Microanalysis, University of Queensland, Queensland, Australia

References:

- McDonald, K, Webb, R. (2011) Freeze Substitution in 3 hours or less. J Microscopy 243, 227-233
- Dubochet, J. (2007). The physics of rapid cooling and its implications for cryoimmobilization of cells. Meth. Cell Biol. 79, 7-21.
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► **Frigimat® – Dry Ice Maker**

US. Patent Des. 220,454

Produce the Dry Ice You Need Right in the Lab

The Frigimat® Dry Ice Maker eliminates the need to buy large quantities of dry ice when only a few blocks are needed. It employs the Joule-Thomson effect to produce a solid 454 gm (16 oz.) block of dry ice in one to two minutes. A brass relief valve safely vents excess gas. Removing the dry ice block requires just 30 seconds. Each 50 lb. cylinder of liquid CO₂ will make 8 to 9 blocks of dry ice, each measuring 8.5cm (3 1/8") x 11cm (4 3/8"). The unit is made from epoxy-coated steel with an aluminum ice chamber and brass valves with four non-skid rubber feet. Dimensions are 30 x 17 x 13 cm H (12" x 6 1/2" x 5"). Shipping weight: 5.5kg (12 lbs) and includes a 1.8m (6 ft) nickel-plated copper connecting tube with standard GCA 320 (0.830" – 14) thread couplings for easy attachment to an LCO₂ cylinder.



Cat. #	Description	Qty.
62056-10	Frigimat® Dry Ice Maker (US Model)	each
62056-20	Frigimat® Dry Ice Maker (Europe Model)	each
62056-22	Frigimat® Dry Ice Maker (Japan Model)	Each

Frigimat® CUB – Dry Ice Maker

Economical Block Dry Ice Maker for On-Demand Use

In only a few minutes, this compact device can be attached to a liquid CO₂ cylinder and will produce a ready-to-use 250 – 300 gram block of dry ice. (Each 50 lb. cylinder makes from 10 to 16 blocks of dry ice). Set-up and use is safe and simple. Dry ice production can be viewed through the transparent polycarbonate body that secures without clamps or screws or tools ensuring easy removal of the solid block of dry ice and connection from the CO₂ cylinder. A rugged nickel plated "pigtail" connects the Frigimat® Cub – Dry Ice Maker to the CO₂ cylinder valve. The system operates at very low pressure (displayed on the built-in dial gauge) and incorporates multiple pressure relief safeguards. Cylinder Connection: 1.8m (6 ft) nickel-plated copper connecting tube with standard CGA 320 thread coupling for easy attachment to a CO₂ cylinder.



Cat. #	Description	Qty.
62057-10	Frigimat® Cub – Dry Ice Maker	each

FreezGuard™ Alarm

Alarm will Sound for Up to Three Days

Prevent costly, time consuming sample loss with this practical battery operated system. The FreeGuard™ Alarm monitors freezers and coolers and detects any variance from temperatures between -20°C and 13°C (-5°F to 55°F), ±1°C, which are preset by the user. The resonant alarm will continue to sound for up to three days if the temperature falls out of the pre-set range. Should the temperature correct itself, an LED will indicate that a variance has occurred. The alarm can be reset manually. A beep will signal when the 9V battery (not included) is low. For added protection, and extra life, a second battery can be connected. The unit mounts with self-adhesive tape or screw. Unit comes with a 3 meter probe lead, and measures 86W x 35D x 26mmH (3 5/16 x 1 1/2 x 5 1/16). The weight without the battery is 144 g (5.1 oz).



Cat. #	Description	Qty.
72092-10	FreezGuard, Celsius	each
72092-20	FreezGuard, Fahrenheit	each

► Laser Cryo-Babies® & Cryo-Tags™ Labels for Cryogenic Storage†



Temperature-Resistant – From -196°C to 150°C. Cryo-Babies and Cryo-Tags withstand freezer temperatures down to -196°C (liquid and vapor phase nitrogen), boiling water baths (100°C), autoclaving and moderate oven temperatures (150°C).

Tough – Chemically inert labels resist most organic solvents and caustic agents. They adhere to most plastics*, glass and metals without cracking, peeling or degrading.

Specially Designed – Label sheets are specially top-coated to readily accept laser printing. Heat-resistant, stay-flat sheets will not jam in laser printers.

Innovative – Made with a flexible, polyolefin* label material and acrylic adhesive. This unique combination expands and contracts together with temperature fluctuations resulting in a strong adhesive bond.

Packs are available in Individual Colors or in *Rainbow Packs (4 sheets of each color)

Blue	Green
Orange	Red
Yellow	White

1.

1.28" x 0.50"
for 1.5–2.0ml tubes
(white and colors)

3.

1.50" x 0.75"
General Purpose
(white and colors)

2.

0.94" x 0.50"
for 0.5ml tubes
(white and colors)

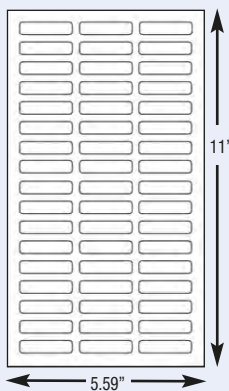
4.

1.69" x 0.75"
CryoVials
(white and colors)

NEW: Mini Sheets

51 Labels Per Sheet (3 Across - 17 Down)

Now available in our most popular label size, 1.28" x 0.50", combine the reliability of Cryo-Tags and the convenience of printing less at a time. This is a perfect solution for small experiments and clinical trials.



Cat. #	Color	Labels per Sheet	Layout Across	Layout Down	Labels per Pack
77559-W	White	51	3	17	1020

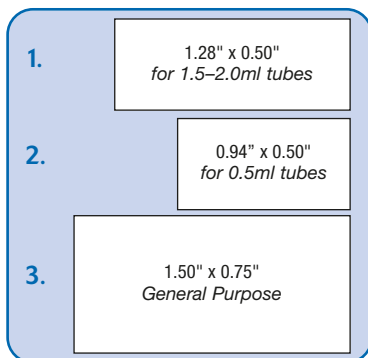
Cat. #	Color	Labels per Sheet	Layout Across	Layout Down	Labels per Pack
1. Laser Cryo-Babies 1.28" x 0.50" (33mm x 13mm) Ideal use: 1.5ml tubes					
77560-W	White	85	5	17	1,700
77560-B	Blue	85	5	17	1,700
77560-G	Green	85	5	17	1,700
77560-O	Orange	85	5	17	1,700
77560-R	Red	85	5	17	1,700
77560-Y	Yellow	85	5	17	1,700
77560-C	Clear	85	5	17	1,700
77560-05	Rainbow*	85	5	17	1,700
2. Laser Cryo-Babies 0.94" x 0.50" (24mm x 13mm) Ideal use: 1.5ml tubes					
77561-W	White	7	17	119	2,380
77561-B	Blue	7	17	119	2,380
77561-G	Green	7	17	119	2,380
77561-O	Orange	7	17	119	2,380
77561-R	Red	7	17	119	2,380
77561-Y	Yellow	7	17	119	2,380
77561-C	Clear	7	17	119	2,380
77561-05	Rainbow*	7	17	119	2,380

Cat. #	Color	Labels per Sheet	Layout Across	Layout Down	Labels per Pack
3. Laser Cryo-Tags 1.50" x 0.75" (38mm x 19mm) Ideal use: General Purpose					
77564-W	White	60	5	12	1,200
77564-B	Blue	60	5	12	1,200
77564-G	Green	60	5	12	1,200
77564-O	Orange	60	5	12	1,200
77564-R	Red	60	5	12	1,200
77564-Y	Yellow	60	5	12	1,200
77564-05	Rainbow*	60	5	12	1,200
4. Laser Cryo-Tags 1.69" x 0.75" (43mm x 19mm) Ideal use: Cryo-Vials					
77565-W	White	52	4	13	1,040
77565-B	Blue	52	4	13	1,040
77565-G	Green	52	4	13	1,040
77565-O	Orange	52	4	13	1,040
77565-R	Red	52	4	13	1,040
77565-Y	Yellow	52	4	13	1,040
77565-05	Rainbow*	52	4	13	1,040

► Cryo-Babies® & Cryo-Tags® On a Roll

Convenient – Dispensing box assists in labeling individual tubes used in small experiments.

Easy to Write on – PVC labels accept writing from most lab markers including our Solvent Resistant Pens and Teeny Writers.



1. Cryo-Babies on a Roll 1.28" x 0.50" (33mm x 13mm) Ideal use: 1.5ml tubes

Cat. #	Color	Labels per Roll
77550-W	White	1,000
77550-B	Blue	1,000
77550-G	Green	1,000
77550-O	Orange	1,000
77550-R	Red	1,000
77550-Y	Yellow	1,000

2. Cryo-Babies on a Roll 0.94" x 0.50" (24mm x 13mm) Ideal use: 0.5ml tubes

Cat. #	Color	Labels per Roll
77551-W	White	1,000



3. Cryo-Tags on a Roll 1.50" x 0.75" (38mm x 19mm) Ideal use: General Purpose

Cat. #	Color	Labels per Roll
77554-W	White	1,000
77554-B	Blue	1,000
77554-G	Green	1,000
77554-O	Orange	1,000
77554-R	Red	1,000
77554-Y	Yellow	1,000

5. 1.50" x 0.25" (Microplates)

6. 2.625" x 1.00"
For boxes, tube racks
& other containers
(white and colors)

3/8" 8. 1.28" x 0.50"
for 1.5-2.0ml tubes
(white only)

7. 3.00" x 2.00"
For bottles, tube racks, boxes
and other laboratory containers
(white only)

10. 1.00" x 1.00"
For Microscope
Slides
(white only)

11. 1.125" x 1.75"
For racks and boxes
(white only)

9. 2.50" x 0.50"
For 0.5ml - 2.0ml tubes
(white only)

Cat. #	Color	Labels per Sheet	Layout Across	Layout Down	Labels per Pack
5. Laser Cryo-Tags 1.50" x 0.25" (38mm x 6mm) Ideal use: Microplates					
77567-W	White	156	4	39	3,120
77567-B	Blue	156	4	39	3,120
77567-G	Green	156	4	39	3,120
77567-O	Orange	156	4	39	3,120
77567-R	Red	156	4	39	3,120
77567-Y	Yellow	156	4	39	3,120
77567-05	Rainbow*	156	4	39	3,120
6. Laser Cryo-Tags 2.625" x 1.0" (67mm x 25mm) Ideal use: Racks and Boxes					
77566-W	White	30	3	10	600
77566-B	Blue	30	3	10	600
77566-G	Green	30	3	10	600
77566-O	Orange	30	3	10	600
77566-R	Red	30	3	10	600
77566-Y	Yellow	30	3	10	600
77566-05	Rainbow*	30	3	10	600

Cat. #	Color	Labels per Sheet	Layout Across	Layout Down	Labels per Pack
7. Laser Cryo-Tags 3.0" x 2.0" (76mm x 51mm) Ideal use: Bottles & Beakers					
77568-W	White	12	4	4	240
8. Laser Cryo-Tags Tough Spot Set					
1.28" x 0.50" with 0.375" spot, (33mm x 13mm with 9.5mm spot) Ideal use: 1.5ml tubes					
77574-W	White	68	4	17	1,360



Cat. #	Color	Labels per Sheet	Layout Across	Layout Down	Labels per Pack
9. Laser Cryo-Tags 2.50" x 0.75" (64mm x 13mm) Ideal use: 0.5 to 2.0 ml tubes					
77572-W	White	60	3	20	1,200
10. Laser Cryo-Tags 1.0" x 1.0" (25mm x 25mm) Ideal use: Microscope Slides					
77571-W	White	80	8	10	1,600
11. Laser Cryo-Tags 1.125" x 1.75" (29mm x 44mm) Ideal use: General Purpose					
77569-W	White	42	7	6	840
Laser Cryo-Tags 8.5" x 11" (216mm x 279mm)					
77570-W	White	1		Blank Sheet	20

* 100% Virgin Polypropylene tubes are recommended. Avoid the use of siliconized surfaces.
† Patented

► Cryo-Clear™ Laser Labels

Clear Cryogenic Storage Labels for Use with Laser Printers

"The Choice is CLEAR" – Contents of vials beneath labels remain visible.

Temperature-resistant – From -196°C to 70°C. Cryo-Clear labels remain fully adhered down to -196°C (liquid and vapor phase nitrogen).

Durable – Chemically inert labels resist most organic solvents and caustic agents. Labels adhere to plastics*, glass and metals without cracking, peeling or degrading.

Laser Printable – Label sheets are specially top-coated to accept laser printing and other markings. Heat-resistant, stay-flat sheets will not jam in laser printers.

Innovative – Made with a flexible, vinyl label material and permanent acrylic adhesive. This unique combination expands and contracts together as temperatures fluctuate resulting in a strong and sustained adhesive bond.



Cryo-Clear Laser Labels - Sizing Guide

1. 1.28" x 0.50" for 1.5 - 2.0ml tubes	2. 0.94" x 0.50" for 0.5ml tubes
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Cat. #	Color	Tag Size (Inches / Millimeters)	Sheet layout	Labels/Sheet	Ideal Use	Qty.
1. 77575-C	Clear	1.28" x 0.50" / 33mm x 13mm	5 Across - 17 Down	85	1.5ml tubes	1,700/pk.
2. 77576-C	Clear	0.94" x 0.50" / 24mm x 13mm	7 Across - 17 Down	119	0.5ml tubes	2,380/pk.

* NOTE: Siliconized surfaces should be avoided. Apply to clean, dry tubes at room temperature. Tubes made of 100% virgin polypropylene are recommended.
† Patented

► Direct Thermal CryoTags®

Temperature-Resistant – From -196°C to 70°C and also freezable in liquid nitrogen.

Tough – They adhere to most plastics, glass and metals without cracking, peeling or degrading. Also resistant to scuffing and smearing.

Compatible – Tubes labeled with Direct Thermal CryoTags easily slide in and out of centrifuge rotors without binding.

Specially Designed – Labels accept printing from direct thermal printers such as Dymo LabelWriters.

Barcoding – Print popular barcode formats for fast and easy sample identification.

Effortless – Printer setup and use is easy and user friendly

Economical – Limit label waste by printing only the quantity required

New Format – Labels are now oriented vertically and are compatible with the new LabelWriter 450

Same Great Product – Users of Direct Thermal Tough-Tags will be happy to know we've expanded the temperature range of Tough-Tags and made them Cryo-Tags

Online Support –

Email us at sgkcck@aol.com to request new definition files for the LabelWriter 450

* NOTE: Prolonged exposure to alcohol may cause material discoloration.



► Cryo Labels And Markers



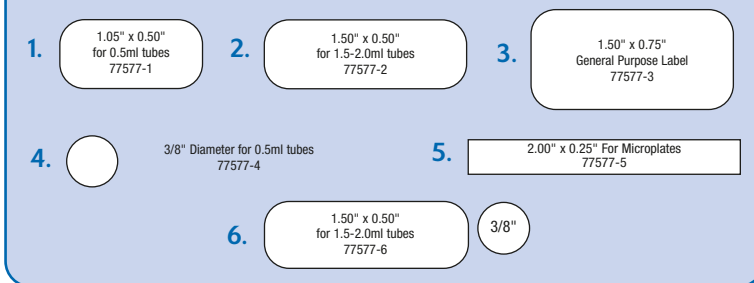
► **Labels:** A specially formulated material for use at ultra-low temperatures and in cryo storage conditions, such as liquid nitrogen and liquid oxygen. They are durable and adhere well to plastic as well as cardboard cryogenic storage boxes. They will not peel or shrink. Ten sheets of labels: five pre-printed, five plain. Twenty labels/sheet. Label measures: 2.5cmx5cm.

62046	Cryo Labels	200 labels/pk
62047	Cryo Labels	10pk/lot

► **Markers:** For permanently marking cloth, cardboard, and plastic. It will not fade at ultra-low temperatures. Smudge-proof. Package consists of four, extra fine point pens in assorted colors (red, green, blue and black).

62050	Cryo Markers	4/pk
62051	Cryo Markers	6pk/cs

Sizing Guide for Direct Thermal Cryo-Tags



EMS#	Color	Dimensions	Ideal Use	Labels per pack	
1. 77577-1	77593-1	White	1.05" x 0.50" / 27x13mm	0.5ml tubes	1,000
77577-7	77593-7	Blue	1.05" x 0.50" / 27x13mm	0.5ml tubes	1,000
77577-8	77593-8	Green	1.05" x 0.50" / 27x13mm	0.5ml tubes	1,000
77577-9	77593-9	Yellow	1.05" x 0.50" / 27x13mm	0.5ml tubes	1,000
2. 77577-2	77593-2	White	1.50" x 0.50" / 38x13mm	1.5ml tubes	750
77577-10	77593-10	Blue	1.50" x 0.50" / 38x13mm	1.5ml tubes	750
77577-11	77593-11	Green	1.50" x 0.50" / 38x13mm	1.5ml tubes	750
77577-12	77593-12	Yellow	1.50" x 0.50" / 38x13mm	1.5ml tubes	750
3. 77577-3	77593-3	White	1.50" x 0.75" / 38x19mm	2.0ml tubes	750
77577-13	77593-13	Blue	1.50" x 0.75" / 38x19mm	2.0ml tubes	750
77577-14	77593-14	Green	1.50" x 0.75" / 38x19mm	2.0ml tubes	750
77577-15	77593-15	Yellow	1.50" x 0.75" / 38x19mm	2.0ml tubes	750
4. 77577-4	77593-4	White	3/8" diameter / 9.5mm dia	0.5ml tubes	4,000
77577-16	77593-16	Blue	3/8" diameter / 9.5mm dia	0.5ml tubes	4,000
77577-17	77593-17	Green	3/8" diameter / 9.5mm dia	0.5ml tubes	4,000
77577-18	77593-18	Yellow	3/8" diameter / 9.5mm dia	0.5ml tubes	4,000
5. 77577-5	77593-5	White	2.00" x 0.25" / 51x6mm	Microplates	1,000
6. 77577-6	77593-6	White	1.50" x 0.50" - 3/8" dia spot	1.5ml tubes	1,000
77577-19	77593-19	Blue	1.50" x 0.50" - 3/8" dia spot	1.5ml tubes	1,000
77577-20	77593-20	Green	1.50" x 0.50" - 3/8" dia spot	1.5ml tubes	1,000
77577-21	77593-21	Yellow	1.50" x 0.50" - 3/8" dia spot	1.5ml tubes	1,000

► Micro Tube Label; Tough-Tags™

Pre-cut, peel-off, pressure sensitive labels. They are sized to fit microcentrifuge tubes, cryo tubes and many other containers.

- They can be boiled, froze, and autoclaved.
- They are chemically resistant.
- They are thin and will not jam in the centrifuge rotor.
- They will not dry out, fall-off, or tear.



Available in two sizes: 1.28"x.5" (33x12mm) and .94x.5" (24x12mm). They are ideal for use with 1.5-2.0 ml and 0.5-0.56ml microtubes respectively. The labels are either clear (for sample visibility) or white.

62044-10	Tough-Tags Clear Label, 24x12mm	1,000/bx
62044-20	Tough-Tags White Label, 24x12mm	1,000/bx
62045-10	Tough-Tags Clear Label, 33x12mm	1,000/bx
62045-20	Tough-Tags White Label, 33x12mm	1,000/bx

► Bake Tough-Tag®

1.50" x 0.75" (38 x 19mm) Ideal Use: Oven Sterilization

Bake Tags are oven-safe marking labels that withstand conventional oven-sterilization (typically 180°C) or heating to inactivate RNase, DNase and other enzymes. Bake Tags will withstand autoclaving, cryogenic freezer storage conditions and boiling baths, without peeling or falling off.

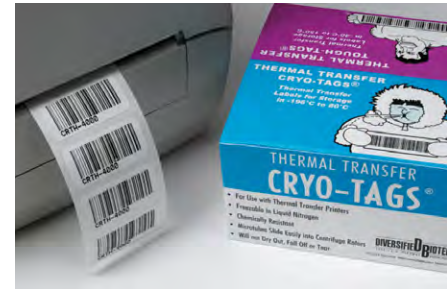
Cat #	Color	Labels/roll	Qty/pk
77540-W	White	250	1

► Thermal Transfer Tough-Tags & Cryo-Tags

Pre-cut, Peel-Off Labels Designed for Use in Thermal Transfer Printers

Thermal Transfer Tough-Tags and Cryo-Tags are a reliable and convenient way to identify samples with text or a barcode on microtubes, microplates, bottles and other laboratory containers.

- Unique solvent-resistant, acrylic-based adhesive provides excellent cold temperature performance
- Print crisp, clear, professional quality labels
- Resists degradation from scuffing, chemicals, moisture and wide temperature fluctuations
- Specially coated for use with a resin ribbon that provides the best performance under extreme conditions
- Print as little as one label at a time, eliminating label waste and saving time and money



SIZING GUIDE: Thermal Transfer Labels for Storage in Temperatures From -196°C to 80°C

<p>0.81 x 0.28" for 0.2ml PCR tubes 77592-65</p> <p>1.</p>	<p>0.94" x 0.50" For 0.5ml tubes 77592-70</p> <p>2.</p>	<p>1.28" x 0.50" for 1.5–2.0ml tubes 77592-75</p> <p>3.</p>	<p>1.05 x 0.50" for .5ml tubes 77592-2</p> <p>4.</p>	<p>1.375" x 0.625" for 1.5–2.0ml tubes 77592-80</p> <p>5.</p>
<p>1.50" x 0.5" for 1.5–2.0ml tubes 77591-4</p> <p>6.</p>	<p>1.50" x 0.75" General Purpose Label 77591-4</p> <p>7.</p>	<p>2.00" x 0.25" for Microplates 77592-5</p> <p>8.</p>		

Cryo-Tags on a 1" I.D. Core with 2,000 labels per roll

Cat. #	Tag Size (Inches)	Tag Size (Millimeters)	Ideal Use	Qty.
1. 77592-65	0.81 x 0.28"	20.6 x 7mm	0.2ml PCR tubes	2000/Roll
2. 77592-70	0.94 x 0.50"	24 x 13mm	0.5 ml tubes	2000/Roll
3. 77592-75	1.28 x 0.50"	32 x 13mm	1.5 ml-2.0 ml tubes	2000/Roll
4. 77592-2	1.05 x 0.50"	27 x 13mm	0.5 ml tubes	2000/Roll
5. 77592-80	1.375 x 0.625"	35 x 16mm	1.5 ml-2.0 ml tubes	2000/Roll
6. 77592-3	1.50 x 0.50"	38 x 13mm	1.5 ml-2.0 ml tubes	2000/Roll
7. 77592-4	1.50 x 0.75"	38 x 19mm	General Purpose	2000/Roll
8. 77592-5	2.00 x 0.25"	51 x 6mm	Microplates	2000/Roll

Cryo-Tags on a 3" I.D. Core with 4,000 labels per roll

Cat. #	Tag Size (Inches)	Tag Size (Millimeters)	Ideal Use	Qty.
1. 77592-81	0.81 x 0.28"	20.6 x 7mm	0.2ml PCR tubes	4000/Roll
2. 77592-82	0.94 x 0.50"	24 x 13mm	0.5 ml tubes	4000/Roll
3. 77592-83	1.28 x 0.50"	32 x 13mm	1.5 ml-2.0 ml tubes	4000/Roll
4. 77592-84	1.05 x 0.50"	27 x 13mm	0.5 ml tubes	4000/Roll
5. 77592-85	1.375 x 0.625"	35 x 16mm	1.5 ml-2.0 ml tubes	4000/Roll
6. 77592-86	1.50 x 0.50"	38 x 13mm	1.5 ml-2.0 ml tubes	4000/Roll
7. 77592-87	1.50 x 0.75"	38 x 19mm	General Purpose	4000/Roll
8. 77592-88	2.00 x 0.25"	51 x 6mm	Microplates	4000/Roll

Tough-Tags on a 1" I.D. Core with 2,000 labels per roll

Cat. #	Tag Size (Inches)	Qty.
1. 77591-1	0.94 x 0.50"	2,000/roll
2. 77591-2	1.28 x 0.50"	2,000/roll
3. 77591-3	1.375 x 0.625"	2,000/roll
4. 77591-4	1.50 x 0.75"	2,000/roll
5. 77591-5	2.0 x 0.25"	2,000/roll

Tough-Tags on a 3" I.D. Core with 4,000 labels per roll

Cat. #	Tag Size (Inches)	Qty.
1. 77591-10	0.94 x 0.50"	2,000/roll
2. 77591-20	1.28 x 0.50"	2,000/roll
3. 77591-30	1.375 x 0.625"	2,000/roll
4. 77591-40	1.50 x 0.75"	2,000/roll
5. 77591-50	2.0 x 0.25"	2,000/roll

Thermal Transfer Accessories

Cat. #	Description	Qty.
77592-55	Resin Ribbon 2.50" x 244' for TLP 2844	each

TECHNICAL TIP

Cryo Sectioning and the Use of Diamond Knives

1. Electron Microscopy of vitrified ultrathin sections allows the cell structure to be studied in the hydrated state.

Richter, Karsten., Gnagi, Helmut., Dubochet, Jacques. (1991). A Model for Cryosectioning Based on the Morphology of Vitrified Ultrathin Sections. J. of Microscopy 163, 19-28.

2. It is demonstrated that cryosectioning with a diamond knife in conjunction with an ionization electrode can produce good cryosections by optimizing the cutting parameters (i.e. sectioning temperature, mechanical stability of the sample, and sectioning velocity).

Reference: Michel, M., Gnagi, H., Muller, M. (1992). Diamonds are a Cryosectioner's Best Friend. J. of Microscopy 166, 43-56.

For a complete line of all of our labels see pages 1126-1144 >>>>

► Wet Grip

Labels for Moist, Frosty or Frozen Tubes

- “GRIPS” to wet, frost-covered and frozen surfaces
- Temperature resistant to -40°C
- Compatible with centrifuge rotors
- Resistant to chemicals and solvents
- Adheres to plastics, glass, metals and even paperboard boxes
- Print on sheets with Laser printers or use rolls for Direct Thermal printers



ALL LABELS ARE CLEAR, ON 1" I.D. CORES WITH 1,000 LABELS/ROLL.

Dymo and LabelWriter are registered trademarks of the Dymo Corp., an Esselte Office Products Co.

► Direct Thermal (Temp. Range: -40°C to 70°C)

Cat. #	Label SIZE (Inches/Millimeters)	Ideal Use	Qty.
77594-10	1.05" x 0.50" / 27mm x 13mm	0.5ml tubes	each
77594-20	1.50" x 0.50" / 38mm x 13mm	1.5ml tubes	each
77594-30	1.50" x 0.75" / 38mm x 19mm	2.0ml tubes	each
77594-40	$\frac{3}{8}$ " diameter / 9.5mm diameter	0.5ml tubes	each
77594-50	2.00" x 0.25" / 51mm x 6mm	Microplates	each
77594-60	1.50" x 0.50" - $\frac{3}{8}$ " diameter spot	1.5ml tubes	each

Cat. #	Description	Qty.
77577-50	Dymo® LabelWriter® 450	each

► On A Roll (Temp. Range: -40°C To 100°C)

Cat. No.	Label Size	Use	Unit
77595-60	1.28" x 0.50" / 33mm x 13mm	1.5ml tubes	1,000/roll
77595-65	1.50" x 0.75" / 38mm x 19mm	1.5ml - 2.0ml tubes	1,000/roll

► Laser Sheets (Temp. Range: -40°C to 100°C)

Cat. #	Color	Tag Size (Inches / Millimeters)	Sheet layout	Labels/Sheet	Ideal Use	Qty.
77595-10	White	1.28" x 0.50" / 33mm x 13mm	5 Across - 17 Down	85	1.5ml tubes	1,700/pk.
77595-20	White	0.94" x 0.50" / 24mm x 13mm	7 Across - 17 Down	119	0.5ml tubes	2,380/pk.
77595-30	White	1.50" x 0.75" / 38mm x 19mm	5 Across - 12 Down	60	1.5ml - 2.0ml tubes	1,500/pk.
77595-40	White	0.875" x 0.875" / 22mm x 22mm	8 Across - 12 Down	96	Microscope Slides	2,400/pk.

► Cloth-Textured Hi/Lo Temperature Tape

These tapes mold tightly to any container, withstand acids, alkalis, oils and greases. It's will not crack peel or fall off in 550°F dry oven temperatures. Hi/Lo Temperature tape also sticks tightly in the dry ice, liquid gases and deep freeze of cryogenic temperatures. Tape is available in widths of $\frac{1}{2}$ ", $\frac{3}{4}$ " and 1" on 250" roll. (This tape must be cut with scissors)

Cat.#	Description	Pack
77012-05	Hi/Lo Cloth Tape, $\frac{1}{2}$ " wide	each
77012-07	Hi/Lo Cloth Tape, $\frac{3}{4}$ " wide	each
77012-10	Hi/Lo Cloth Tape, 1" wide	each



► Cryogenic Labels

These labels are made from top quality materials, a wide range of sizes, designed specially for cryogenic use.

1. DuraStick Labels (KDS-series) For Temperature of -40°C and Below

These labels feature a smudge resistant surface. They are available in rolls for thermal transfer printing or in $8\frac{1}{2}$ " x 11" sheets for laser printing. All accept handwritten notations with cryo markers.

2. CryoStick Labels (FCS-series) For Temperatures of -80°C
Ideal for use with cryotubes, these labels are best used with thermal transfer printers or cryo marker pens. Available in a wide range of sizes on sheets or rolls, they are not recommended for laser printing.

3. LiquiStick Labels (LSC-series) For temperatures of -195°C
Labels feature a synthetic surface that accepts crisp bar codes from thermal transfer printers or handwritten notations cryo markers. Supplied in sheets or rolls, these labels are not recommended for use with laser printers.

4. Satin Cloth Labels (SC-series) For temperature of -60°C
These textured labels withstand dry ice, deep freezers and liquid gases. Supplied in sheets or rolls. They are easily marked with cryo markers, not for use with automated printers.

5. Wrap-Around Labels (WA-1) For Freezers and Cryogenic Use

These unique labels are for sub-zero use, measures $\frac{1}{16}$ " x $2\frac{3}{8}$ ". They feature a $\frac{1}{16}$ " x $\frac{1}{16}$ " area, frosted for thermal printing or marking with cryo markers. The remainder of the label is clear. It wraps around the cryo-tube to provide a protective cover for printed information while leaving a clear space for viewing the tube contents.

Ordering Information

Cryogenic Labels - Sold per 1000 labels

Label Size	DuraStick-series	CryoStick-series	LiquiStick-series	Satin-Cloth	Wrap-Around
$\frac{3}{16}$ " Dia	77025-01	77026-01	77027-01	—	—
$\frac{1}{2}$ " x $\frac{9}{16}$ "	77025-10	77026-10	77027-10	—	—
$\frac{1}{2}$ " x $1\frac{1}{4}$ "	77025-11	77026-11	77027-11	—	—
$\frac{1}{2}$ " x $1\frac{1}{4}$ "	77025-LA*	—	—	—	—
$\frac{1}{2}$ " x $1\frac{1}{2}$ "	—	77026-12	77027-12	—	—
$\frac{5}{8}$ " x 1"	—	—	—	77030-01	—
$\frac{5}{8}$ " x 2"	—	—	—	77030-02	—
$\frac{3}{4}$ " x $9\frac{1}{10}$ "	—	77026-15	77027-15	—	—
$\frac{3}{4}$ " x $1\frac{1}{4}$ "	—	77026-16	77027-16	—	—
$\frac{3}{4}$ " x $1\frac{1}{2}$ "	—	77026-17	77027-17	—	—
$\frac{15}{16}$ " x $2\frac{3}{8}$ "	—	—	—	—	77028-18 (frosted)
1" x 2"	—	—	—	77030-03	—
1" x $2\frac{1}{4}$ "	—	—	—	77030-04	—

*Sheet for Laser Printer - 5000 per pack

DiATOME Diamond Knives

Introduction, Manufacturing, Characteristics

Quality Guarantee and Prices

DiATOME Diamond Knives

- Ultrasonic Oscillating
- Ultra Room Temperature
- Cryo Low Temperature
- Cryo Immuno
- Trimtool
- Histo, Histo Jumbo and Histo-Cryo
- AFM for Ultra and Cryo

Accessories

- Manipulator
- Static II Line Ionizer

Special Diamond Knife Programs

Resharpener, Exchange, and Policies

Unique Characteristics & Justifications

Diamond Knife Handling and Use Manual

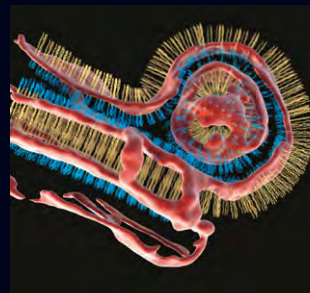
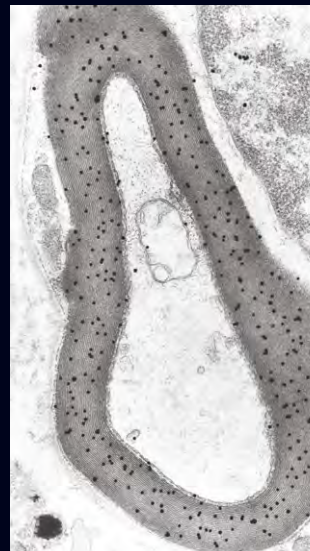
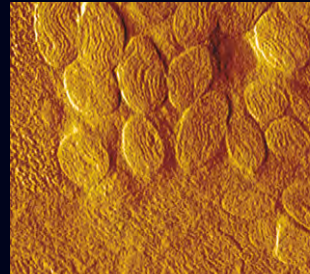
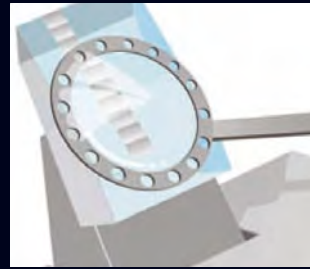
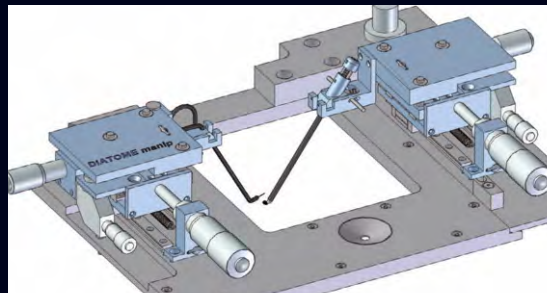
Gallery



DiATOME



**Electron
Microscopy
Sciences**



THE DiATOME FINDER

A MINI-GUIDE TO DIATOME KNIVES

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**DEAR CUSTOMER,**

DiATOME Diamond Knives: development, manufacturing and customer service since 1970

What have we achieved in this period?**ultra 45**

the first diamond knife with an absolutely score-free, hydrophilic cutting edge.

semi

the first diamond knife for alternating sectioning ultrathin/semithin.

cryo

the diamond knife for sectioning at low temperature.

histo

the first diamond knife for semithin sections for light microscopy.

ultra 35

the diamond knife for optimized sectioning results in almost all applications.

STATIC LINE II

the ionizer for eliminating electrostatic charging in ultramicrotomy.

cryo-P

a cryo knife with a patented platform for section pick up.

cryo immuno

the optimized cryo diamond knife for the Tokuyasu technique.

ultra sonic

the oscillating diamond knife for room temperature sectioning.

cryotrim

45 and 25 optimizing trimming with diamond blades.

ultra afm & cryo AFM

the first diamond knives for AFM at room and low temperatures.

cryo 25

for sectioning frozen hydrated specimens.

histo and ultra jumbo

for room temperature

trimtool

45° and 20° trimming tools for both room and cryo temperatures.

manipulator

for easy handling and mounting of section ribbons

These developments were possible by the cooperation with you, our valued customers. We are convinced that our future developments will allow diamond knives to be used for many new applications.

What services can we offer you?

- Technical assistance in all fields of ultramicrotomy.
- Free sectioning tests for all types of samples.
- Make use of our many years of experience in perfecting our knives.
- With a telephone call, an e-mail or a fax message we can inform you of any details you require.

We are looking forward to hearing from you soon!

YOUR DiATOME TEAM

Manufacturing

The Raw Material:

The manufacturing of high quality knives, like ours, begins with the selection of the highest possible purity diamonds with a regular crystal structure, which are pale yellow in color. The crystal orientation of the diamond that we have chosen permits a final polishing parallel to the cutting edge, which gives you an extremely sharp, scorefree, durable cutting edge.

Precision in Grinding and Polishing:

Our precise pre-grinding and polishing techniques assure you the perfection in a diamond knife that you expect. Each one of our stones is ground strictly in accordance with its structure, with an accuracy of +/- 2 degrees being maintained in the crystal axis. Loss of weight during this preliminary grinding amounts to 80%. In contrast to the methods of others our diamond knives are ground parallel to the cutting edge.

Some of the reasons for doing so are as follows:

1. The cutting edge life of a diamond tool used for processing a tough metal such as beryllium bronze can be appreciably lengthened, if the diamond is oriented in such a way, that the grinding direction is at a right angle to the subsequent working direction. If we wish to apply this knowledge to the manufacturer of diamond knives, then the grinding direction will be parallel to the knife cutting edge. This is crucial in the cutting of bone or metals, for example.
2. The diamond knife cutting edge is formed from the polished surface which is turned towards the trough and the ground surface which forms the clearance angle with the block. Since the sections pass over the side turned towards the water, this surface is subject to much greater use than the clearance angle surface, and if it has been badly polished, the areas with polishing ridges in the cutting edge give rise to stripes and streaks in the sections, some more visible than others.

The same thing would occur if we turned the ground surface towards the water and its grinding ridges were not exactly parallel to the cutting edge. It has been demonstrated that the steeper the grinding ridges are to the knife cutting edge, the more pronounced is the formation of stripes in the sections. According to this, grinding or polishing at right angles to the cutting edge would represent an extreme case. The streaks in the sections can be seen in the stereomicroscope of the ultramicrotome or in the electron microscope. In the course of time the effects of irregularities in the cutting edge can be increased through polymerized embedding material. Knives that have been supplied by us in perfect condition have come back to us after complaints and have been found to be cutting with streaks, even though there was no damage visible under the microscope.

The Cutting Edge:

The sharpness of a DiATOME knife edge can not fully be shown in a light microscopy photograph, however, it has been shown that the radius of curvature of our knives is less than 2nm.

Quality Control/Optical Checking and Section Testing:

The final step before any of our knives leave the plant is our own extensive testing that each knife, new or resharpened, is put through. Only if these knives perform successfully will they be sold. During the polishing process the edges of the knives are inspected at 500 to 1000x magnification. Very small irregularities that could not be found by light

microscopy are detected during the sectioning test in accordance with the range of the different knife types (sections are checked by light and electron microscopy). Only knives that cut perfectly over this range are accepted for delivery to the customer.

Characteristics of **DiATOME** Diamond Knives:

- DiATOME knives are compatible with all ultramicrotomes.
- The boat is designed in such a manner that the water surface is horizontal when the clearance angle is set. This results in a stationary water surface and good reflection.
- The shape of the boat offers you the advantage of easy pick-up of the floating sections.
- The surfaces of the DiATOME diamond knives are hydrophilic. This property allows an easy wetting of the cutting edge, even with a very low water level (important for sectioning Lowicryls and other hydrophilic embedding media, as well as for water sensitive samples.)
- The diamond is fastened in a metal shank which is securely screwed into the boat.
- The cementing material seals boat and knife. It is hydrophilic and aids the easy wetting of the cutting edge.

Quality Guarantee of **DiATOME** Diamond Knives:

Before delivery, each knife, new or resharpened, is subject to extensive testing. We can therefore guarantee perfect sectioning (in the respective thickness range) over the entire cutting edge.

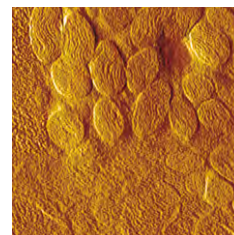
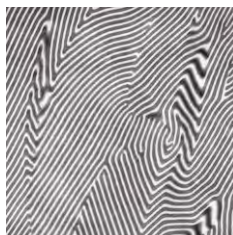
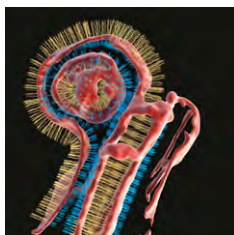
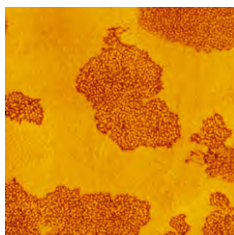
Our goal has always been to assure our customers' satisfaction. Therefore, in the unlikely event that you experience difficulties, or for any reason are unhappy with the performance of your new or resharpened knife, contact us immediately. You can be sure that any problem with your knife will be corrected.

WE STAND BY OUR COMMITMENT TO QUALITY AND CUSTOMER SATISFACTION.



The different knife types and their applications

Knife	Angle	Sizes	Cutting Range	Application
ultra	35°	1.5-4.0mm	30-200 nm	Standard applications
		1.5-4.0mm	10-30 nm	Electron Spectroscopic Imaging (ESI), 3D Reconstruction, etc.
ultra semi	35°	3.0mm	50-500 nm	Alternating ultra-thin/semi-thin sectioning
ultra (dry)	35°	1.5-4.0mm	100nm-2µm	Dry sections for element analysis and SIMS
ultra	45°	1.5-4.0mm	30-200 nm	Standard applications
		1.5-4.0mm	50nm-1µ	Alternating ultra-thin/semi-thin sectioning
ultra jumbo	35°	2.0, 3.0mm	50-500 nm	—
	45°	2.0, 3.0mm	50-500 nm	—
ultra-AFM	35°	2.0, 3.0mm	15-100nm	Surface sectioning for biological and material specimens for AFM investigation
ultra sonic	35°	3.0mm	15nm-100nm	10nm-80nm
cryo (dry)	25°	3.0mm	30nm-150nm	Frozen hydrated specimens
cryo immuno	35°	2.0, 3.0mm	30nm-500 nm	Cryo-immuno-chemistry
cryo-AFM	35°	2.0, 3.0mm	20-100nm	Surface sectioning for biological and material specimens for AFM investigation
cryo-dry	35°	1.5-4.0mm	30nm-500 nm	Frozen biological and material samples such as polymers, rubbers and paints
	45°	1.5-4.0mm	30nm-500 nm	Routine cryo sectioning
cryo-wet	35°	1.5-4.0mm	30nm-500 nm	Frozen biological and material samples such as polymers, rubbers and paints
	45°	1.5-4.0mm	30nm-500 nm	Routine cryo sectioning
trimtool 20	20°	—	—	RT: Trimming of epoxy and acrylic embeddings as well as polymers and non-ferrous metals
				cryo: Trimming of sucrose protected as well as frozen hydrated biological samples and polymers
trimtool 45	45°	—	—	RT: Trimming of epoxy and acrylic embeddings as well as polymers and non-ferrous metals
				cryo: Trimming of sucrose protected as well as frozen hydrated biological samples and polymers
histo	45°	4.0, 6.0, 8.0mm	0.2-5µm	Sectioning of biological and material specimens non embedded or embedded (plastic or epoxy) for light microscopy
histo-cryo wet	45°	4.0, 6.0mm	0.2-5µm	Cryo sectioning with a boat for light microscopy
histo-cryo dry	45°	4.0, 6.0mm	0.2-5µm	Cryo sectioning with a triangular holder for light microscopy
histo jumbo	45°	6.0, 8.0mm	0.2-5µm	Immuno-histo-chemistry and 3D reconstruction
STATIC LINE II	—	—	—	Reduction of static charging.



ordering information

Knife Type	Angle	Size	Size	Cat # New	Cat # Resharpen	Cat # Exchange
ultra (dry and wet)	35°	1.5mm	1.5-1.7mm	15-ULD/15-UL	15-ULDR/15-ULR	15-ULDE/15-ULE
		1.8mm	1.8-2.0mm	18-ULD/18-UL	18-ULDR/18-ULR	18-ULDE/18-ULE
		2.1mm	2.1-2.3mm	21-ULD/21-UL	21-ULDR/21-ULR	21-ULDE/21-ULE
		2.4mm	2.4-2.6mm	24-ULD/24-UL	24-ULDR/24-ULR	24-ULDE/24-ULE
		2.7mm	2.7-2.9mm	27-ULD/27-UL	27-ULDR/27-ULR	27-ULDE/27-ULE
		3.0mm	3.0-3.4mm	30-ULD/30-UL	30-ULDR/30-ULR	30-ULDE/30-ULE
		3.5mm	3.5-3.9mm	35-ULD/35-UL	35-ULDR/35-ULR	35-ULDE/35-ULE
		4.0mm	4.0-4.4mm	40-ULD/40-UL	40-ULDR/40-ULR	40-ULDE/40-ULE
ultra-jumbo	35°	2.0mm	2.0-2.3mm	20-ULJ	20-ULJR	—
		3.0mm	3.0-3.4mm	30-ULJ	30-ULJR	—
ultra-AFM	35°	2.0mm	2.0-2.3mm	20-AFM-UDL	20-AFM-UDLR	20-AFM-UDLE
		3.0mm	3.0-3.4mm	30-AFM-UDL	30-AFM-UDLR	30-AFM-UDLE
ultra	45°	1.5mm	1.5-1.7mm	15-US	15-USR	15-USE
		1.8mm	1.8-2.0mm	18-US	18-USR	18-USE
		2.1mm	2.1-2.3mm	21-US	21-USR	21-USE
		2.4mm	2.4-2.6mm	24-US	24-USR	24-USE
		2.7mm	2.7-2.9mm	27-US	27-USR	27-USE
		3.0mm	3.0-3.4mm	30-US	30-USR	30-USE
		3.5mm	3.5-3.9mm	35-US	35-USR	35-USE
		4.0mm	4.0-4.4mm	40-US	40-USR	40-USE
ultra-jumbo	45°	2.0mm	2.0-2.3mm	20-USJ	20-USJR	—
		3.0mm	3.0-3.4mm	30-USJ	30-USJR	—
ultra sonic Knife set	35°	3.0mm	3.0-3.4mm	30-ULTSON	30-ULTSONR	30-ULTSONE
ultra sonic knife only	35°	3.0mm	3.0-3.4mm	30-ULTSONK	30-ULTSONKR	30-ULTSONKE
cryo (dry)	25°	3.0mm	3.0-3.4mm	30-CD25	30-CD25R	30-CD25E
cryo immuno	35°	2.0mm	2.0-2.3mm	DCIMM3520	DCIMM3520R	DCIMM3520E
		3.0mm	3.0-3.4mm	DCIMM3530	DCIMM3530R	DCIMM3530E
cryo-AFM	35°	2.0mm	2.0-2.3mm	20-AFM-CDL	20-AFM-CDLR	20-AFM-CDLE
		3.0mm	3.0-3.4mm	30-AFM-CDL	30-AFM-CDLR	30-AFM-CDLE
cryo (dry and wet)	35°	1.5mm	1.5-1.7mm	15-CDL/15-CDW	15-CDL/15-CDWR	15-CDL/15-CDWE
		1.8mm	1.8-2.0mm	18-CDL/18-CWL	18-CDL/18-CWLR	18-CDL/18-CWLE
		2.1mm	2.1-2.3mm	21-CDL/21-CWL	21-CDL/21-CWLR	21-CDL/21-CWLE
		2.4mm	2.4-2.6mm	24-CDL/24-CWL	24-CDL/24-CWLR	24-CDL/24-CWLE
		2.7mm	2.7-2.9mm	27-CDL/27-CWL	27-CDL/27-CWLR	27-CDL/27-CWLE
		3.0mm	3.0-3.4mm	30-CDL/30-CWL	30-CDL/30-CWLR	30-CDL/30-CWLE
		3.5mm	3.5-3.9mm	35-CDL/35-CWL	35-CDL/35-CWLR	35-CDL/35-CWLE
		4.0mm	4.0-4.4mm	40-CDL/40-CWL	40-CDL/40-CWLR	40-CDL/40-CWLE
cryo (dry and wet)	45°	1.5mm	1.5-1.7mm	15-CDS/15-CWS	15-CDS/15-CWSR	15-CDS/15-CWSE
		1.8mm	1.8-2.0mm	18-CDS/18-CWS	18-CDS/18-CWSR	18-CDS/18-CWSE
		2.1mm	2.1-2.3mm	21-CDS/21-CWS	21-CDS/21-CWSR	21-CDS/21-CWSE
		2.4mm	2.4-2.6mm	24-CDS/24-CWS	24-CDS/24-CWSR	24-CDS/24-CWSE
		2.7mm	2.7-2.9mm	27-CDS/27-CWS	27-CDS/27-CWSR	27-CDS/27-CWSE
		3.0mm	3.0-3.4mm	30-CDS/30-CWS	30-CDS/30-CWSR	30-CDS/30-CWSE
		3.5mm	3.5-3.9mm	35-CDS/35-CWS	35-CDS/35-CWSR	35-CDS/35-CWSE
		4.0mm	4.0-4.4mm	40-CDS/40-CWS	40-CDS/40-CWSR	40-CDS/40-CWSE
trimtool 20	20°	-	-	TT-20	TTR-20	
trimtool 45	45°	-	-	TT-45	TTR-45	
histo	45°	4.0mm	4.0-4.9mm	40-HIS	40-HISR	40-HISE
		6.0mm	6.0-6.9mm	60-HIS	60-HISR	60-HISE
		8.0mm	8.0-8.9mm	80-HIS	80-HISR	80-HISE
histo cryo (wet and dry)	45°	4.0mm	4.0-4.9mm	40-HCD/40HCW	40-HCD/40HCWR	40-HCD/40HCWE
		6.0mm	6.0-6.9mm	60-HCD/60HCW	60-HCD/60HCWR	60-HCD/60HCWE
histo Jumbo	45°	6.0mm	6.0-6.9mm	60-HISJ	60-HISJR	
		8.0mm	8.0-8.9mm	80-HISJ	80-HISJR	
Static Line III manipulator	-	-	-	SL-II	SL-IIR	
				DZ100-01		

► DiATOME ultra

These knives are available in 35, and 45 degree angles. The optimal thickness range for cutting with these knives is between 30-150nm. They are available in sizes ranging from 1.5mm-4.0mm as a standard. Other sizes are available upon request. All of these knives are tested within a thickness range of 30- 150nm. Whether your needs are biological or materials related, in EM or LM, we have a knife to suit your needs.

► ultra 45°:

Recognized as the knife for routine sectioning. It is a good compromise between section quality and durability.

The 45° knife is recommended for the sectioning of extremely hard and brittle materials such as ceramics. In this domain it has replaced the formerly recommended 55° knife.

► ultra 35° Wet:

The capabilities of the 35° diamond knives have been shown in two publications by J.Jésior (Ref 3, 4). He proved markedly reduced compression, smoother section surfaces and better structural preservation with the use of our 35° diamond knives.

In the meantime a great number of scientists have noticed and recognized the advantages of the 35° knives for the sectioning of Lowicryls, inhomogenous samples such as undecalcified bone, dental materials, etc.

The 35° knives have proved advantageous in the sectioning of soft industrial samples such as metals and polymers, as well as for hard and brittle samples, for example semiconductors (Si, GaAs, etc), superconducting oxides, nanocrystalline ceramics.

The use of 35° knives leads to reduced compression in soft samples and to less breaking in hard and brittle samples.

We can claim that the 35° diamond knife has proved it's capability as a routine knife for many applications.

► ultra 35° Dry:

The ultra 35° knife (in the triangular holder) with a cutting range of 100nm - 2µm is used for dry sectioning of epoxy or acrylic resin embedded biological samples, which need to be investigated by element analysis (Ref. Edelmann) and SIMS (Ref. Guerquin-Kern). The gliding of the sections on the dry knife surface is facilitated with the use of our Static Line II ionizer.

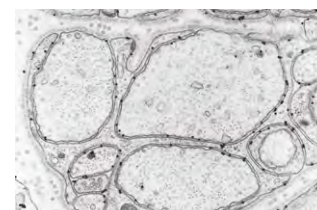
► ultra Jumbo

Perfect for serial sectioning for 3D reconstruction STEM.

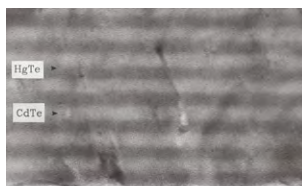
The Ultra Diamond knife is now available in Jumbo with 35° and 45° angles and in 2.0mm and 3.0mm sizes.



P. Swab, Advanced Refractory Technologies Inc., Buffalo, NY. ZnS/SiO₂ multilayer optical coating.



W. Graber, University of Bern, Inst. of Anatomy. Unmyelinated nerve fibres in rat iris, labelled with link protein-gold, Lowicryl K4M. X50000



S. R. Glanvill, CSIRO Division of Materials Science and Technology, Clayton, Victoria. HRTEM of a 100-period HgTe/CdTe superlattice near the top surface (grown by MBE on ZnCdTe substrate).



References

- J.C. Jésior: Use of low-angle diamond knives leads to improved ultrastructural preservation of ultrathin sections. Scanning Microscopy Supplement 3, pp. 17-153, 1989. Scanning Microscopy International, Chicago (AMF O'Hare) L 6066 USA.
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► DiATOME ultra sonic

The oscillating diamond knife for room temperature ultramicrotomy. It was developed in collaboration with Dr Daniel Studer, Lab. of Anatomy, University of Berne.

A piezo actuator produces an oscillation of the knife at a desired frequency and amplitude, parallel with the cutting edge. A depression in the foot of the knife allows the oscillation parallel to the cutting edge. The depression is rigid in the north/south direction and guarantees stability in the cutting direction.

The new knife produces ultrathin sections almost free of compression. The sections become thinner at the same thickness setting: since the volume of the section remains the same, the increased length leads to a decrease in thickness.

The theoretical considerations and first results of this invention were presented in the Journal of Microscopy (Ref 13). Results with polymers using the oscillating knife were shown at the M&M 2002 meeting in Quebec (Ref 14).

We have tested the oscillating knife with the following samples:

- Biological samples in Epon, Araldite, EM Bed, etc.
- Biological samples in acrylic resins (Lowicryls, LR White).
- Rigid polymers such as PS, PMMA, ABS, HIPS, modified PP, etc.

Specifications

- Knife angle: 35°
- Knife cutting range: 10-80nm
- Knife cutting edge length: 3.0mm

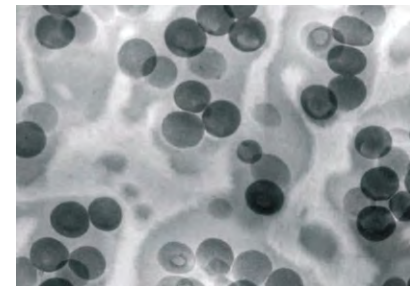
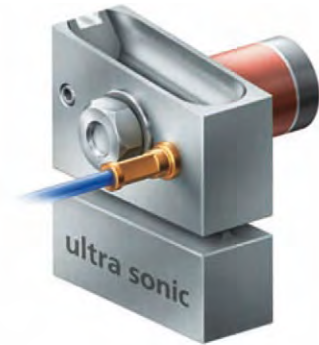
Control Unit

- Frequency: 25-45kHz, or automatic setting of the resonance
- Amplitude: variable (Voltage 0-30V)
- Mains voltage: 230V, 110

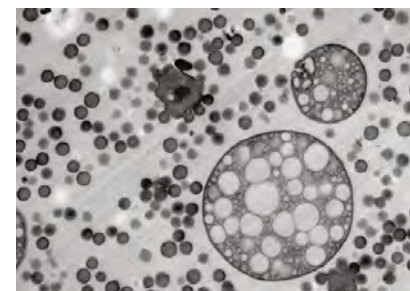


References

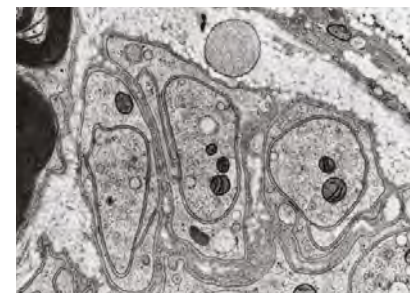
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13. D. Studer and H. Gnägi: Minimal compression of ultrathin sections with use of an oscillating diamond knife. Journal of Microscopy, Vol. 197, Pt 1, pp. 94-100, 2000.
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Polycarbonate modified with rubber.
Jens Sicking, Bayer Technology Services, Leverkusen.



ABS, stained with OsO₄, sectioned at room temperature with the ultra sonic knife, section thickness 50nm. Note the almost perfect spherical shape of the large rubber particles and the preservation of the inclusions inside. Also the smaller dense rubber particles are well preserved. B.Vastenhout, Dow Benelux N.V. Terneuzen, The Netherlands.



Peripheral nerv (rat), HP frozen, freeze substituted, Epon embedded, cut with the ultra sonic knife, section thickness 50nm. W. Graber, Institut of Anatomy, University of Bern, Switzerland

► DiATOME cryo

The Low Temperature Ultra-Thin Collection

Available for wet or dry sectioning with a 25°, 35° or a 45° angle. Section thickness range 30nm - 500nm. Cutting edge sizes 1.5 - 4mm.

Diatome cryo diamond knives may be used for all low temperature situations such as sectioning of cryo-protected specimens, frozen hydrated specimens and industrial samples such as polymers and rubber.

There are numerous advantages to our cryo diamond knives as opposed to glass knives:

- They produce thinner sections.
- Ultrathin and semithin sections with the same knife.
- Less compression and greater uniformity of sections.
- Easy to produce long ribbons of sections.
- You gain time. No knife manufacturing, no knife changing, hence no waiting for temperature equilibration.

► cryo 25°

The cryo 25° knife is designed for sectioning frozen hydrated specimens. The 25° angle results in the least possible compression and the best structure preservation.

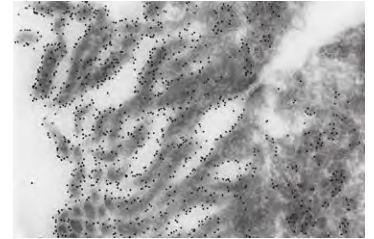
► cryo 45° cryo 35°

The 45° knife is well suited for routine cryo sectioning.

The 35° knife allows you to section with considerable reduction of mechanical damage to the specimen (up to 20% less compression as compared to the 45° knife) and, in turn, better structural preservation of most frozen samples (Ref 6, 7, 8).

The triangular holder for dry sectioning and the boat for the sectioning with a liquid (DMSO/water and others) are made of a special copper/nickel alloy. They both guarantee excellent cold or heat transmission.

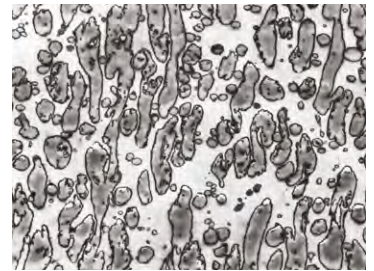
The seal is made of a cold-resistant epoxy resin.



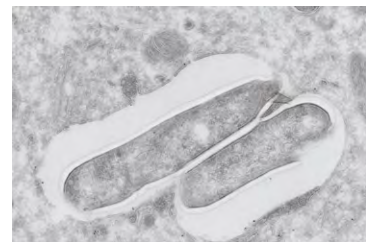
M. Michel, M. E. Müller Inst. for Biomechanics, University of Bern. Cryosection of high pressure frozen mature bovine articular cartilage tissue. X55000



E. Ingolic, Technical University of Graz. Polymethylpenten, cryosection, RuO4 stained. X129000



E. Ingolic, Technical University of Graz. Polypropylene/Polyamid blend, cryosection, RuO4 stained. X11250



Fusion of late endosome/lysosome with the Mycobacteria tuberculosis phagosome. Aldehyde fixed cryo-section labeled with anti-CD63 and protein-A gold 10nm. Scale bar = 100nm. Nicole van der Wel and Peter J. Peters, Netherlands Cancer Institute, Amsterdam.



► DiATOME cryo immune

The first cryo knife with a diamond platform, guarantees the best possible sectioning for cryo-immuno-chemistry.

The diamond platform guarantees easy and gentle section collection. Sections are collected directly from the diamond surface using a loop and a sucrose/methylcellulose droplet (Refs. Liou, Peters).

The 35° cutting angle leads to a considerable reduction in mechanical stresses and therefore to improved structure preservation in sucrose-protected samples.



References

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In the Diatome special brochure "Diatome Static Line II" you will find detailed information about technical data, the applications and the handling.

► DiATOME trimtool 20 and trimtool 45

Finally, one trimming tool for all of your trimming needs, be it at room or cryo temperatures. The trimtool series supercedes the cryotrim and ultratrim lines of trimming tools. Resharpener is still available for these lines.

For successful ultramicrotomy in biology and materials science, precise trimming is mandatory.

The Diatome trimming blades trimtool 45 and trimtool 20 will fulfil all your trimming requirements, allowing quick, easy and accurate trimming at both room and cryo-temperatures.

Due to the extreme sharpness of our diamond blades, less mechanical damage is applied to the sample during trimming. Very shiny sample faces and precise sides are the result.

The trimtool 45 produces pyramidal sides with an inclined angle of 45° and the trimtool 20 produces pyramidal sides with an inclined angle of 20°.

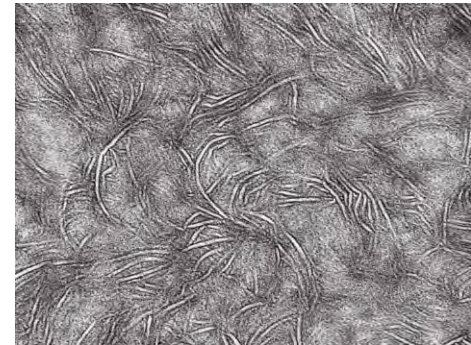
Area of Application

Room Temperature:

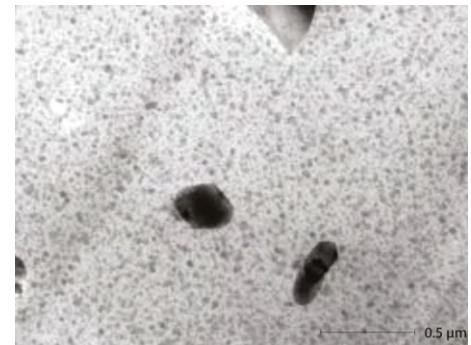
- Epoxy or acrylate resin embedded biological samples
- Metals
- Polymers
- Nanoparticles in polymers
- Non-embedded brittle samples

Cryo Temperatures:

- Sucrose infiltrated and frozen hydrated biological samples
- Soft polymers



Polyethylene x120'000
Ronald Walter, BASF Aktiengesellschaft, Polymer Physics,
D-67056 Ludwigshafen.



SiC, SiO₂, TiO₂ and AlO₃ nanoparticles in polymer matrix.
Claudia Mayrhofer, TU Graz.

The Trimming Procedure



1. Trim the sample surface with the front facet



2. Trim the pyramidal side with one edge



3. Trim the second side with the outer edge



4. Rotate the sample 90°



5. Trim the two remaining sides

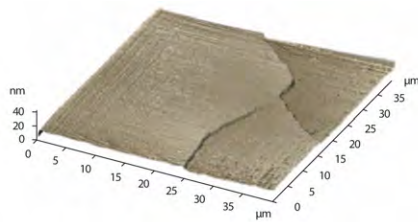
► DiATOME AFM

For Ultra and Cyro

Extremely smooth sample surfaces.

Best possible structure preservation.

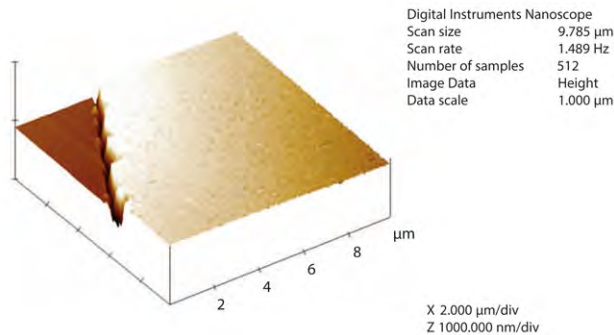
The high quality Diatome diamond knives are not just perfect for producing ultrathin and semi-thin sections, but also for surfacing sectioning of all kinds of biological and industrial specimens for AFM investigation. Instead of a section as for TEM, the specimen surface is investigated using AFM. In order to achieve the best results for AFM investigation, only the highest quality diamond knives should be used. Diatome ultra AFM and cryo AFM knives are specially tested to ensure that they meet the increased quality requirements of AFM investigation. They produce extremely smooth sample surfaces and guarantee the best possible structure preservation. Available in 35° with a cutting range of 10-100 nm in 2mm and 3 mm sizes.



Sectioned with an ultra AFM knife, section thickness 15nm. Scan 40x40μm, average roughness 1.28nm. Robert Ranner, Leica Microsystems GmbH, Vienna.

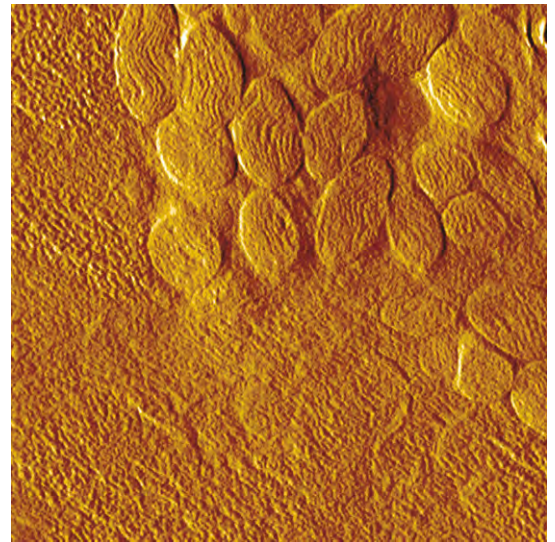
Superconducting Oxide $\text{Bi}_2\text{Sr}_2\text{Ca}_1\text{Cu}_2\text{O}_8$ (BSCCO)

Sample surfaced with a Diatome ultra AFM diamond knife, feed 20nm.



References

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AFM amplitude image of the muscle of cat's mite *Otodectes cynotis*. The contrast covers amplitude variation in the 1-3nm range. Size of the whole image equals 4.6microns. Nadejda Borisovna Matsko, Institut für angewandte Physik, ETH Zürich

Trade In

When you need to sharpen your DiATOME Knife we will accept trade in knives from any knife manufacturer and apply the appropriate discount to your new purchase. The size of the knife that is being traded will determine your discount. Please note that there is a limit of one trade in per resharpened knife.

The diamonds that we receive as trade ins are absolutely never used for any of the products that we manufacture or sell.



► DiATOME histo and histo Jumbo

For Room Temperature:

Knives are available with a 45° angle.

Section thickness range 0.2 - 10µm.

Cutting edge length 4, 5, 6, 8, and 10mm.

The knife is designed for the sectioning of hard and soft biological and industrial materials, non embedded or embedded in methacrylate or epoxy resins.

The histo knife may be used on all ultramicrotomes and microtomes with a retraction of the specimen in the return phase.

For the production of our histo knives we use natural diamonds of highest quality. They guarantee the best quality and durability of the cutting edges.

Some of the advantages of our histo diamond knife as compared to glass knives are as follows :

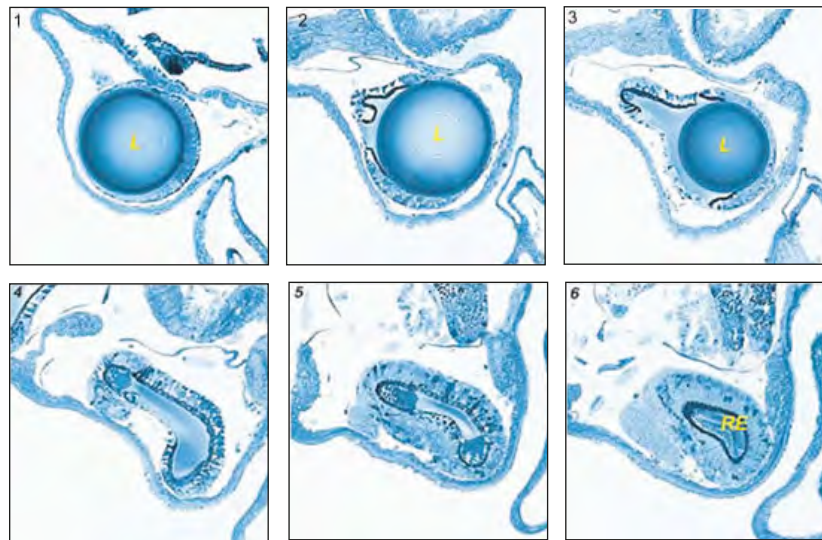
- Perfect sections, free of scores or compression.
- Serial sections without knife change.
- Thinner sections.
- Extreme durability of the cutting edge.
- No knife making procedure.
- Lifetime Guarantee.

For 3D reconstruction it is imperative not to lose a single section (Ref. Blumer).

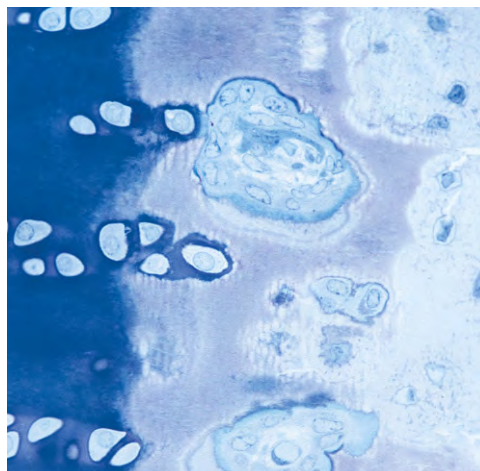
The large Jumbo boat as well as the adhesive (Pattex compact by Henkel) applied to the side of the sample block increase the distinct advantages of our histo knives.

They allow:

- Easy production of section ribbons (0.5-2µm)
- No section loss
- No folding
- The same orientation of all sections
- Easy collection of section ribbons
- Multiple ribbons on one glass slide
- Perfect for Immuno-histo-chemistry



E. B. Hunziker M. E. Müller Institute for Biomechanics, University of Bern. Rabbit joint, calcified cartilage/bone. X760



E. B. Hunziker M. E. Müller Institute for Biomechanics, University of Bern. Rabbit joint, calcified cartilage/bone. X760

► DiATOME histo-cryo

For Cryo Temperatures:

Knives are available in 45° angle.
Section thickness range 0.2 - 5µm.
Cutting edge length 4 and 6mm.

The histo-cryo knives are delivered in boats (for wet cryo sectioning) and triangular holders (for dry cryo sectioning), made of a special copper/nickel alloy, which guarantees the best heat/cold transmission.



► DiATOME manip

For easy handling and mounting of section ribbons.

The mounting of the manipulator is easy. The original plate on the cryochamber is removed, the manipulator is fixed in 5 minutes.

Applications

- Frozen hydrated biological samples (CEMOVIS)
- Room temperature sectioning of water sensitive samples
 - Dry resin sectioning of biological samples for chemical analysis
 - Dry sectioning of industrial samples such as polymers

Functionality

The left manipulator moves a conductive fibre on which the sections are attached by electrostatic force; the growing ribbon is guided.

The right manipulator guides the grid very precisely below the section ribbon, the sections are attached to the carbon film with electrostatic force.

Compatibility

Leica cryochambers FC6 and FC7 equipped with a Crion ionizer/charger adaption on other cryochambers upon request

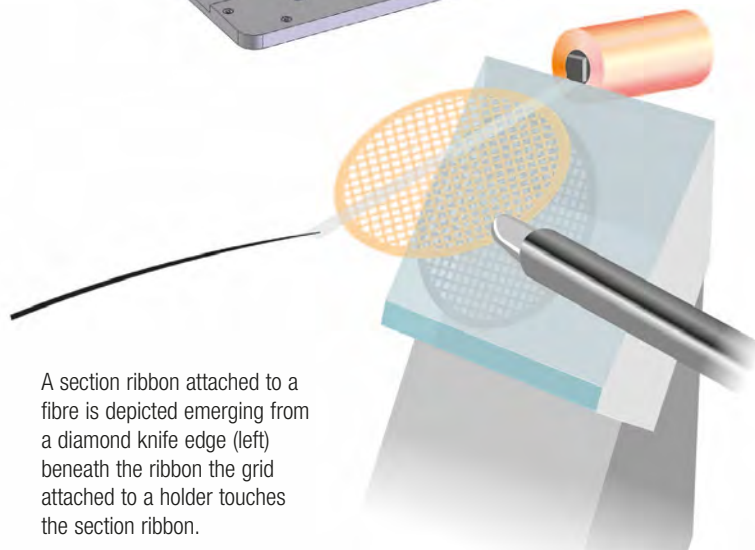
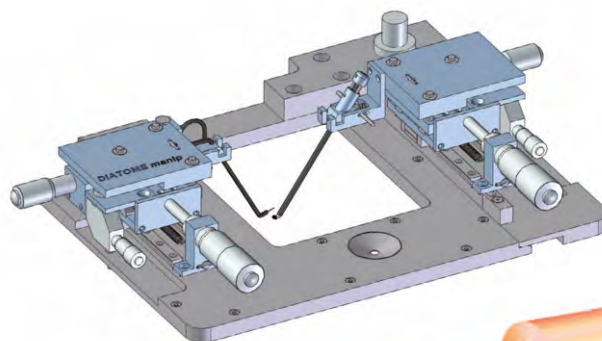
Ordering Information

Description	ItemID	Qty.
DiATOME manip	DZ100-01	each
Micromanipulator Lashes (5)	DZ100-Z003	5/pk

References

The cryosectioning approach is described by Struder et al.:

Struder, D., Klein A., Iacovache, I, Gnaegi, H., and Zuber B. (2014). A new tool based on two micromanipulators facilitates the handling of ultrathin cryosection ribbons. *Journal of Structural Biology*, 185, 125-128.



A section ribbon attached to a fibre is depicted emerging from a diamond knife edge (left) beneath the ribbon the grid attached to a holder touches the section ribbon.

A cryosection showing vacuole, mitochondria and filopodium of a cultured cell. C. Peitsch and I. Iacovache, Inst. of Anatomy, Bern. Bar 100 nm



► The Static Line II Ionizer

The Static Line II ionizer is an antistatic device which emits negative and positive ions, neutralizing the electrostatic charging in the cryochamber.

The sections no longer stick to the knife edge, or bunch up one on top of the other, but float in a nice ribbon over the knife surface. The pick-up of the sections can be done easily.

We recommend the use of the Static Line II ionizer for trimming, sectioning and section collection.

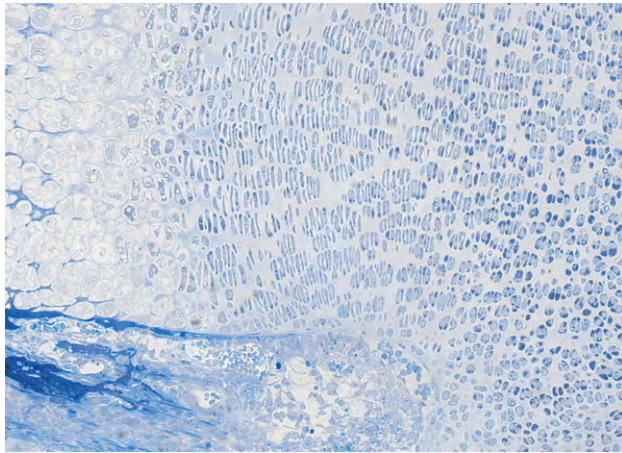
The range of applications:

- Sucrose protected specimens.
- Cell cultures in elatine/ sucrose.
- Frozen hydrated specimens.
- Dry cut Lowicryls at room temperature.
- Polymers and rubber.

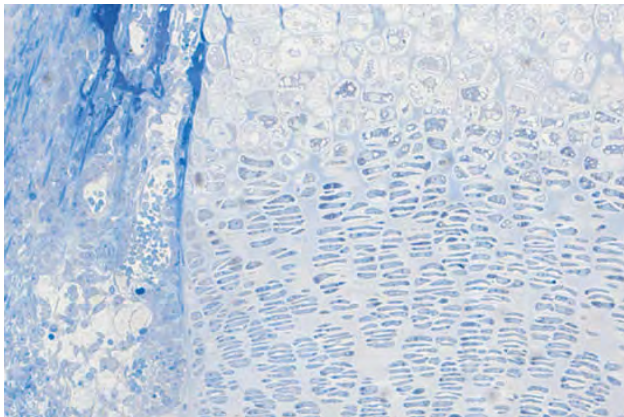
Ordering Information

Description	ItemID	Qty.
Static Line II ionizer	SLI	each

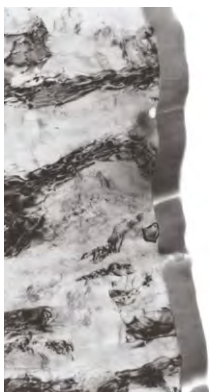




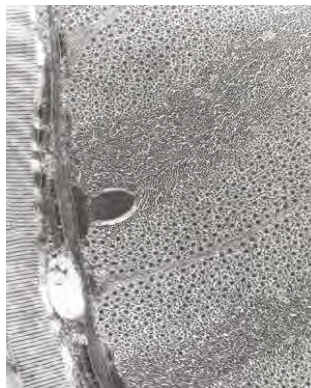
Rabbit joint, calcified cartilage/bone. X760 E. B. Hunziker, M. E. Müller Institute for Biomechanics, University of Bern.



Nondecalcified rat bone., Scale: 35 mm = 100µm. Daniel Studer, Anatomisches Institut, Bern.



E. Ingolic, Technical University of Graz. Al with Al₂O₃ layer (amorphous). X117000



H. Hohenberg, Heinrich-Pette-Institut, Hamburg, FRG. Outer muscle zone of a Nematode (*C. elegans*), high-pressure frozen in the living state in cellulose capillary tubes, freeze-substituted in Acetone (-90°C), fixed in 1% Osmium/Acetone (-60°C) and Epon-embedded. X80000

Special **DiATOME** Diamond Knife Programs:

Dear Fellow Researcher,

We thank our loyal customers for allowing us to do what we do. All of us here at Diatome would like to make your job just a bit easier and we are pleased to announce we shall continue to offer some special programs and discounts to help in your scientific research needs especially in these economic tough times. We thank you for your loyalty and look forward to continuing to work together.

Program #1: The Ultra Exchange Program

This program allows you to exchange any old diamond knife you have for a brand new ultra thin diamond knife and pay almost half the price of a new knife. It does not matter what size you trade in, you may choose any size Diatome Ultra knife and pay the reduced price of the knife size you choose.

Program #2: The Multiple Purchase and Give-Away Program

For your convenience we have set this program up in three different ways.

- Buy any 2 Ultra room temperature or cryo knives at the full price and get the third knife at 50% off.
- Buy one Diamond knife for full price and get the second knife at the exchange price.
- Resharpen 2 knives and the third knife have resharpened for free.

Program #3: The EMS Tool Give-Away Program

This program allows you to buy any New or Exchange Diatome knife and receive an EMS #5 Biology Grade Tweezers.

Program #4: The DiATOME Rebate

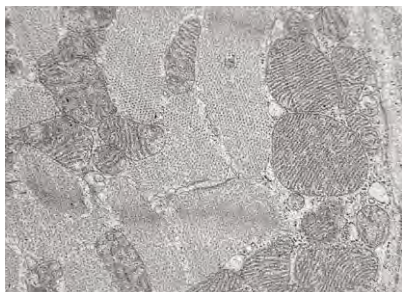
This program allows you to purchase any new Diatome Diamond Knife at its regular price and receive a \$250.00 coupon towards the purchase of chemicals, accessories and supplies from Electron Microscopy Sciences, the leader in Microscopy consumable items.

If you would like to receive Catalog or a separate brochures on our Diamond knives and tools please complete the online request form, call, write, e-mail, or fax us. We will be more than happy to fill any and all of your requests.

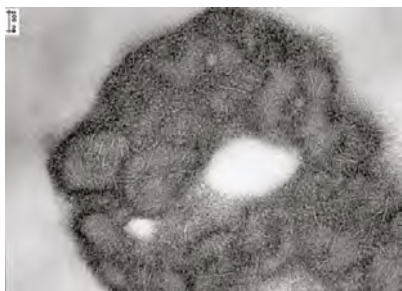
We look forward to hearing from you and fulfilling all of your microscopy and research needs.

Sincerely,

Stacie Kirsch



Heart (rat), fixed with 2.5% Glutaraldehyde, OsO₄ stained, Spurr's embedded, cut with the ultra sonic knife, section thickness setting 15nm. J. Nebesarova, Institut of Parasitology, Ceske Budejovice, Czech Republic. Imaged by Petr Stepan in LVEM 5 at 5kV, DeLong Instruments, Brno, Czech Republic.



Impact modified PP, stained with RuO₄, sectioned at room temperature with the ultra sonic knife, section thickness 50nm. The EP-rubber particle is built from tiny agglomerated particles. The original particles have a more crystalline core (brighter with lamellae) and a more amorphous shell (dark). B.Vastenhout, Dow Benelux N.V. Terneuzen, The Netherlands.



W. Graber, University of Bern, Inst. of Anatomy.
Myelinated nerve fibre of human conjunctiva labelled with HABP-gold complexes. X49000

DiATOME Services:

A. Resharpener and Exchange Service of DiATOME Diamond Knives:

Resharpener DiATOME knives undergo the same stringent optical checking and sectioning test as new knives.

A diamond knife resharpener by DiATOME is the same high quality as a new one!

During resharpener a knife may be reworked into another type (ultra to cryo, 45° to 35°, etc).

We let you choose: You may have your knife resharpener, or exchanged against a new one. In the exchange service a type change is possible (ultra to cryo, 45° to 35°, small knives to large ones, etc). This, of course includes changing the boat to your desired style.

When we resharpener our diamond knives we restore it to its original condition.

Your resharpener DiATOME knife will have the same length, the identical cutting edge and carry the same exact guarantee of quality as the day it first left our factory.

We are the only manufacturer that guarantees that after a resharpener, the knife will be the same flawless quality as the knife you originally purchased. Other manufacturers state that during their resharpener process the diamond may become smaller (up to 5% of its original length). With our advanced techniques in resharpener you will never, and we mean never, lose any diamond length.

Other companies "CAN NOT SUCCESSFULLY" resharpener a DiATOME Knife. We have found that when other companies try to resharpener our knives, the original parameters of our knives are either altered significantly or totally lost; returning to you an inferior diamond knife. Many times we have also found that other manufacturers ruin our diamonds during their resharpener process and end up replacing our diamond with one of inferior quality.

Any DiATOME knife can be resharpener an "UNLIMITED" number of times due to the following reasons:

1. The cutting edge of the diamond knife is on the narrow side of the rectangular cut diamond, leaving the large part of the stone as a resharpener reserve.
2. Special attention is given to minimizing the amount of grind off to the diamond during the resharpener process.

When you send a knife to us for resharpener we will automatically replace your boat at no charge if it is either damaged, discolored, or at your request.

Each DiATOME Diamond Knife, whether new or resharpener, is subjected to extensive testing for its ability to cut accurately without scoring or compression. Only if its performance passes our tests will we ship it to you.

B. Sample Testing Service of DiATOME Diamond Knives:

The great experience obtained during long years of development, manufacturing and application of diamond knives allows us to offer a unique service:

You send us biological or industrial samples of any nature and let us know what you would like to obtain. The more information you give us the better results you will receive. We perform a sectioning test and send you the resulting ultrathin section (ie. the sample face for SEM, AFM, STM investigation), a report of how the results were obtained and recommendations for the most suitable knife. This service is free of charge as long as the number of samples is reasonable. You may take it for granted that we treat your "secret samples" with absolute discretion.

Please allow us to help you choose the appropriate knife from our large range for your specific application.

C. Custom Diamond Knives and Boats:

* Upon request, we can supply you with different color (Black) and shaped boats (Huxley for instance) at no extra cost to you.

Certain applications require special knives and or tools outside of the standard knives and tools that are available. For years DiATOME has been manufacturing custom diamond blades, tools, and knives for customers meeting all of their specific needs.

If you already have in mind the type of diamond knife or tool that you require, please submit a diagram of it to us as well as your sample blocks or specimens. We, in turn, will manufacture a prototype knife for you and test it in accordance to your requirements with your blocks. Only if the knife or tool passes all of our extensive testing will we send it to you for your evaluation and approval.

If you are not quite sure how to attack your sectioning problems but you believe that you may be a candidate for a custom diamond knife or tool please send us your sample blocks and a complete description of the work that you are doing and what you would like to achieve with your diamond knife. We will take it from there. We will manufacture a prototype knife, evaluate and test it, and then send it to you for your evaluation and approval.

There is absolutely no charge for this service outside of the regular cost of purchasing the blade once you have approved it.

D. Delivery Time and Shipping:

All new knives as well as exchange knives are in stock for immediate delivery. For our resharpening service our turn around time is no longer than 4 weeks from date that the knife is received by us. In most instances the service usually only takes 2-3 weeks. All of our knives, new or resharpened, are shipped by UPS Blue (2 day air service). When you send knives back to us we recommend that you use either UPS or Federal Express and insure the knife for its original value.

DiATOME Unique Characteristics & Justifications:

A. Characteristics:

1. DiATOME offers incomparable durability of the diamond edge. DiATOME knives have been known to last for many years without resharpening.
2. All DiATOME diamonds are of the highest possible quality diamonds with a regular crystal structure. The crystal orientation of the diamond that we have chosen permits a final polishing parallel to the cutting edge, which gives you a perfect nick free edge.
3. Uniform sections are easily reproducible.
4. DiATOME knives are guaranteed for an unlimited amount of resharpenings.
5. When we resharpen our diamond knives we restore them to their original condition. Your resharpened DiATOME diamond knife will have the same length, the identical cutting edge and carry the same guarantee of quality as the day it first left our factory.
6. Our diamonds are fastened into a metal shank which is securely screwed into the boat and then sealed. The sealing material is hydrophilic, allowing for easy wetting of the cutting edge, and has no effect on the stability of the knife.
7. For our cryo knives we use a special epoxy resin for sealing which is chemical and temperature resistant.
8. Before delivery each knife, new or resharpened, is subjected to extensive testing for its ability to cut accurately without scoring or compression. Only if its performance passes our tests will we ship it to you.
9. The DiATOME boat is designed in such a manner that the water surface is horizontal when the clearance angle is set. This results in stationary water surface and good reflection.
10. DiATOME's universal knife boats are designed to fit all brands of ultramicrotomes without the need for an adapter.
11. The shape of the DiATOME boat offers you the advantage of easy pick up of the floating sections.
12. For 40 years DiATOME has been the innovator in the manufacture of diamond knives covering the entire microtomy spectrum.
13. DiATOME offers special testing services without charge. If you are having problems sectioning a particular specimen or you are not sure which knife will perform the best in your specific application, just submit a sample block to our testing division. We, in turn, will do all of the necessary testing for you and make our recommendations to you.

B. Justification:

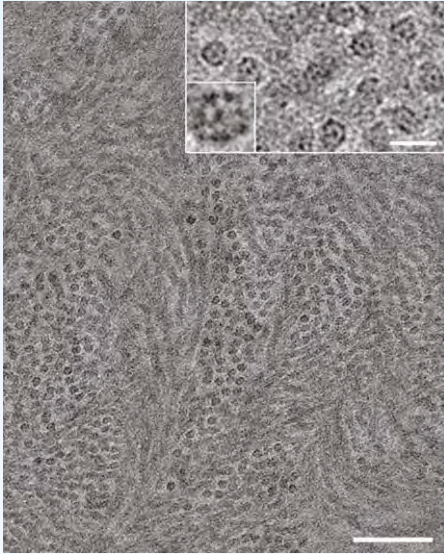
The DiATOME knives are the only knives that can cut all types of materials from biological to materials (hard and soft alike). The DiATOME diamond knives are the only diamond knives that are constantly mentioned in all professional journals and books and are the only knives that are proven to work consistently for any type of sectioning specifications.

Much research has been done that supports the claim that the DiATOME knife is the only knife that can be relied on. Testing of other knives on the market proved to be futile and it was impossible to achieve success with them. The DiATOME was the only knife that was able to successfully cut all types of materials and allowed us to achieve the desired results like no other knife did.

The specific characteristics and properties of the DiATOME diamond knives that support the above claims are as follows:

DiATOME is the only manufacturer to use a 2-point diamond edge with a radius of curvature less than 2nm. This specification allows the DiATOME knife to be far superior than any of the other manufacturers and affords the knife a much longer life than any other knives on the market.

However, the main reason to buy a DiATOME diamond knife is that in the long run it is less expensive. The reason for this is that the durability of the DiATOME diamond is far longer than any other knife. That is to say that once a DiATOME knife is purchased it is good for a lifetime with the need for resharpening only every 2-3 years with proper use. All other manufacturer's knives must be resharpened much more frequently. Within a very short time the DiATOME knife becomes half of the price of all others on the market and on top of this it does a far superior job in your research.



High resolution electron micrograph of vitreous section of keratin intermediate filaments in the midportion of stratum corneum of human epidermis. The fine structure of the keratin filaments is well resolved and their molecular organization is seen in favorable cases (inset).

Scale bar = 100nm. Scale bar inset = 20nm.

Ashraf Al-Amoudi, Laboratoire d'Analyse Ultrastructurale, Lausanne.



A single slice of a tomogram of an aldehyde fixed and sucrose infiltrated cryosection with a 3D reconstruction.

Erik Bos and Peter J. Peters, Netherlands Cancer Institute, Amsterdam. (see: J. Lefman, P. Zhang, T. Hirai, R.M. Weis, J. Juliani, D. Bliss, M. Kessel, E. Bos, P.J. Peters, S. Subramaniam: Three-dimensional electron microscopic imaging of membrane invaginations in *E. coli* overproducing the chemotaxis receptor Tsr. *J. Bacteriol.* 2004 Aug; 186(15): 5052-61

DiATOME Diamond Knife Handling & Use Manual:

A. Diamond Knife Handling:

Contrary to popular belief a diamond knife is not as fragile as you might think. Taking into account the vast array of specimens that it is able to cut successfully from soft to hard, the diamond edge is quite durable. With proper care and handling, the DiATOME diamond knife can withstand a great deal of use.

However, with all of this said, in order to avoid any unfortunate mishaps, the following precautions should be taken when receiving the knife:

1. Make sure that the seal on the outside of the knife box has not been tampered with.
2. Insure that the receiving department of your institute or facility does not open the plastic box for they can cause damage.
3. When unpacking the knife, care should be taken not to disturb the knife edge.
4. Once the knife is unpacked it is ready for use*; just place it in the stage and begin sectioning.

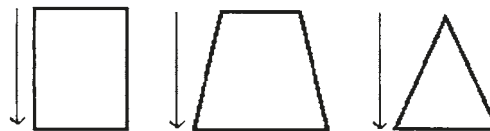
*During our final inspection before packaging, the cutting edge is thoroughly cleaned. Only knives that pass our high inspection standards are released for shipping. Therefore, no cleaning is required by you for your initial use.

WE DO NOT RECOMMEND THE TESTING OF KNIVES WITH BLANK BLOCKS BECAUSE THEY CAN NOT SHOW THE KNIVES TRUE CUTTING ABILITY.

B. Preparation Prior To Sectioning:

A perfect section ribbon can only be obtained from a well trimmed block. The upper and the lower side of the block must be parallel to the knife edge. The block should not be too wide because this would substantially increase the cutting pressure. This may result in chatter. (see troubleshooting)

Possible Block Forms



We have found that the best trimming results with plastic embedded specimens are obtained with our Diamond trimming tools. For the trimming of frozen specimens, biological as well as industrial, our cryo diamond trimming blade offers the best results. If trimming is done with a razor blade, always use a fresh degreased blade. Before the final few cuts of your block are made, we highly recommend that you change to a new blade.

Caution: If the razor blade is old or the cutting of the block is too thick, the blade does have a tendency to leave steel particles (shavings) on the block. Upon sectioning, these particles will cause damage to the diamond's edge.

If the block face is precut with glass knives, use only a clean new portion of the edge. This will avoid glassy particles sticking on the block.



C. Sectioning:

1. Room Temperature

The following are factors that will determine, in part, the quality of your sections. These points should be checked prior to you beginning your sectioning.

1. Alignment of the block: it must be parallel to the cutting edge.
2. Adjustment of the hardware: All of the screws should be tightened in the block holder, the knife holder, etc.
3. Knife parameters: The clearance angle and the cutting speed should be set as indicated on the cutting card. (see all exceptions in Troubleshooting).
4. Trough liquid: the water should be level with the cutting edge and give a good reflection. (see all exceptions in Troubleshooting.) The boat should be filled until the cutting edge is moistened. Then the left and right hand sides of the boat are wetted with the tip of a toothpick without touching the knife edge or the cement mounting material.

To avoid difficulties during sectioning and extend the life of your diamond knife, the following tips should be kept in mind:

1. Do not add solvents to the distilled water in the boat (ie, acetone) for the following reasons:
 - a. They may dissolve the sealing material between the knife and the boat.
 - b. Solvents will reduce the surface tension of the water.
 - c. Solvents may also dissolve and destroy the cellular materials of your specimen.
2. Avoid cutting thicker than the limits given for each specific knife
3. The block should be fully cured and should not be too wide.
4. Exercise care when picking up sections. Do not touch the cutting edge with any solid object (grids, loops, tweezers).
5. Do not allow the sections to dry on the cutting edge.

2. Cryo temperatures:

Cryo sections have a tendency to stick to the knife edge, curl, bunch up one on top of the other, and fly away. These problems in large are caused by electrostatic charging in the cryo chamber. The lower the temperature is the more pronounced these problems become.

To eliminate these problems and make cryo sectioning as easy as sectioning at ambient temperatures, we highly recommend that you use our "Static-Line" II Ionizer in conjunction with our cryo diamond trimming tool and knife.

It has been proven that diamond knives produce higher quality cryo sections than that of glass knives. With a diamond knife it is possible to cut thinner sections and these sections have less compression and greater uniformity than those cut on glass knives.

The most widely used technique in cryo sectioning is the Tokuyasu technique. For this technique we have found that the optimum results are achieved when using a diamond knife at the following temperatures:

- For trimming and semi-thin sections: -80°C
- For ultra-thin sectioning: -110°C to -120°C

For all other techniques the temperature range will be dependent on your specimen that needs to be cut. (see our separate catalog on the Static Line Ionizer II).

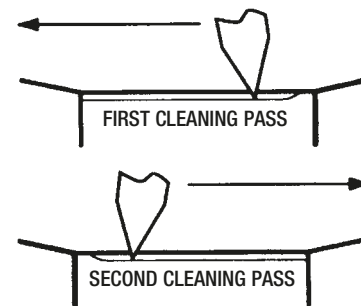
D. Cleaning Procedure:

Method 1

Immediately after picking up the sections, remove all unused sections with a hair curl or an eyelash. Then proceed to clean the knife edge as follows:

- Empty the boat and remount it in the ultra microtome support stage.
- Take one of our polystyrol rods and bevel it to an angle approximately 45° using an oil free razor blade.
- Dip the rod into 100% ethyl alcohol and shake off the excess.
- Pass the rod over the cutting edge without applying pressure *
You may repeat this procedure, if necessary, until the edge is clean.

This procedure has been used for many years by us and we have recommended it to all of our customers; the results have been exceptional with no evidence at all of knife damage.



* It is important not to contact the shaded (cemented) areas as this will damage the edge of the polystyrol rod and transfer dust to the cutting edge of the knife.

Mechanical cleaning as explained above is absolutely necessary after cutting poorly polymerized blocks.

Method 2

If you do not feel comfortable using the method described in procedure 1, there is an alternative. Immediately after picking up the sections proceed as follows:

- Remove all unused sections with a hair curl or an eyelash.
- Rinse the knife thoroughly with distilled water.
- Take a can of clean pressurized air and blow the water off of the knife.

If the knife is tended to immediately after sectioning, there is no need for any elaborate cleaning.

Method 3:

If sections or debris dry on the knife edge we recommend the following procedure be followed:

- Place the knife in distilled water.
- Add one or two drops of mild liquid dishwashing detergent to the distilled water.
- Let it sit overnight.
- Remove the knife and rinse it with distilled water only.
- Now proceed to clean the knife using method 1. For the cleaning of our cryo knives proceed as follows:
 - Remove the knife from the cryo chamber (before heating the chamber up).
 - Rinse the knife under tap water to warm it up.
 - Then proceed to clean using method 1. (Please note: for our cryo knives we recommend a 50% solution of ethanol in place of 100%.

E. Troubleshooting

The following is a brief summary of the difficulties that can be experienced while sectioning with a diamond knife and what to do if it occurs.

1. PROBLEM: Difficulty wetting the knife edge

SOLUTION:

- Clean the knife edge with alcohol (100%) and a DiATOME cleaning rod.
- Fill the boat with distilled water until the water level is a little too high, wait a few minutes, and then carefully remove the excess water.
- A DiATOME cleaning rod is passed over the cutting edge (the boat being full and mounted in position) using the same motion as the cleaning method.
- A hair or eyelash is drawn over the tongue and then passed over the cutting edge of the knife while the boat is full and clamped in place.

If the cementing material is damaged and you suspect that this is the reason you can not wet the knife edge, please contact us immediately so we may arrange to get your knife back and recement it for you.

2. PROBLEM: Block face is getting wet

CAUSES:

- a. For epoxy resins:** Block faces may get wet due to electrostatic charging (low room humidity and or transportation).
- b. For methacrylates:** Some of these embedding materials are hydrophilic and tend to wet the block surface because they attract water (Lowicryl, LR White, etc.).

SOLUTION:

a. For epoxy resins:

- Increase the room humidity.
- Lower the water level ever so slightly.
- Dry the block face with filter paper.
- Eliminate electrostatic charging with an antistatic device.

b. For methacrylates:

- Lower the water level to a concave shape.

Two problems will become pronounced by lowering the water level.

- You will have difficulties wetting the edge.
 - To combat this just follow the steps outlined above in edge wetting.
- You will have difficulties with reflection.
 - To alleviate your reflection problem you should adjust the light source to the appropriate angle.

If your ultramicrotome does not allow for adjustment of the light source proceed as follows:

- Tape a small piece of aluminum foil to the light source.
- Slowly bend the foil until you reach your desired reflection.

3. PROBLEM: Chatter

CAUSES:

Chatter manifests itself in many ways and is caused by different reasons.

- External vibrations.
- A faulty microtome.
- Screws are not fully tightened (block, block holder, and knife).
- Cutting pressure is too big.
- Clearance angle is too small (may cause friction between the block face and the diamond face).

SOLUTION:

- Change the location of the microtome.
- Have the microtome checked by a service engineer.
- Make sure all of the screws are tightened.
- Reduce the block width.
- Increase the clearance angle by 1-2 degrees.

4. PROBLEM: Compression

CAUSES:

- The block is too soft.
- The knife angle is too big.
- The knife is dull.
- The clearance angle is too big and or the cutting speed is too high.

SOLUTION:

- Make the blocks harder.
- Switch from the 45 to the 35 degree angle knife.
- Send the knife back to us for evaluation and possible resharping.
- Reduce the clearance angle by 1-2 degrees and reduce the cutting speed from 1mm/sec to 0.5mm/sec.



5. PROBLEM: Knife marks

The majority of all diamond knives that are in need of resharping are due to knife marks. They are found in the cutting edge and cause very fine lines in your sections.

CAUSES:

- Touching the edge with your fingers or any solid object.
- Remnant particles in your block from trimming.
- Hard particles in your block and specimen.
- Normal use of the diamond knife that over time and depending on the different types of specimens will all cause nicks.

SOLUTION:

Some of the causes are easily prevented while others are more difficult to prevent.

- Keep all hard objects as well as fingers away from the cutting edge.
- Follow our recommendations under the trimming section for best results.
- Most blocks have hard particles in them. (continued) These inclusions can be controlled, to an extent, by keeping to the highest possible purity during the entire block making procedure from fixation through sectioning. It is impossible to avoid some inclusions but keep in mind that the knife marks produced are so small that they are not even detectable in a light microscope but only through the sectioning test.
- Normal wear and tear is inevitable. You can extend the periods between resharping by using a different knife for each of your different types of specimens.

6. PROBLEM: Striations

Whereas nicks are found on the knife edge, striations are found in the sections itself.

CAUSES:

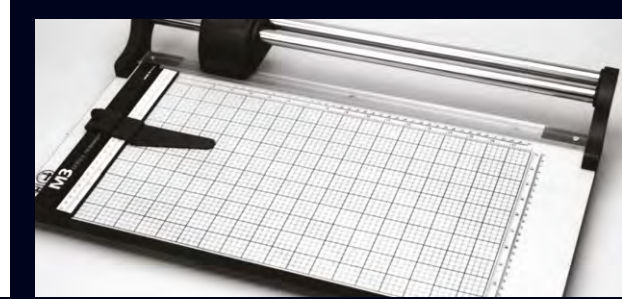
- Very fine imperfections in the cutting edge.
- Poorly polymerized blocks.
- Inhomogenous blocks.

SOLUTION:

- Make sure the blocks are fully polymerized.
- Change the block.
- Try another portion of the cutting edge.

Photography: Film and Supplies

Kodak Film including Electron Microscopy Film
Instant Films and Film Holders from Fujifilm
Photographic Papers from Ilford
Photographic Chemicals from Ilford and Kodak
Darkroom Exhaust Fans and Louvers
Mohr Automatic Film and Print Processor
Developing Tanks, Film Racks, Tongs, Squeegees,
and Dryers
Cutters and Rotary Trimmers
Easels and Enlargers
Enlarging Focusing Aids, and Light Gathering
Magnifiers
Film Safes, Film Cleaner, and Static Eliminators
Tapes, Sprays, and Adhesives for Photo Mounting
Darkroom Timers, Safe Lights, and Light Boxes
Dry Transfer Lettering Sheets
Negative Envelopes, Film Sleeves, and CD Sleeving
File Cabinet Systems and Portable Storage Chests
Scanning Electron Microscope Digital Images
INFINITY Digital Microscope Cameras



**Electron
Microscopy
Sciences**



► Kodak Films

For a complete user's guide to produce high quality images with our Kodak Electron Micrography products, please call or write us today.

► Kodak Electron Microscopy Film 4489

- 7mil Estar Thick Base.
- Microfine Grain.
- Blue Sensitive Emulsion.

Kodak has reverted to film type 4489 as the standard emulsion for EM. It is coated on a sheet film .007" Polyester base (for high dimensional stability and rapid pump down). Its fine grain, blue sensitivity emulsion is characterized by intermediate speed. Use safelight filters No. 1A, OA or OC and Kodak Developer D-19. Available in boxes of 100 sheets, supplied as two units of 50 sheets each in heat-sealed foil packages or in bulk pack.



74100	Kodak EM Film 4489, 3 1/4"x4"	100/bx
74102	Kodak EM Film 4489, 3 1/4"x4"	20 bxs/cs
74104	Kodak EM Film 4489, 3 1/4"x4"	250/pk
74107	Kodak EM Film 4489, 3 1/4"x3 1/8"	12 bxs/lot
74112	Kodak EM Film 4489, 6.5x9cm	250/pk
74113	Kodak EM Film 4489, 7x7cm	10 bxs/lot
74114	Kodak EM Film 4489, 6 1/2"x9cm	100/bx
74115	Kodak EM Film 4489, 6 1/2"x9cm	10 bxs/lot

► Kodak T-MAX 100 Professional Films

Especially useful for detailed subjects when maximum image quality is needed. Recommended for copying black and white photographs, for use in photomicrography, and in making black and white prints from color transparencies.

- Medium speed (EI-100).
- Extremely high sharpness, fine grain.
- Very high degree of enlargement, expanded exposure latitude.
- Recommended Kodak Developers: T-Max, D-76, HC-110, Microdol-X, Duraflo RT.
- Total darkness.



1) T-MAX 100 Roll Film:

74160	T-MAX 100, 35mmx100ft	roll
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2) T-MAX 100 Cut-to-Size:

74162	T-MAX 100, 135/24	roll
74164	T-MAX 100, 135/36	roll
74172	T-MAX 100, 4X5 (Substitute for Kodak 4127)	50/bx
74173	T-MAX 100, 4X5 (Substitute for Kodak 4127)	10 bx/lot

3) Due to the discontinuation of Technical Pan Film 6415 (the most used for Zeiss 109 TEM), we recommend T-Max 100/120 as a direct replacement.

74157	T-Max 100, 120	each
74158	T-Max 100, 120	5/Lot

► Fujifilm Instant Films and Film Holders Replacement film for Polaroid SEM films.

► FP-100C Color Instant Film

Fujifilm FP-100C is a "peel-apart-type" instant color daylight film that performs extremely well under varied lighting conditions.

FP-100C works in any Instant Film camera with an image size of 3.25" x 4.25". FP-100C45 works in any Instant Film camera with an image size of 4" x 5".

Its fine grain and rich tonal gradation make it ideal for passport photos, commercial test shots, presentations, ID photos, and direct printing.

- Exceptional image quality and color reproduction.
- Superb tonal gradation from highlights through shadows.
- Wide applicable temperature range.
- Enhanced resistance to light-induced discoloration.
- Photos can be laminated.

74681	Fujifilm Professional Instant FP Series FP-100C, 3.25x4.25	10/pk
74682	Fujifilm Professional Instant FP Series FP-100c, 4x5	10/pk

► Film Pack Holder

74683	Fujifilm Professional Instant Film 4x5 Pack Holder	each
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Kodak T-MAX 400 Professional Films

Especially useful for: dimly lighted subjects, fast action, extending the distance range, and flash pictures. Used in scientific and biomedical work, especially where fluorescence photography is required.

- High speed (EI 400).
- Very high sharpness; extremely fine grain, high resolving power.
- High degree of enlargement.
- Shorter push-processing development time.
- Recommended Kodak Developers: T-Max, D-76, HR-110, Microdol-X.
- Total darkness.

T-MAX 400 Roll Film

74166	T-Max 400, 35mmx100ft	roll
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T-MAX 400 Cut-to-Size

74168	T-Max 400, 135/24	roll
74170	T-Max 400, 135/36	roll

► Kodak T-MAX P3200 Professional Film/TMZ

A multispeed panchromatic negative film that combines very high to ultra-high film speeds with finer grain than that of other fast black-and-white films. Allows you to take photographs in many situations where photography was previously impossible.

- Film speed: EI 800 to 25,000 with push processing
- Wide exposure latitude
- Excellent sharpness and shadow detail, fine grain
- Suggested applications:** Fine Art • Law Enforcement • Medical/Science • Military/Instrumentation • Photojournalism • Sports
- Recommended KODAK Developers:** T-Max, T-Max RS, XTOL, D-76, HC-110
- Total darkness (no safelight recommended)

74171-10	T-MAX P3200 /TMZ , 135-36	1 roll
74171-20	T-MAX P3200/TMZ/651, 35mm-100ft	1 roll

► Kodak Electron Image Film SO-163

- Fine grain, blue sensitive emulsion.
- Slightly faster than Electron Image Plates.
- Twice as fast as EM film 4489.
- 7mil ESTAR base.
- May use anti-fog.

74142	Kodak SO-163 Film, 3 1/4"x4"	250/pk
74144	Kodak SO-163 Film, 6.5x9cm	100/bx
74145	Kodak SO-163 Film, 6.5x9cm	10 bxs/lot



► **Kodak Chemicals for Photography:**

► **EMS Kodak Developer D-19® Replacement; Powder**

A high contrast developer for EM films.

Kit contains pre-weighed amounts of:

- Distilled Water (48°C/125°F)
- Metal
- Sodium Sulfate
- Hydroquinone
- Sodium Carbonate (monohydrate)
- Potassium Bromide

to make 1 liter or 1 gallon of developer.

74205	EMS Developer D-19 Rep. Kit (makes 1 liter)	each
74200	EMS Developer D-19 Rep. Kit (makes 1 gallon)	each
74210	EMS Developer D-19 Rep. Kit (gallon-sized)	20/pk

► **Kodak Dektol Developer; Powder**

Each pack makes one gallon (3.8L). For photographic paper and projector slide plates.

74220	Dektol Developer	1 pack
74230	Dektol Developer	20 pack/cs

► **Kodak T-MAX Developer; Liquid**

For use with T-Max Film, Tri-X Pan. A liquid concentrate for easy mixing. Each pack makes 5 liters.

74245	T-Max Developer	each
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► **Kodak Polymax T Developer**

Tray processing. Liquid developer-concentrate for use with cold-tone papers.

■ **Medium contrast, high capacity, fast acting.** ■ **Dilute 1:9 for use.**

74232-01	Kodak Polymax T Developer	1 qt
74232-12	Kodak Polymax T Developer	12qt/cs

► **Kodak Fixer; Powder**

Each pack makes one gallon. A general purpose fixer for film and paper.

74300	Fixer	1 pack
74310	Fixer	20 pack/cs

► **Kodak Rapid Fixer**

A rapid-acting hardening fixer for automated and tray processing Complete fixer: Kit makes 1 gal: 32oz solution A and 3.6 oz solution B.

74312	Kodak Rapid Fixer	1 gal kit
74313	Kodak Rapid Fixer	5 kit/lot

► **Kodak Polymax T Fixer**

Single solution hardening fixer for papers. Designed for use with Kodak Polymax T Developer.

74290-01	Kodak Polymax T Fixer	1 gal
74290-12	Kodak Polymax T Fixer	3X 1 gal/cs

► **Kodak Hypo Clearing Agent**

It promotes fast washing of films and prints without emulsion swelling or softening.

74256	Hypo Clearing Agent	5 gal
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► **Kodak Stop Bath Indicator; Liquid**

For general use with films, plates, or papers.

■ **Built-in color indicator to signal exhaustion.**

■ **Dilutes 1:64.** ■ **Each package makes 8 gallons.**

74340	Stop Bath Indicator	16oz
74341	Stop Bath Indicator	12x16oz

► **Kodak Photo-Flo Solution**

It decreases water surface tension and minimizes water marks and drying streaks on film; speed dries.

74257	Photo-Flo 200 Solution	16oz
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► **Kodak Developer System Cleaner and Neutralizer**

This cleaner removes build up of silver and tar deposits from developing tanks, recirculation systems, and on the racks and rollers of the processors. One package will make 10 gallons.

74270-01	Developer System Cleaner & Neutralizer	each
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► **Kodak Developer System Cleaner**

Removes calcium-silver scale from developer tanks, rollers, and recirculation systems.

74271-01	Liquid Developer System Cleaner	3.75 gal.
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► **Kodak Fixer/Wash System Cleaner**

Removes chemical buildup. One package will make 2½ gallons.

74274-01	Fixer/Wash System Cleaner	each
74274-10	Fixer/Wash System Cleaner	10/cs

► **The Kodak Ektatherm XLS Media Products:**

We are offering a full range of media products for outstanding image stability and near-photographic quality continuous tone thermal prints. Our media products feature excellent color reproduction, including superior flesh tones and durability. The unique Kodak XtraLife Ribbon overcoats prints with a rugged transparent layer which prevents destructive dye transfer as well as it resists fingerprints and fading.

Kodak Ektatherm XLS Ribbons:

Cat. #	Description	Max. Image Size	# Images
89050	Kodak Ektatherm XLS Three-Color Ribbon	8.5x10"	100
89051	Kodak Ektatherm XLS Oversize Three-Color Ribbon/CMY	8.5x12"	100
89052	Kodak Ektatherm XLS Three-Color Ribbon XtraLife Media/CMY*	8.5x10"	100
89053	Kodak XLS Black Ribbon/XtraLife Media*	8.5x12"	150

*NOTE: Only laminates to paper. When printing transparency material with the XTRALIFE Ribbons the laminate patch is bypassed.

**For use with the 48MB Printer only.

Kodak XLS Print Paper:

Cat. #	Description	Max. Image Size	Sheets
89056	Kodak Ektatherm XLS Print Paper 8.5x11"	8.0x8.93"	100
89057	Kodak Ektatherm XLS Print Paper 8.5x12"	8.0x10"	100
89058	Kodak Ektatherm XLS Print Paper 8.5x14"	8.0x12"	100
89059	Kodak Ektatherm XLS Print Paper 9.5x14"	8.5x12"	100

► Ilford Products

► Ilford Multigrade IV RC Deluxe

This is a direct replacement for the Kodak Polycontrast IV RC B&W Papers. Neutral tone – Variable contrast.

MULTIGRADE IV RC Deluxe has the standard weight of (190g/m²) with a resin coated base.

- Resin Coated – Black & White
- Non-Developer Incorporated
- 12 Contrast Grades with MULTIGRADE Fibers
- Glossy Surface
- Compatible with the Kodak OC Filter
- Dish/Tray Processing
- Developer: Mutigrade, Bromophen or PQ Universal
- Fixer: Ilford Rapid Fixer or Hypam

EMS #	Sheet Size In. x In.	Sheets per Package
83020-10	5 x 7	100/pk
83020-25	5 x 7	250/pk
83021-10	8 x 10	100/pk
83021-25	8 x 10	250/pk
83021-1M	8 x 10	1000/pk

► Ilford Multigrade RC Express PF Paper

This is a direct replacement for the Kodak Polycontrast IV RC B&W Papers. Neutral tone – Variable contrast for high speed printing applications. MULTIGRADE RC Express PF has the standard weight of (190g/m²) with a resin coated base. It is especially designed for high speed printing applications, where automatic and semiautomatic printers, printer-processors and minilabs are used.

- Non-Developer Incorporated
- Short Exposures, Cool Image Tone & Cool White Base
- Recommended for high-Speed Printers and Murals
- Glossy Surface
- Available in Rolls only with Emulsion Wound Out (EWO)
- Ilford 2000RT developer/replenisher & Ilford 2000RT fixer/replenisher are designed for machine processing
- Ilford Mutigrade developer, Ilford Iflostop-Pro stop bath and Ilford Rapid Fixer or Ilford Hypam Fixer are used for Dish/Tray processing.

EMS #	Roll Size In. x Feet	Emulsion Wound	Case Qty.
83024-08	8" x 250'	EWO	each
83024-10	10" x 250'	EWO	each



► Ilford Multigrade RC Warmtone Paper

This is a direct replacement for Kodak Polycontrast IV RC B&W Papers. Premium Quality, Warm Tone – Variable Contrast.

MULTIGRADE RC Warmtone Paper has the standard weight of (190g/m²) with a resin coated base. It is equally suitable for printing conventional black and white and XP2 SUPER negatives.

- Rich, Warm Blacks; Creamy Whites
- Excellent Toning Characteristics
- Developer: MULTIGRADE, or BROMOPHEN, or PQ UNIVERSAL
- Stop Bath: ILFOSTOP, or ILFOSTOP PRO
- Fixer: ILFORD RAPID FIXER or HYPAM
- For ILFORD processor: ILFORD 2000RT developer/replenisher & fixer/replenisher are recommended
- Glossy Surface

EMS #	Sheet Size In. x In.	Sheets per Package
83027-25	8 x 10	25/pk
83027-1C	8 x 10	100/pk

► Ilford Multigrade RC Cooltone Paper

This is a direct replacement for Kodak Polycontrast IV RC B&W Papers. Premium Quality, Cool Tone – Variable contrast.

MULTIGRADE RC COOLTONE Paper has the standard weight of (190g/m²) with a resin coated base. It is equally suitable for printing all black and white negatives including chromogenic negatives, such as ILFORD XP2 SUPER.

- Cooler Image Tone with Cool White Base Tint
- Non-Developer Incorporated
- Easy to Tone in a Variety of Toners
- Glassy Surface
- Developer: MULTIGRADE, or BROMOPHEN, or PQ UNIVERSAL
- Stop Bath: ILFOSTOP, or ILFOSTOP PRO
- Fixer: ILFORD RAPID FIXER or HYPAM
- For ILFORD processor: ILFORD 2000RT developer/replenisher & fixer/replenisher are recommended

EMS #	Sheet Size In. x In.	Sheets per Package
83030-25	8 x 10	25/pk
83030-1C	8 x 10	100/pk

► Ilfospeed RC Deluxe Paper

This is a direct replacement for Kodak Kodabrome II RC B&W Papers. Premium Quality Graded Paper on a Resin Coated Base.

MULTIGRADE RC COOLTONE Paper has the standard weight of (190g/m²) with a resin coated base. It is suitable for a wide range of applications including commercial, press, industrial, advertising, and display work.

- Can be used with virtually all safelights for B&W papers
- Neutral Tone Graded RC
- Can be either Dish/Tray Processed or Machine Processed
- Latent Image Ability
- Developer: Ilford MULTIGRADE, or BROMOPHEN, or PQ UNIVERSAL
- Stop Bath: ILFOSTOP, or ILFOSTOP PRO
- Fixer: ILFORE RAPID FIXER, or HYPAM
- For ILFORD processors: ILFORD 2000RT developer/replenisher & fixer/replenisher are recommended

SURFACE: Glossy – Grade 2 (ISO Range 100)

EMS #	Sheet Size In. x In.	Sheets per Package
83032-10	8 x 10	100/pk
83032-25	8 x 10	250/pk

SURFACE: Glossy – Grade 3 (ISO Range 80)

EMS #	Sheet Size In. x In.	Sheets per Package
83033-10	8 x 10	100/pk
83033-25	8 x 10	250/pk

► Ilford MultiGrade IV FB Fiber

This is a direct replacement of Kodak POLYMAX Fine Art Paper - Premium Quality Variable Contrast Paper on a Fiber Base. Ilford MUTIGRADE IV FB Fiber is a premium quality variable contrast black and white paper on a 255g/m² fiber base.

- Available in a Glossy Surface – Double Weight
- May be used with the most Common Safelights for B&W Papers
- Processed in the same way as other fiber base papers

EMS #	Sheet Size In. x In.	Sheets per Package
83040-10	8 x 10	100/pk
83040-25	8 x 10	250/pk

➤ **Iford Products**

➤ **Iford Photochemical Range**

➤ **Paper Developer**

The range of Iford paper developers includes products that cover all the general purpose black and white paper processing applications.

➤ **ILFORD MULTIGRADE Dish/Tray Developer**

MULTIGRADE is a liquid developer which is concentrated and it is suitable for all black and white papers. It can be used at a standard dilution of 1+9 or at 1+14 for greater development control and economy. MULTIGRADE developer is clean working and has excellent keeping properties and gives a neutral image tone with most papers. MULTIGRADE is designed for use at ambient room temperatures, normally 20° C/68° F. We do not recommend its use for high temperature or machine processing applications. It is not suitable for film developing.

Cat. #	Description	To Make	U/M
83050-05	MutiGrade Paper	5 L	500ml
83050-50	Developer	50 L	5 L

➤ **ILFORD Developer**

PQ UNIVERSAL developer is designed for use at ambient room temperatures, normally 20° C/68° F. We do not recommend its use for high temperature or machine processing applications.

Cat. #	Description	To Make	Sale Unit
83052-50	Developer	50 L	5 L

➤ **ILFORD 2000RT MACHINE DEVELOPER**

2000RT is a liquid concentrate developer/replenisher recommended for use with all types of black and white RC photo paper processors. It is easy to use as no starter solution is required. The recommended dilution for both the tank and replenisher solution is 1+4. It is a robust, economical, clean working developer with a long tank life. It can be used at a wide range of developing temperatures, 20 – 40° C (68 – 104° F). With most papers it gives a print image tone just slightly cool of neutral.

Cat. #	Description	To Make	Sale Unit
83056-05	2000RT Developer/	25 L	5 L
83056-10	Replenisher	50 L	10 L

➤ **Iflostop Stop Bath**

ILFOSTOP is a low acid stop bath that stops development immediately; it contains an indicator dye that changes color from yellow to purple as the stop bath becomes exhausted. It is specifically recommended for dish/tray processing of paper where it helps to maintain the activity of the fixer bath.

Cat. #	Description	To Make	Sale Unit
83080-05	Iflostop Stop Bath	10 L	500ml



➤ **Paper Fixer**

The range of Ilford paper Fixers includes products that cover all general-purpose black and white film and paper processing applications.

➤ **ILFORD RAPID FIXER**

Iford Rapid Fixer is a non-hardening rapid fixer supplied as a liquid concentrate for fixing black and white film and paper in all manual and machine processing applications. It is easy and convenient to use in the temperature range of 18 – 40° C (64 -104° F). ILFORD RAPID FIXER must not be used with fix hardeners

Cat. #	Description	To Make	Sale Unit
83060-10	Iford Rapid Fixer	5 L	1 L
83060-50		50 L	5 L

➤ **ILFORD HYPAM FIXER**

HYPAM is a non-hardening liquid rapid fixer that can be used with the fix hardening agents that are needed for some film processing applications. Without the addition of a hardener it is suitable for all black and white film and paper, manual and machine processing applications in the temperature range of 18 – 40° C (64 -104° F). HYPAM is the recommended fixer for all ILFORD scientific products and other X-ray films, plates and cineradiography films. If the addition of hardener is required, use ILFORD HYPAM HARDENER.

Cat. #	Description	To Make	Sale Unit
83062-50	Iford Hypam Fixer	25 L	5 L

➤ **ILFORD 2000RT MACHINE FIXER**

2000RT is a non-hardening, liquid fixer concentrate specially designed for the rapid fixing of resin coated paper in processing machines complementing the 2000RT developer. It can be used at a wide range of fixer temperatures, 20 – 40° C (68 – 104° F). 2000RT Fixer must not be used with fix hardeners.

Cat. #	Description	To Make	Sale Unit
83066-05	2000RT	25 L	5 L

EMS ROR (Residual Oil Remover)

EMS is proud to introduce the ROR-It is not a lens cleaner in the usual sense- it goes far beyond what a routine cleaner does. ROR is specifically designed to emulsify and remove microscopic oil residues- a by product of environmental pollution –from the surface and pores of glass and plastic.

For more information, see page 736. >>>>



► Darkroom Fans and Louvers:

With all of the toxic chemicals and fumes which are released during film processing, the need for adequate ventilation in darkroom work areas cannot be over emphasized. Improperly ventilated space can be harmful to the health of workers. Now available is our "Air-No-Lite" 100% light tight darkroom exhaust fans and louvers which insure healthy ventilation continuously.

Each fan is one piece molded body and five sections molded louver. Different sizes of fresh air supply louvers are available. Each size is designed to supply just the right amount of air to a particular model exhaust fan.

(Exhaust fans work best in a darkroom that is equipped with fresh air supply louvers or some other kind of air supply. If there is no air supply to the darkroom, the fan will be working against a vacuum and can do nothing).

Electrical: 110 V AC, 60 Hz. 3-wire grounded cord.

► 1. Exhaust Fan:

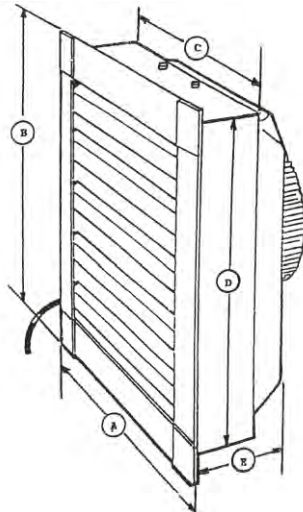
► Darkroom Ventilation

■ **A1212 Fan:** Housing measures 12" x 12" x 4". Airflow is from 400 –800 CFM. Good for room up to 12 x 12 feet. One piece-molded body and 5 section molded louver.

► Mini-labs and Photo finishers

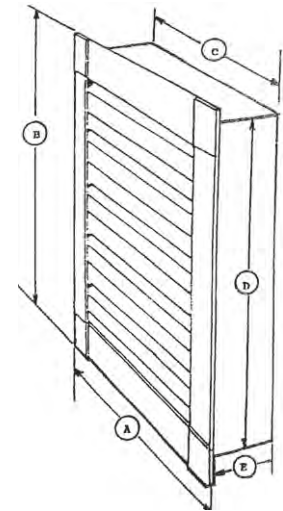
■ **Pro-Lab SL/PS:** Comes with 6" Exhaust Pipe Starter. Used to exhaust air out of the darkroom using a 6" diameter galvanized pipe through the ceiling and roof to a roof rack. Airflow is from 600 –900 CFM. It requires 18 x 18" supply louver (L1818). Good for room size from 15 x 15' to 20 x 20'.

■ **Pro-Lab SL/WC:** This is similar to SL/PS fan but suited for exhaust air out of the room through a thick cinderblock wall or stud partition dry wall. Comes with Outside Exhaust Wall Cap, which has an anti-back-up-flap against air coming in when the fan is off, and a grill to keep out small wild life. All units come with 3 feet three wire grounded power cord.



► 2. Darkroom Louver:

Different sizes of fresh air supply louvers are available.



Model L-1212:	Molded plastic	use with fan	A-1212
Model L-1224:	Plastic/Metal	use with fan	Pro-Lab

Model	Dimensions					Cut-out Size
	A	B	C	D	E	
L-1212	13 $\frac{3}{4}$ "	13 $\frac{3}{4}$ "	12"	12"	1 $\frac{1}{4}$ "	12 $\frac{1}{4}$ " x 12 $\frac{1}{4}$ "
L-1224	25 $\frac{1}{2}$ "	13 $\frac{3}{4}$ "	23"	11 $\frac{3}{4}$ "	1 $\frac{5}{8}$ "	23 $\frac{3}{4}$ " x 12"

Ordering:

Catalog #	Model	Hole Size	Use w/ Fan Model	Area Sq Inches
74851-20	L-1212	12" x 12"	A-1212	144
74851-30	L-1224	12" x 24"	Pro-Lab	325

Model	Dimensions					Cut-out Size	CFM
	A	B	C	D	E		
Pro-Lab	12 $\frac{3}{4}$ "	13 $\frac{3}{4}$ "	12"	12"	13"	12 $\frac{1}{4}$ " x 12 $\frac{1}{4}$ "	600
A-1212	13 $\frac{3}{4}$ "	13 $\frac{3}{4}$ "	12"	12"	4 $\frac{1}{4}$ "	12 $\frac{1}{4}$ " x 12 $\frac{1}{4}$ "	400

Ordering:

Catalog #	Model	CFM	Room up to	Wattage	Amp.
74850-20	A-1212	400	12' x 12'	110 W	1
74850-35	SL/PS	600	20' x 20'	205 W	1.86
74850-40	SL/WC	600	20' x 20'	205 W	1.86

► 3. Speed Control

A Speed Control device saves energy by controlling the air flow from the top-rated CFM of the unit down to 20 CFM.

74853	Speed Control	each
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► MohrPro 14-ST Automatic Print and Film Processor

The MohrPro 14 can process a wide variety of B&W RC papers, high contrast B&W line films and RA-4 color papers. The processor will accept material as small as a 5 x 7 with no modification and 3 1/4 x 4 "(with the Dryer Modification).



The MohrPro 14 is a 14 inch wide processor with a **straight through or ST** roller transport design capable of processing 60-8x10 RA-4 color prints (8 inches per minute) or 120-8x10 B&W RC prints (16 inches per minute) dry to dry, per hour. The chemical capacity requires a minimum of 3/4 of a gallon of developer and fixer with a maximum of 5 gallons.

The chemicals are not stored inside the processor tanks but below in auxiliary 2 or 5 gallon containers. From these containers, the chemical solutions are automatically pumped into the processor whenever the solutions are heating or during processing of paper. Once the preset temperature is reached or when in the energy saving standby mode, the chemicals automatically drain into the auxiliary containers.

This unique feature keeps the solution racks and tanks cleaner than in a traditional processor where the racks and tanks are in contact with solution continuously. This processor is self cleaning. Just remove the chemical containers and replace them with containers filled with water.

Turn the process switch to the heating mode. Water is pumped up into the processor through the solution racks into the tanks and overflows down into the containers. Once the processor reaches the preset temperature and shuts off, the processor is clean.

The temperature is adjustable from room ambient to 115 degrees. Development time is adjustable from 20 seconds to 2 minutes. The dryer and solution temperatures are adjustable and very accurate. The drive motor is variable speed DC controlled by an electronic PC board. The straight through roller drive system all but eliminates jamming.

STANDARD FEATURES

- **STRAIGHT LINE PROCESSING PATH.** Process with confidence. The straight paper path eliminates many problems that cause jamming.
- **EASILY CLEANED.** Operator will be delighted with the ease of cleaning this processor. Roller assemblies lift right out, tank corners are all rounded.
- **FULL ACCESS TO COMPONENTS.** Maintenance is so simple that any part can be changed in minutes.
- **NO PLUMBING NECESSARY.** The Mohrpro 14 may be located anywhere as a stand-alone unit.
- **MATERIAL UP TO 14" IN WIDTH MAY BE PROCESSED.** Minimum length required is 7 inches.
- **VARIABLE TEMPERATURE CONTROL.** Chemical temperature can be adjusted for proper processing of paper or film.
- **VARIABLE SPEED CONTROL.** Speed may be varied for proper processing of paper or film.
- **STANDBY MODE.** Saves equipment wear, electrical and plumbed water expenses, when not processing.

MohrPro 14-ST Processor Specifications

Materials.....resin coated B&W paper, RA-4 color paper,graphic arts film & paper (either rolls or sheets) and EM Film (4489)
Processing WidthUp to 14 inches
Transport SpeedUp to 4.5 feet per minute
Solution Temperature82-115° F
Solution Tank Capacity3/4 gallon minimum
Warm-Up Time10-30 minutes
Power Requirements115 volt, 60 Hz, 15 amps
Drain TypeGravity
Dimensions12" H, 30" L, 22" W, with Shelf & Exit basket 50" L
Dry Weight.....90 pounds
Warranty12 months on all parts

Ordering Information:

74950-14	MohrPro 14 Processor	each
74950-14-MO	Dryer Modification (Adds an additional set of rollers in the dryer which allows for the processing of paper or film smaller than 5 x 7")	each
74952-14	DayLight Loader (A light tight loader designed to accept roll or cut sheet material.)	each



► Chemicals for MohrPro

All chemicals are concentrated. One quart (0.95L) of concentrate mixed with water will make one gallon of working solution.

74961-01	R-201 Developer	1 qt
74961-10	R-201 Developer	12x1qt
74962-01	R-202 Fixer	1 qt
74962-10	R-202 Fixer	12x1qt
74963-01	R-203 Hardener	1 qt
74964-01	R-204 Defoamer	3/4 oz
74965-01	R-401 Dev/Activator Cleaner	1 qt
74965-03	R-401 Dev/Activator Cleaner	3x1qt
74966-01	R-402 Fix/Wash/ Cleaner	1qt
74966-03	R-402 Fix/Wash/Cleaner	3x1qt

The MohrPro is also available in a 22" model.

- **MOHRPRO 20 model** is a 22 inch (56cm) wide processor with a "Deep Tank" roller transport design capable of processing 240 - 8x10 RA color prints (18" (54.7cm) /minutes) or 480 - 8x10 B&W RC prints (36"/minute) dry to dry per hour.

► Bamboo Print Tongs

These rubber tipped bamboo tongs are ideal for handling films during processing. 9"(L).



74818 Bamboo Print Tongs 3/set

► Paterson® Print Tongs

These tongs have textured side panels which offer a firm grip and deeply notched "shoulders" which avoid slippage into the tray. The tongs are all plastic and chemically resistant. Tongs are color-coded in light and dark gray to help minimize the risk of cross-contamination.



74817 Paterson® Print Tongs 2/set

► Paterson Chemical Mixer

This ergonomically designed mixer is specially shaped for efficient stirring and incorporates a particle crusher. It is invaluable when making up solutions either from liquid concentrates or from dry powdered chemicals.

74394 Paterson Chemical Mixer each

► Paterson Force Film Washer

This quick and efficient film washing system fits most domestic taps. It is designed for the Paterson Super System 4 tanks. (Cat. #74342-)

74336-01 Paterson Force Film Washer set



74394

► Paterson Super System 4 Developing Tanks

The super System 4 is simpler to load, faster to fill, and easier to clean than any other tank. It has a

large diameter one-piece lid and funnel, which clips into place positively and securely enabling the tank to be filled and emptied quickly. The Paterson 35mm tank takes a single 35mm film; the Paterson Universal tank takes two 35mm films or a single 120/220 film.

Supplied complete with one 35mm/120/220 Auto Load Reel, Watertight EVA cap prevents leakage during inversion agitation. Uses less than 300ml solution for a single 35mm film.

74342-14 Paterson 35mm Tank and Reel set

74342-15 Paterson Universal Tank and Reel set



► Paterson Auto Load Reel

Designed for use in the Paterson Super System 4 tank, the Auto Load Reel allows thru free flow of solutions. Paterson Reels have a smooth finish and use the unique twin ball ratchet system. Film loading just couldn't be easier!

74338-01 Paterson Auto Load Reel each

74338-06 Paterson Auto Load Reel 6/pk



► Paterson Water Filter

This filter may be disassembled and the filter reversed for flushing. This 20 microns filter removes most water borne dust and dirt and it fits most modern tap sizes.

74337-01 Paterson Water Filter set



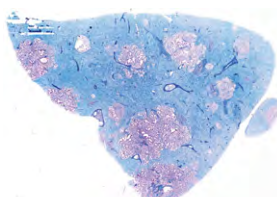
PathScan Enabler IV

Low Cost Digital Histology Slide Scanner

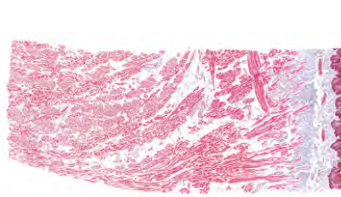
The PathScan Enabler IV, is designed to allow scanning of an entire whole mounted histology sample attached to standard 1 x 3 inch cover slipped glass slide. The PathScan Enabler IV solves low power, large field of view, high resolution imaging problems.



Rat Brain



Lung



Tongue



For more information, see page 606. >>>>

► **Developing Tanks and Floating Lids**

Rectangular Film tanks are made of durable plastic to replace the Kodak Hard Rubber Tanks and Lids, which are no-longer available. Comes in 2 different sizes — 4x5 and 5x7. They feature floating lids.

► **(1) ½ Gallon Size (1.9L) Plastic Tank**

Measurements: Outside: 7¼"x5"x6"H (18.5x12.5x15cm); Inside: 5½"x3¾"x5¼"D (15x9.5x14cm)
74343 4x5 Developing Tank and Lid each

► **(2) Gallon Size (3.18L) Plastic Tank**

Measurements: Outside: 9"x5½"x7¼"H (23x14x18cm); Inside: 7¾"x4¼"x7"H (19.5x11x17.5cm)
 Accommodates: EMS film racks #74350; #74352; #74890-18; #74891-18; #74891-24; #74891-25; or #74895-12.
74345 5x7 Tank and Lid each



► **EMS Lucite® Film Racks**

Fabricated from genuine Lucite®; these racks fit into our 5"x7" and 8"x10" developing tanks (EMS Cat. #74345 and 74347). One end of the rack is extended in length with a cut-out hole to serve as a handle. The racks are designed to accommodate



a number of sheets per rack without changing the length of the rack (As the number of the films per rack increases, the space between them decreases).

■ **Racks for 3¼x4" (8.3x10.2cm) films or plates. Rack measures: 7½"(L)x3¾"(W)x7½"(H) (19.2cmx8.5cmx20cm).**

74890-18	EMS Lucite Rack for 18 Plates	each
74891-18	EMS Lucite Rack for 18 Films	each
74891-24	EMS Lucite Rack for 24 Films	each
74891-25	EMS Lucite Rack for 25 Films	each

■ **Rack for 4x5" (10.2x12.7cm) films. Holds 12 of 4x5" film, fits into the 5x7" tank. The rack measures: 7½"(L)x4½"(W)x7½"(H) (19.2x10.4x20cm).**

74895-12	EMS Lucite Rack for 12 of 4x5" Film	each
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► **EMS Film Racks**

Fabricated acrylic racks that are designed to fit with above developing tanks. Sheet film is firmly held in the slots in the side rails while solution is freely circulating inside the tank. **catalog #74350**, overall measurements 3½x6x6"H (8.9x17.5x15.2cm), holds 18 sheets of film 3¼x4" (8.3x10.2cm); **catalog #74352** overall measurements 4x6x8"H (10.2 x 15.2 x 20 cm), holds 12 sheets of film 4x5" (10.2x12.7cm).



74350	EMS Film Rack 3¼x4	each
74352	EMS Film Rack 4x5	each

► **Developing Trays**

Laminated styrene developing trays. Wide cross bars and perimeter ribbing provide rigidity and easy cleaning. 3" (76mm) deep.



74360	Size 8x10" Developing Tray	each
74361	Size 11x14" Developing Tray	each
74362	Size 16x20" Developing Tray	each
74363	Size 20x24" Developing Tray	each

Film Clips, See page 727 >>>>>

► **Air-Evac® Bottle**

For storing chemicals that are air and light sensitive. Suitable for use with all photographic chemicals. As chemicals are used, Air-Evac can be compressed forcing out extraneous air from the bottle contents. Cap is then replaced for an air tight seal.



74356	Air-Evac Bottle, 1 qt (0.95L)	each
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► **Graduated Pitchers**

Gracefully proportioned, molded pitchers with large comfortable handles and well designed pouring spouts. Metric graduations, and crystal clear to the eye (polymethylpentene). Resists heat to 175°C (374°F); it is shatter-proof and has excellent chemical resistance. Ideal for preparation of photographic chemicals.



74370	Graduated Pitcher, 1000ml	each
74371	Graduated Pitcher, 2000ml	each
74372	Graduated Pitcher, 3000ml	each

► Roll Film Washer

For complete washing of your roll film. The vacuum action will gently wash your film to archival standards. This conventional overflow washer lets water in from the bottom and the contaminated water out from the top. The vacuum action washer fills the water from the bottom, but quickly and automatically empties from the bottom by a vacuum syphon action, which discharges all contaminated water 2-3 times per minute. The vacuum action washer also protects your film from abrasions caused by high turbulence and unwinding of the reel, which happens in conventional washers. Holds 5: 35mm reels.



74386 Roll Film Washer each

► Rapid Print Washer

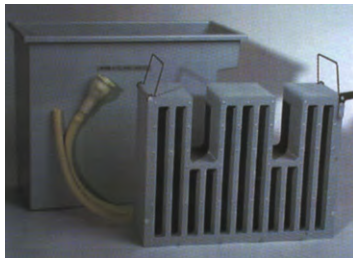
Water from 21 powerful jets runs constantly to separate and wash both sides of prints quickly and completely. Agitating water engages and dilutes the hypo, carrying it through the washer and out the opposite side quickly. The Rapid Print Washer accommodates 10 to 12 full-sized prints in one loading; all size films up to 11x14" (28x35.5cm). Internal measures: 13"x15½".



74387 Rapid Print Washer each

► Paterson® Auto Print Washer; Standard

Perfect for washing both RC and fiber-based papers. To use, prints are loaded into the cradle which is then lowered into the tank. Faucet pressure gently rocks the print cradle as water continuously exchanges. All prints remain separate and water freely circulates. The washer holds up to 12-8x10" or 24-5x7" prints. *



74353-10 Paterson® Standard Print Washer each

► Paterson® Auto Print Washer; Major

The Major Print Washer is similar to the standard one, but with a larger capacity and a built-in siphon for convenient emptying after use. The Major holds 12-11x14" or 24-5x7" prints. *

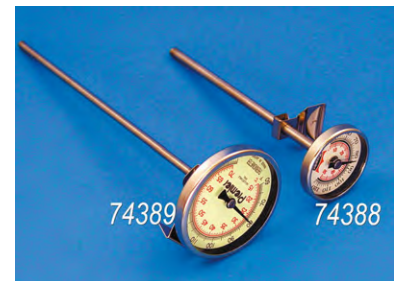


74353-20 Paterson® Major Print Washer each

* Note: For our international users: Standard and Major Print Washers will in fact accept prints to 10x12" (24x30cm) and 12x15" (30x28cm), respectively.

► Darkroom Thermometer

Precision Dial Thermometer: easy to read Fahrenheit and Centigrade scales. Hermetically sealed; water proof; will not fog; made from corrosion resistant stainless steel. Comes with an adjustable positioning clamp.



74388 Model A Thermometer each

74389 Model B Thermometer each

► Fluorescent Ruler



Fluorescent Scale in inches and centimeters. This metric/english plastic ruler is printed with a pink phosphorescent ink that glows in the dark. It is most useful for all fluorescent viewing and fluorescent photographic work. The scale will fluoresce visibly upon illumination with ultraviolet light and serves as a measure of nucleic acid mobility. The scale is 0 to 6" with 1/16" increments on one edge and 0 to 15 cm with 1mm increments on the other.

68137-01 Fluorescent Ruler each

► **Datamarker V Pens – Permanent Marker**

Write on anything. Perfect for every photo. Will not wash off even on resin-coated paper. Comes with a convenient pocket clip and it is permanent, smudge proof, and waterproof.



Catalog #	Description	Qty
72122-B	Datamarker, Fine Point, Black	each

► **Film Clip**

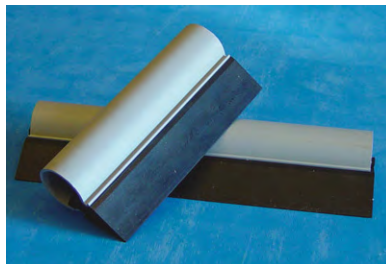
A stainless Steel Paper & Film Clip. Rust proof. Positive grip. Convenient for wall or wire hanging. Measurements: 3" (L) x 1 1/4" (W)



74385	Film Clip	2/pkg
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► **Smoother Squeegees**

The Clean Sweep Squeegee that outperforms all other squeegees. Unbreakable handle – Soft rubber blade – Acid resistant – long life – Scratch free – Lock in place – Ideal for applying window film.



74820	Film Squeegee, Size 6" Long	each
74821	Film Squeegee, Size 8" Long	each

► **Yankee Film Squeegee**

Made from rugged high impact styrene with a 4" long and 1" wide cellulose sponge. Easy to handle and it accommodates all films up to 4x5".



74822	Yankee Film Squeegee	each
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► **Paterson® RC Print Squeegee**

Extra soft rubber blades and a unique floating-action lower blade prevents any damage to the print surface. Suitable for both RC and fiber-based papers. The Print Squeegee handles prints up to 16x20" (40x50cm).

74823	Paterson® RS Print Squeegee	each
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► **Paterson® RC Rapid Drying Rack**

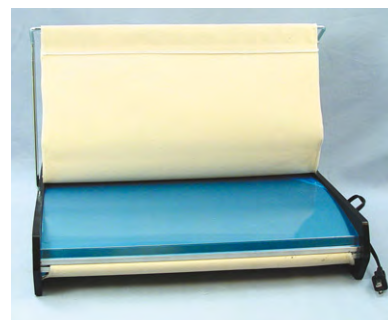
For air drying up to 20 RC prints in 15 min. Its compact design permits maximum ambient air circulation and prevents trapping of water between the print and the rack. The rack is also suitable for use with fiber-based paper. Print capacity: 5-11x14"; 10-8x10"; 20-5x7". Rack measures: 13 1/2" L X 8" W X 12" H



74839	Paterson® RC Rapid Drying Rack	each
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► **Thermostatic Dryer**

For RC and fiber base papers. It accommodates one 11x14", two 8x10" or eight 4x5" prints at once on each drying surface. Fast start; Quick drying; No over heating. Has maximum uniformity of surface heat. Made from a highly polished chrome Ferrotype metal. Drying surface: 12x17" (30.5x43.1cm)



74836	Thermostatic Dryer	each
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► **RC Filter Flow Air Dryer**

This RC Filter Flow Air Dryer means 5 minutes to perfect flat, and spotless RC prints or films. A built in Air Filter eliminates dust. It is thermostatically controlled for optimal drying temperatures. Accommodates four 11x14" prints. Overall measurements: 19 1/2 x 14 x 7 1/4" (H) (49.5 x 35.5 x 18.5cm)



74838	Flow Air Dryer	each
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► EMS Professional M3 Series Trimmer

Durable, accurate, and easy to use

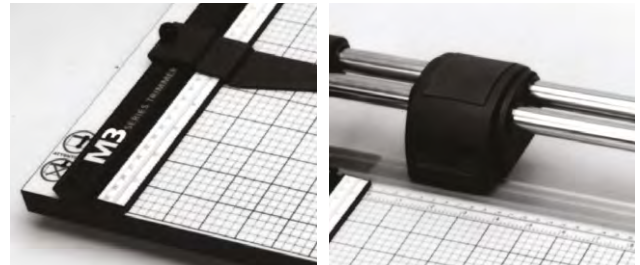
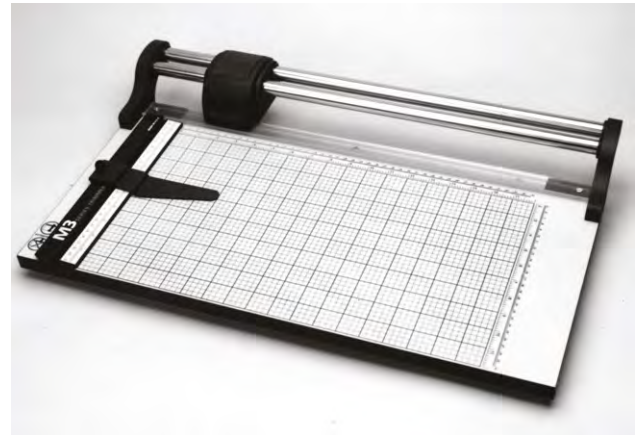
Our cutting head is made from die-cast alloy construction, which adds strength, maintains alignment, and guarantees years of service. It's molded to the shape of your hand with an exclusive Comfort Grip that makes repetitive work less fatiguing. Within the housing is a hollow-ground tool-steel rotary blade that is self-sharpening for a long life of clean, precise cuts.

Dual steel rails guide the cutting head with complete stability and precision for accurate, repeatable cuts. Four nylon bearings in the head further ensure quiet, effortless cutting. The extruded aluminum supports on each end lock in alignment. A transparent paper guide automatically holds material in place without risk of damage. An extruded aluminum alignment scale is factory-locked to be perfectly square to the blade edge. The alignment scale has measurements in inches and centimeters and accepts the Slide Guide for making repeatable cuts. The baseboard has a long lasting laminate finish that wipes clean in seconds. A durable, silk-screened registration grid, laid out in 1-inch increments, covers the baseboard for quick and easy measuring of any print or documents.

Designed for safety

The cutting blade is completely covered by the blade housing – making the M3 Series an ideal choice for schools, offices, darkrooms, selfservice print stations, and high volume production labs. The base rests on non-slip rubber feet.

Made in the USA. Backed by a five year limited warranty.



Ordering:

EMS M3 SERIES CUTTER

Catalog	Model	Cut Length	Dimensions	Weight
74885-18	M3-18	18"/45.7cm	24" x 15"	10.5lb / 4.8kilo
74885-24	M3-24	24"/61cm	30" x 15"	14lb / 6.3kilo
74885-36	M3-36	36"/91.4cm	42" x 15"	19.5 / 8.8kilo

Cutting lengths 42" and 54" also available, please call.

► Rotary Trimmer

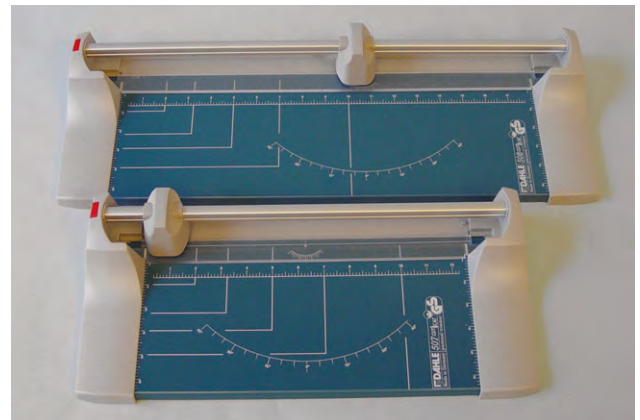
High quality, professionally styled, yet economically priced

FEATURES:

- Self-sharpening, high quality steel rotary cutting blade.
- Shielded blade assures safe operation.
- Clear plate permits alignment during set up and cutting.
- Steel working surface. Calibrated in inches. Color coordinated in black and beige.

Cutting size: 18", measures: 22"x7"x2"

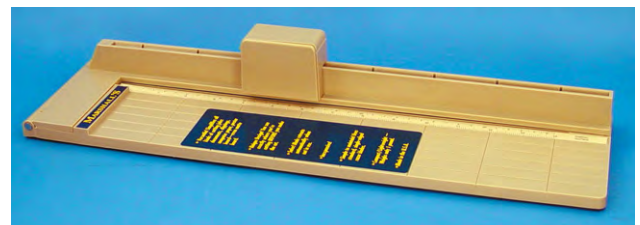
70868	Rotary Trimmer, 18"	each
70867	Rotary Trimmer, 12"	each



► Print Trimmer

Unique features: super sharp cutting edge, using a standard single edge razor blade. Unobstructed view of the cutting process. Safe, fully enclosed retractable blade. Light weight (1lb), handles prints up to 14". Measurements: 5½"x17½"

70860	Print Trimmer	each
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▶ Rotatrim® Mastercut; Quality Rolling Trimmers

The High End Cutters

1. Dualrail Cutters

For precision cutting. It can slice through tough materials like cardboard, litho plates, mount board, and even 1/16" hardboard; yet, Rotatrim® also has a delicate touch, trimming film, paper, and dry mount tissue to hairline tolerances. Known for its safe operation and best performance, the rotary blade is Sheffield tungsten steel, self-sharpening, and is completely shielded by a protective housing. Its self-sharpening blade assures consistent cutting quality. Exclusively from Rotatrim®, its **double steel tube** suspension guides the cutting head with the stability essential for accurate, repeatable cuts. An **extruded aluminum squaring arm** incorporates a combination inch/metric measuring scale and accepts the accessory side guide. A **Transparent clamping strip**, holds material in place without risk of damage.

Its durable, high pressure laminate in a handsome photogray finish keeps the baseboard warp-free, long lasting, and easy to clean.

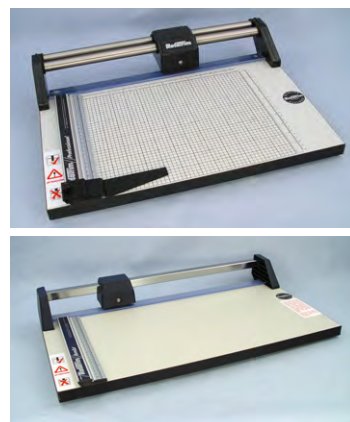
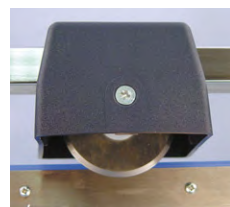


Catalog#	Cut Size	Dimensions	Weight
74880-12	12" (31cm)	17.5x15" (46x39cm)	10lbs (4.6kg)
74880-15	15" (39cm)	21.5x15" (56x39cm)	11.5lbs (5.2kg)
74880-17	17.5" (45cm)	24x15" (64x39cm)	12lbs 5.6kg
74880-24	24" (64cm)	30.5x15" (80x39cm)	15lbs (6.9kg)
74880-30	30" (77cm)	36.5x15" (96x39cm)	17.5lbs (8kg)
74880-36	36" (94")	42.5x15" (110x39cm)	22lbs (10kg)

2. Monorail Cutters

Designed for those applications that do not require the industrial rating of the Rotatrim® Mastercut Series. It accurately trims papers and lightweight boards up to 3/32" (2mm) thick. It also has a delicate touch, trimming mounting materials, laminates and films.

The Monorail has a strong, square rail which securely holds and guides the cutting head for accurate, precise results. The rotary blade is a hardened Sheffield carbon steel, spring-tensioned and self-sharpening. The Monorail Cutters feature the same baseboard, clamping strip, and squaring arm as the Dualrail Cutter.



Catalog#	Cut Size	Dimensions	Weight
74881-16	16" (42cm)	22.5x15" (58x39cm)	12lbs (5.6kg)
74881-26	26" (68cm)	31.5x15" (80x39cm)	15lbs (7kg)

▶ RotaTrim® Cutter Accessories

1. Side Guide

It mounts on the squaring arm of the cutter, slides to the desired position and locks in place. It is used when cutting sheet materials to identical lengths. It can be used with either the Dualrail or the Monorail RotaTrim® Cutters.

74882-10	RotaTrim® Side Guide	each
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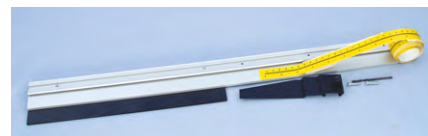


74882-10

2. Extension Arm

It replaces the standard squaring arm and extends beyond the baseboard to help align and measure wider materials (without the need of buying larger cutters). Choose the 24" (61cm) or 36" (91.5cm) length.

74882-24	RotaTrim® Extension Arm, 24"	each
74882-36	RotaTrim® Extension Arm, 36"	each



74882-24

3. Replacement Parts

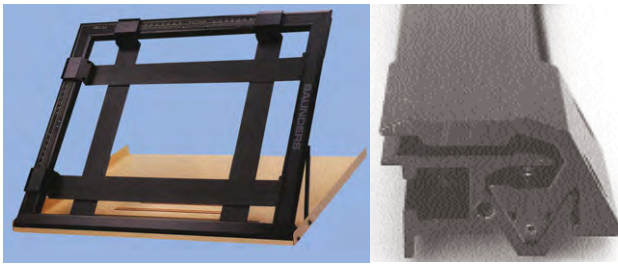
For Rotatrim® Dual-Rail and Monorail Cutters

74883-10	Cutting Wheel	each
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74883-10

► V-Track™ Professional Easel

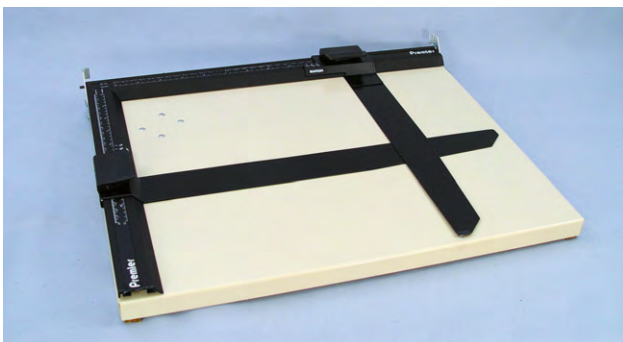


The V-Track 4-bladed enlarging easel is a complex extruded outer frame designed to provide maximum strength, stability, and flawless alignment; inside the frame is the "V" shaped track which the four blade actuators glide. Each actuator, shaped to fit precisely into the track, rides on two spring-loaded, PTFE-filled bearings which are captive inside the V-track groove. The result is a blade actuator which precisely and automatically maintains alignment. A counter-balanced frame assembly with dual lift arms holds the easel open and frees your hands for paper loading.

- V-Track™ Easel size: 11x14". Guide slots for 5x7, 8x10, and 11x14 paper. Dimensions: 27¾ x 18½ x 1". Weight: 14.3 lbs.
- V-Track™ Easel size: 16x20". Guide slots for 5x7, 8x10, 11x14, and 16x20 paper. Dimensions: 27¾ x 23½ x 1". Weight: 27.6 lbs.

74860-14	V-Track™ Enlarging Easel, 11x14"	each
74860-20	V-Track™ Enlarging Easel, 16x20"	each

► Two-Band Enlarging Easel



This two-band enlarging easel eliminates slip ups. Bands have perfectly square margins. They will not shift once positioned, but they can be moved if desired by applying pressure to the control knobs.

74375	Easel Size 8"x10"	each
74376	Easel Size 11"x14"	each

► Saunders/SLP 670-Series Medium Format Enlargers

The 670-series enlargers accept all negative formats up to 2¼"x 2¼" (67cm) and share the same chassis assembly, negative carriers, and lensboards. The lamp-houses are interchangeable and their differences are noted under each catalog number.

All 670-Series enlargers have the following features:

- A massive, aluminum girder locks into a die-cast base-sturdy and vibration-free. It permits 18X magnification from 35MM. The anodized black girder comes with a reference scale.
- A counterbalanced, die-cast carriage with nylon bearings offers smooth and effortless travel.
- Precise focusing - through double rail, lash-free, adjustable friction drive controls. Left/Right-handed focusing knobs are standard. An extra long bellow facilitates small prints or reductions.
- A large baseboard allows you to print 16x20's. All surfaces are laminated and the edges are vinyl banded.
- Extremely high-quality, hinged negative carriers in both glass and glassless models.



Note: Easel shown is not included.

SPECIFICATIONS:

Maximum Format	2¼"x2¼" (6x7cm)
Base Dimensions	18"x23"x1"
Girder .....	.42"
Max. Height	48" (Carriage fully raised)
Electrical	120VAC, 50/60Hz
Magnification	17.6X (35mm neg., 50mm lens)
on baseboard	8.6X (6x6cm neg., 75mm lens)
Lens Mount	Standard 39mm thread on reversible, rotating, quick-change lensboard
Shipping.....	Supplied in two cartons

Carton	Contains	Dimensions	Weight
#1	Chassis/Head Assembly	45.5x9.5x12.5"	35.0 lbs
#2	Baseboard	26x20.5x3.5"	13.5

1. 670-MXL Dichroic Color Enlarger

- Dichroic lamphouse with stepless 0-200 (Cyan 0-170) continuously.
- Color-coded, illuminated filtration scales in 1cc increments.
- White light focusing and safety indicator.
- Converts in minutes to full-featured slide duper. An accessory kit is required (Cat#74867-40, sold separately).
- Supplied with 12V/100W Quartz-Halogen lamp (EEP) & 6x7 mixing chamber.
- Includes standard removable power supply; Leica-threaded.
- Negative carrier, red filter assembly and lens not included.

74865-10 670-MXL Dichroic Color Enlarger each

2. 670-CXL Triple Condenser Enlarger

- Triple condenser lamphouse with all glass optics.
- Condenser matched to all formats up to 6x7cm.
- Supply with 75W/120V opal lamp (PH140), safety filter and two-way lensboard.
- Negative carrier and lens not included.

74865-20 670-CXL Triple Condenser Enlarger each

3. 670-VCCE Dichroic Auto Variable Contrast

- Dual filtration channels in one head. Channel one is calibrated for Kodak Polycontrast III RC paper(grade 0-5); Channel two is calibrated for Ilford Multigrade III RC paper and compatible papers (grade 0-5).
- Memory-Lock™ white-light system for easy focusing.
- It has variable contrast/contrast exposure printing capabilities. The channels have built-in neutral density, which allows for consistent exposure for the full range of paper grade selections.
- Has a continuous variable dial for desired paper grades. Filtration is achieved with cut-off dichroics. For new Kodak Polymax RC papers, supplementary filters are supplied to cover the expanded -1 to +5 range.
- 12V/100W Quartz-Halogen lamp & 6x7 mixing chamber supplied.
- Negative carrier and lens not included.

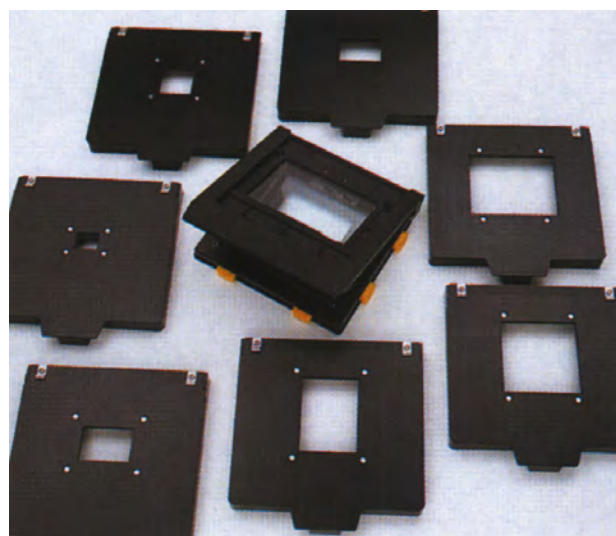
74865-30 670-VCCE Dichroic Enlarger each

► **Components for 670-Series:**

74866-10	Dichroic Head and Power Supply Only	each
74866-15	Triple Condenser Head Only	each
74866-20	VCCE Head Only	each

*Owners of the 670-CXL Triple Condenser Enlarger who wish to purchase the 670-VCCE, will need to order the Standard Dichroic Power Supply (Cat. #74866-35). Those whom already own the 670-DXL or MXL should purchase the head only.

74866-30	Chassis and Baseboard only (Becomes a heavy-duty camera copy stand with the addition of Cat# 74869-20 Copy Camera Adaptor)	each
74866-35	Standard Dichroic Power Supply (Replacement part)	each



► **Negative Carriers**

- Professional quality, with black, anodized aluminum construction.
- Hinged for quick handling.

1. Glassless, Sandwich Type Negative Carriers

74867-10	35mm Full Frame Format	each
74867-20	126 Format	each
74867-30	2¼ x 2¼" (6x6cm) Format	each
74867-35	2¼x 2¼" (6x7cm) Format	each
74867-40	Mounted 35mm Slide	each

2. Universal Glass-Type Masking Negative Carriers

- Features four individually adjustable masking blades and removable glass inserts.
- Accepts accessory anti-Newton glass.
- Top and bottom glass can be removed to convert it to a single-size glassless carrier by means of lock-in inserts.

74868-10	Universal Glass-Type Carrier	each
74868-20	Insert for 35mm Negatives	each
74868-25	Insert for 110 Negatives	each
74868-30	Insert for 126 Negatives	each
74868-40	Anti-Newton Top Glass	each
74868-45	Replacement Standard Glass	each

► **Accessories & Replacements For 670-Series:**

A double-stage, 5:1 geared fine-focusing knob which replaces the standard knob for very critical focus control.

74869-10	Fine Focusing Attachment	each
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An extra-heavy, machined camera stage that replaces the lamphouse projection assembly to convert the enlarger into a heavy-duty camera copy stand; single knob conversion; no tools required.

74869-20	Copy Camera Adapter	each
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Complete tools which are needed to turn the 670-MXL enlarger into a professional, full-featured slide duplicator.

74869-30	Slide Duping Kit for 670MXL	kit
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A pair of L-shaped supports for printing long rolls of film. It prevents damage to the film.

74869-35	Film Hanger Kit	kit
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74869-50	Quartz-Halogen Lamp For 670-DXL & VCCE	each
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74869-55	Opal Lamp For 670-CXL	each
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► Saunders/LPL 4x5" Enlargers:

► Series 4550XLG and 4500-II

These enlargers have common a lamphouse and chassis configuration with different slide-in filtration modules, depending on the model. 4x5" enlargers accept all film formats from 35mm to 4x5".

The 4550XLG has a longer column and an extended chassis, a larger baseboard, and a higher output lamp.

All Saunders/LPL 4x5" Enlargers Feature:

- A massive oversized column assuring strength, rigidity, and a vibration free environment.
- A factory-aligned carriage and column for perfect alignment and elevation.
- A convenient elevation system with a hand grip for rapid lifting and a drive knob for finer changes. It has a separate locking knob.
- Voltage-stabilized, solid-state power supply with US electronics
- Diffusion illumination.
- An Interchangeable Diffusion Chamber and Light Multiplier (4x5" supplied), and rotating lens boards.
- Built-in, vibration-free, noiseless blower and a heat sink.
- A fully counterbalanced carriage.
- Geared, dual-range, fast-fine focus control.
- Dual stainless steel focusing rails.
- Extra-long, heavy-duty extruded girder.
- A fully laminated, oversized, neutral gray baseboard with a vibration-dampening double plate.

Supplied with: Quartz-Halogen lamp. Regulated solid-state power supply. Swing away combination red safety filter and under-the-lens-holder.

Does not include: A negative carrier, lens or lens mount (see accessories list).

Ordering:

► Model 4550XLG Enlargers

These models come with the following additional features:

- Supplied with 250 watts, 82 volt EVW quartz-halogen lamp for 25% greater light output.
- Improved ventilation.
- A Whisper Tone™ muffling fan system for quiet operation.
- The fan is mounted on shock-dampening bearings to eliminate vibration.
- Extra-long column and oversized baseboard allows 20x24" enlargements of 35mm negatives (using 50mm lens).
- An extended carriage increases the distance from the column to the lens axis by 2½" which allows for use of a larger easel (20x24").

Available in three models:

1. Model 4550XLG Color Dichroic

- As described. Includes Dichroic Filtration Module with 0-200 yellow, 0-200 cyan, and 0-170 magenta stepless and continuously variable filtration.
- Permanent, fade-free dichroic filter. Color coded, illuminated filtration scale calibrated in 1cc increments.
- Memory-Lock™ while light focusing.
- Two f-stop light attenuator.

74870-10 4550XLG Color Dichroic Enlarger each



Note: Easel shown is not included.

2. Model 4550XLG Variable Contrast/Constant Exposure (VCCE)

- As described. Includes a special Dichroic Filtration Module calibrated for the filtration requirements of Ilford Multigrade III variable contrast paper.
- Instantly set for the Ilford filter equivalent (conversion chart supplied for Kodak papers).
- Automatic neutral density (ND) filter keeps exposure times constant throughout the contrast range.

74870-20 4550XLG VCCE Enlarger each

3. Model 4550XLG Black & White Diffusion

- As described with same quartz-halogen/diffusion system for fast B&W printing and the scratch and dust suppression characteristics of diffusion-type light sources.

74870-30 4550XLG B&W Diffusion Enlarger each

► **Model 4500-II Enlargers**

This is a valuable 4x5" enlarger, with all of the features listed.

1. Model 4500-II Color Dichroic

- As described. Includes Dichroic Filtration Module with 0-200 yellow, 0-200 cyan, and 0-170 magenta stepless and continuously variable filtration.
- Supplied with 200watt/82volt (EYA) Quartz-Halogen lamp with integral dichroic reflector.
- Permanent, fade-free dichroic filters. Color-coded, illuminated filtration scales calibrated in 1cc increments.
- Memory-Locks™ instant while light focusing.
- Two f-stop light attenuator.

74871-10 Model 4500-II Color Dichroic each

2. Model 4500-II Contrast/Constant Exposure (VCCE)

- As described. includes a special dichroic filtration module calibrated for the filtration requirements of Ilford Multigrade III variable contrast paper.
- Instantly set for the Ilford filter equivalents (conversion chart supplied for Kodak papers).
- Automatic neutral density (ND) filter keeps exposure times constant throughout Multigrade contrast range.

74871-20 Model 4500-II VCCE Enlarger each

3. Model 4500-II Black & White Diffusion

- As described with same quartz-halogen/diffusion system for fast B&W printing and the scratch and dust suppression characteristics of diffusion-type light sources.

74871-30 Model 4500-II B&W Enlarger each

► **Components for Series 4 X 5 Enlargers**

Interchangeable Slide-in Filtration Modules.

Fits all Saunders/LPL 4550XLG and 4500-II enlargers. Both models are easily converted by switching the modules.

74872-10	Color Dichroic Module	each
74872-20	VCCE Dichroic Module	each
74872-30	Black & White Module	each

► **Negative Carriers For Both 4550XLG and 4500-II**

- All aluminum precision carriers.
- Hinged sandwich design for fast handling and loading.
- Guide pins automatically position negatives in line with carrier aperture.
- Offset tabs permits rapid opening of carrier.
- All 4500 Carriers can be used on Omega D5 Enlarger.
- Both glass and glassless are available as follows:

Glassless, Hinged, Sandwich-Type Carriers

74873-20	35mm Full Frame Carrier	each
74873-21	Mounted 35mm Slide Carrier	each
74873-22	2¼ x 1½" (6x4.5cm) Carrier	each
74873-23	2¼ x 2¼" (6x6cm) Carrier	each
74873-24	2¼ x 2¾" (6x7cm) Carrier	each
74873-25	2¼ x 3¼" (6x9cm) Carrier	each
74873-26	4x5" Carrier	each

SPECIFICATIONS:	4550XLG	4500-II
Baseboard	31½x23¾x1"	23¾x23¾x1"
Girder	53x4¼x3½"	47x4¼x3½"
Carriage fully raised, Hgt	59"	53"
Max. bellows extension	9"	9"
Bellows	6½x6½"	6½x6½"
Net weight (inc. Power supply)	61 lbs	61 lbs
Electrical: Input	120VAC, 50/60Hz	120VAC, 50/60Hz
Output	82V	82V

Shipping: Supplied in 3 cartons:

#1 (Lamphouse/Carriage)	35 lbs	35 lbs
#2 (Girder Column)	18 lbs	15 lbs
#3 (Baseboard)	22 lbs	20 lbs

Important Note: The column and carrier of these enlargers are factory matched. Carton #1 and #2 have been marked with a serial number at the factory. The head and column themselves are also numbered. It is mandatory that the customer receive cartons with matching serial numbers.

► **Lensboards for All 4550XLG and 4500-II Enlargers**

1. 39mm Threaded (Leica) Lensboard

- For 40/60/80mm, Rogonar 50mm, Rogonar SC 50/75mm, Rogonar S 25/35/50/90/105mm, Rodagon 28/35/50/60/80/105/135, APO Rodagon 50/90mm, SCHNEIDER Componon W/A 40/60/80mm, Comparon 50/75/135mm, EL NIKKOR 50/63/75/80/105/135mm.

74874-39 39mm Threaded (Leica) Lensboard each

► **Accessories & Replacement Parts for 4 X 5" Enlargers**

Extension Tube/39mm Thread

Accepts Leica-threaded (39mm) lenses to permit 1:1 size printing of 4x5" negatives.

74875-10 Extension Tube/39mm Thread each

Four-Bladed Masking Attachment

- Mounts on the negative stage in place of standard negative stage plate to provide masking with optional 4x5" glass (universal) carrier.
- Cab can also be used with the standard glassless carriers.

74875-20	Four-Bladed Masking Attachment	each
74876-10	4x5" Enlarger Power Supply	each
74876-20	200W/82V Quartz-Halogen Lamp (EYA) (for 4500-II only)	each
74876-30	250W/82V Quartz-Halogen Lamp (EVA) (for 4550XLG only)	each
74876-40	Glass, Standard, 4x5" (Bottom replacement for 4x5" carrier)	each
74876-50	Glass, Anti-Newton, 4x5"	each

For our Photomicrograph Scale Marker, See page 168 >>>>

Dusting Products; Compressed Gas; Mini Vac, See Cleaning Section, pages 945-947, 953 >>>>

Lint Free Gloves, See Cleaning Section, see page 948 >>>>

Cotton Gloves, See Cleaning Section, see page 948 >>>>

► Enlarging Focusing Aids

1. Mini-Sight Grain Focuser

A 12X power grain focuser without a high power price tag. Comes with a high power viewing lens. A Mikodot Mirror makes the Mini-Sight a high focusing device. Made from all metal construction, the Mini-Sight, makes dark negatives appear lighter and focusing is easier. The focuser comes complete with the mirror and lens cap. Stands only 5-3/4" high.



74856-12

2. Micro-Sight Grain Focuser

A 25X power grain focusing magnifier for absolute critical sharpness. The Micro-Sight has a large, high quality triple element achromatic lens and a suspended hair-line reticule. As well it possess a Mikodot Super-bright Mirror for brightness and sharpness of the images. With its large flat-field viewing area it can be used to test for enlarger vibration and auto-focus tracks as well as checking the resolving power of lenses and the accuracy of the negative carrier and whether the negative carrier is absolutely parallel to the easel.



74856-25

3. PEAK Model I Enlarging Focuser

This focuser ensures sharp focusing of your photoenlarger not only at the picture center portion, but also at any position within the picture area. Features a 10X eyepiece in 2-groups, 3-elements. It's angle of acceptance is 30°. Mirror size: 86mm x 26mm. Includes a BG filter for use with black and white films.



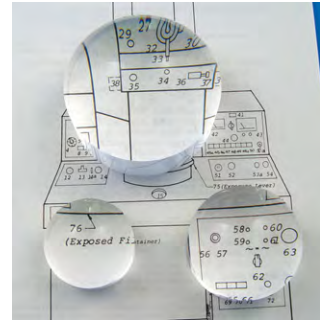
74857-10

ORDERING:

74856-12	Magnasite Mini-Sight Grain Focuser	each
74856-25	Magnasite Micro-Sight Grain Focuser	each
74857-10	Peak Model I Enlarging Focuser	each

► Light-Gathering Magnifiers

Made from solid grounded acrylic (not molded) and polished like a glass lens. Crystal clear and pre-focused. There are no bulbs or batteries needed. Available light is nearly four times brighter in the subject area. Available in three sizes:



1. Magnabrite™ 90mm 4X Light-Gathering Magnifier

FEATURES:

- Magnifies the viewing area by 4X, while intensifying available light and focusing it on the subject area.
- An "Infinite eyepoint" eliminates the need to keep the eye close to the magnifier. Can be viewed from any distance, at any angle. It reduces eye strain and allows several people to view the same object at once.
- Its 90mm base is concave which reduces the risk of scratching the film.
- The light comes with a drawstring storage pouch.

74393-90 Magnabrite™ 90mm each

2. Magnabrite™ 64mm 4X Light-Gathering Magnifier

FEATURES:

- Same features as (Cat.# 74393-90), but with a 64mm diameter base.

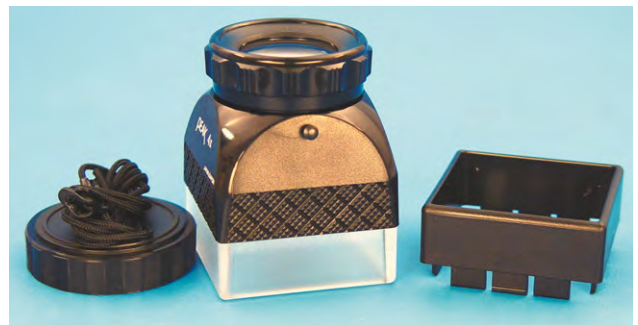
74393-64 Magnabrite™ 64mm each

3. Magnabrite™ 51mm 4X Light-Gathering Magnifier

FEATURES:

- Same features as (Cat.# 74393-90), but with a 51mm diameter base.

74393-51 Magnabrite™ 51mm each



► PEAK Achromatic Magnifier; 4X

Uses high-resolution achromatic lenses whose chromatic aberration has been corrected. With its wide square Field-of-View (45x45mm) and its interchangeable semi-transparent black skirt, this unique magnifier offers you a variety of uses for precision work. Fine focus adjustment with multi-groove screw helicoid system gives you very smooth operation. Neck strap is included.

- Magnification: 4X
- Size: 51x65x51mm
- Field of View: 45x45mm
- Net Weight : 80g

68128-04 4X Achromatic Magnifier each

► **Standard Paper-Safe**

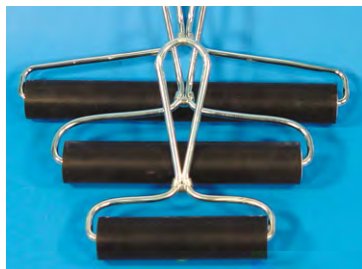
Light proof protection for film and paper. No more fussing with frayed cardboard boxes. Exclusive "Tilt and Tap" feature for easy single sheet removal. Holds 200 Single Weight sheets. Measures 8½"x11" for 8x10" paper.



74377 Standard Paper Safe each

► **Testrite® Print Rollers**

These rollers are lightweight and sturdy, offering fine smooth action, yet they have ample strength to efficiently remove surplus water from prints and distribute an even pressure.



74844-04 Testrite Print Roller, 4" Wide each
74844-06 Testrite Print Roller, 6" Wide each
74844-08 Testrite Print Roller, 8" Wide each

► **Blotter Books**

Chemically pure lintless blotting paper. It dries prints without staining or scratching.



74805 Blotter Book, Size 9x12" each
74806 Blotter Book, Size 12x18" each
74807 Blotter Book, Size 18x24" each

► **Mottler Brush**

Brush, fine goat hair. For dusting negatives before printing.



74366 Mottler Brush, 1" (25mm) Wide each
74367 Mottler Brush, 2" (50mm) Wide each

► **Cutting Mats**

Cutting Mats will protect all table-top surfaces from knife cuts. Its smooth surface permits straight, even cutting and the cut mark heals instantly. Each mat is printed with both ½" and 1" grid patterns to aid in measuring and aligning work. Available in translucent white, which allows for cutting and trimming on a light box surface.



77621-12 White Translucent 8-1/2"x 12" Mat each
77621-18 White Translucent 12"x 18" Mat each
77621-24 White Translucent 18"x 24" Mat each

► **Kodak Lens Cleaner**

For quick, safe removal of foreign matter from the surface of all optical glass.

74315 Lens Cleaner, 1½ oz. each
74316 Lens Cleaner, 16 oz. each



► **Lens Cleaner**

Newly introduced! An anti-fog and anti-static lens cleaner, with action up to 7 days. It is safe for glass and plastic lenses.

74314-04 Anti-Fog/Static Lens Cleaner 4 oz



► **Film Cleaner**

It cleans positives & negatives. It removes tape-marks, grease, pencil, ink, dirt, smudges, and fingerprints. Leaves no residue.

74317 Film Cleaner, 16 oz can each



► **Lint and Dust Remover**

Recommended for the removal of microscopic dust from magnetic tapes and heads, optic and camera lenses, general microscope areas, computers, etc.

74318 Lint & Dust Remover, 12 oz can, 7 fl oz each

► **Specialty Film Cleaner**

Cleans diazo film, silver film, color trans-parencies, screen tints, scanner drums, contact screens, etc. Non-flammable, and will not leave any residue.

74319 Specialty Film Cleaner, 20 oz can, 9.5 fl oz each





► EMS ROR (Residual Oil Remover)

EMS is proud to introduce the ROR-It is not a lens cleaner in the usual sense-it goes far beyond what a routine cleaner does. ROR is specifically designed to emulsify and remove microscopic oil residues- a by product of environmental pollution –from the surface and pores of glass and plastic.

When you clean an optical surface with ROR you will observe a measurable difference in brightness and clarity. For the first time, you will experience pollution free, unimpeded vision. Because ROR removes microscopic oil residues, dust has nothing to adhere to allowing the surface to remain cleaner longer.

ROR is safe and versatile for all delicate surfaces. It has been tested and used on everything from multicoated lenses to beryllium surfaced contacts and has proven time and again to be the finest and safest optical cleaning treatment on the market today.

Invented 25 years ago with professional and amateur photographers in mind, ROR is used today by the military, NASA, astronomers, scientists, hospitals, laboratories and universities.

Protect your investment through regular ROR cleaning and maintenance and your equipment will endure and perform excellently for years to come.

The cleanser is available in either a Dropper bottle or a Pump style bottle

Instructions for Use:

The most likely source of damage to glass surfaces and sensitive optical coatings is abrasion caused by rubbing the fine particles that are resting on the surface. Never “dry clean” a lens because that will guarantee scratching and abrading of the coating.

ROR recommends:

- Use a can of compressed air or a camel hair blower brush to remove any particles that may be resting on the surface.
- Place a few drops or spray a little ROR on the surface, let the solution settle for a few moments then wipe gently with a lens cleaning cloth or tissue making sure that you use as much of the clean area of cloth or tissue, each time you wipe. If you are working on a small surface, squeeze a few drops or spray some ROR onto the applicator that you are using and commence the cleaning as described above.
- Apply enough pressure to effectively clean the optical surface.
- Use a clean cloth or tissue to do a final wipe of the surface, again using sufficient pressure for each additional motion.
- Use a professional task wiper to apply and remove ROR with. These soft, chemical free, non abrasive tissues offer great absorbency and streak free cleaning on sensitive surfaces. If you have to use a generic variety of tissues, make sure it is untreated.
- Untreated micro-fiber cloths also work well as long as you wash them frequently and keep them dust free in a pouch or container. Be sure to check the make-up of your micro-fiber cloth before using with ROR. Treated micro fiber cloths can integrate poorly with ROR, leaving a residue on the surface. We recommend you wash and dry the cloth before proceeding with your application.

► Ultra Brush

The ULTRA BRUSH is totally different than standard camel hairbrushes. Its unique fibers are ultra-soft allowing for the cleaning of delicate surfaces of camera lenses, binoculars, telescopes and other fine optics. The ULTRA BRUSH fully retracts within the base to completely protect the brush ends. Guaranteed to be the softest lipstick style brush you can buy.



60611 Ultra Brush each

Applications:

ROR has many uses for your business, home and hobbies.

It is one of the most versatile cleaning agents available. We are constantly amazed to hear from our customers about yet another use for our product. Just recently we were contacted by a church pipe organ technician who told us that nothing cleans keyboards and organ parts better than ROR! The list goes on and on.

- Camera Lenses
- Filters
- Camera Surfaces
- Video Camera Lenses
- Video Camera surfaces
- Microscope Lenses
- Touch-screen Surfaces
- Multi-touch Optical Surfaces
- Projection Lenses
- Telescopes
- LCD Displays
- Television, Computer and Studio Monitors
- Security and Surveillance Cameras
- Flat Screen TVs
- Binoculars
- Spotting Scopes
- Night Vision Optics
- Transits
- Eyeglasses
- Gun Scopes
- Medical Lenses
- Scanners
- Cell Phone Screens
- CDs and DVDs
- VCR Heads
- Museum Acrylic Optical Surfaces

Ordering Information

Cat. #	Description	Qty.
74319-30	ROR Lens Cleaner 1 oz., Dropper style	each
74319-35	ROR Lens Cleaner 2 oz., Pump style	each

► Formula MC; Multi-Coated Filter And Lens Cleaner

A unique cleaner that handles the delicate cleaning requirements of multi-coated filters as well as lenses.

- No smear, no residue.
- Cleans standard or multi-coated optics.
- Handy 1 oz. dispenser bottle.



74314-01 Formula MC Lens Cleaner each

➤ **Static Eliminators:**

➤ **Anti-Static Spray**

It stops static build-up on optics, disc drives, photographic materials, lenses, metal rollers; any where that static may generate.

60615 Anti-static spray, 20 oz can, each
14 fl oz



For more Static Eliminators, See page 947 >>>>



➤ **Zerostat Anti-Static Gun**

This device operates on a piezoelectric effect to emit positive (trigger squeeze) and negative (trigger release) charges to neutralize static on virtually any surface. The gun emits no radioactivity and it does not require electricity or batteries. The unit measures 4 x 6".

60610 Zerostat Anti-Static Gun each

➤ **Anti-Static Brushes**

Eliminates static electric charges and removes dust, lint and other particles from negatives and lenses with one quick operation. These non-chemical, non-radioactive, synthetic brushes use the natural principle of resistance flow to obliterate dust and the static electricity that attracts it. They are absolutely safe on all photographic surfaces and emulsions, great for computer monitors and glass screens as well. They can be cleaned with soap and rinsed with water. They never need "recharging" and will last a lifetime with proper care. Short: A 4" (10.5cm) long carbonized plastic handle, 4" brush. Weight 1oz (28g).



60612-04 Short Anti-Static Brush each

➤ **StaticMaster Brushes:**

Eliminate static electric charges, and remove dust, lint and other foreign particles in one quick operation. StaticMaster contains Polonium210 element' which emits low energy alpha particles. Alpha particles are non-penetrating, stopped completely by a thin sheet of paper or a few inches of air. By ionizing the air in the immediate vicinity of the film, lens, etc., a conductive path is provided through which the static charge is safely and effectively grounded.

➤ **1. StaticMaster 1C200**

This 1" model cleans negatives, mounted or unmounted transparencies, cameras, and smaller enlarging lenses. It is ideal for use with 35mm or 2 1/4" x 2 1/4" film formats. In addition, this model is perfect for removing static and dust from the inside of cameras as well as other equipment. Brush of soft, natural hair removes dust and lint.



60613-1C StaticMaster 1C200 each

➤ **2. StaticMaster 3C500**



The 3" model cleans large areas quickly and effectively. Its brush is retractable to just a desired length making it perfect for use with 4 x 5 or smaller film formats. It is also handy for cleaning enlarger condenser lenses, film holders, and other large surfaces. While the active element is 2" wide, in one stroke it actually eliminates static across a 4" area. For cleaning very large areas, such as 8x10" films, two or more 3" StaticMaster may be joined together with easy-to-install StaticMaster Connectors are available separately.

60613-3C StaticMaster 3C500 each

➤ **3. StaticMaster Replacement Cartridges**



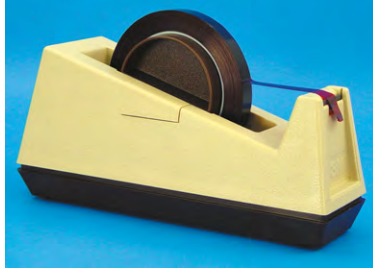
The StaticMaster has a useful life of at least one year. The element gradually loses its power to neutralize static and should be replaced. For this reason, StaticMasters are stamped with an expiration date. You can easily install a new cartridge without returning the brush to the factory.

60613-1R 1" Replacement Cartridge each
60613-3R 3" Replacement Cartridge each

► Photo Mounting Tapes Sprays and Adhesives:

► Scotch C-25 Heavy Duty Dispenser

Durable and economical; high impact resistant plastic dispenser. It features a permanently attached tape drum to eliminate loss. A rubber base prevents slipping. Two tone brown and beige. Holds tape up to 1" wide. 3" core.



77000 Tape Dispenser each

Scotch 665 and 666 Double Coated Tape, See Scanning Section, page 649 >>>>>

► Scotch 811 Removable Magic Tape

This transparent tape can be removed as easily as it goes on. Ideal for taping before photocopying, leaving notes and memos, taping transparencies onto frames, etc., 3" core.



77200 Removable Magic Tape $\frac{3}{4}$ " x 72 yds each
77210 Removable Magic Tape $\frac{3}{4}$ " x 72 yds 5bx/lot

► Scotch 810 Magic Tape

The ever popular tape that is invisible when applied. Can be written on. Resists yellowing, cracking, and moisture. Ideal for mending, slicing, and many other permanent applications. 3" core.

77300 810 Magic Tape, $\frac{1}{2}$ " x 72 yds each
77310 810 Magic Tape, $\frac{1}{2}$ " x 72 yds 5bx/lot

► Scotch 235 Photographic Tape

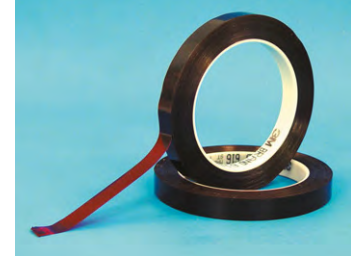
Black, crepe paper, pressure-sensitive tape that is designed for use in commercial as well as private photography. It can be used for making negatives, positives, and transparencies. Conformable, opaque, and it has low light reflectance. 3" core.



77400 235-Photographic Tape, $\frac{1}{2}$ "x60 yds each
77410 235-Photographic Tape, 1"x60 yds each

► Scotch 616 Lithographer's Tape

This ruby-red transparent tape is for use in opaquing, stripping, and edging on film materials. 3" core.



77500 616-Lithographer Tape, $\frac{1}{2}$ "x72 yds each
77510 616-Lithographer Tape, $\frac{1}{2}$ "x72 yd 5roll/lot

► Scotch 850 Tape

Good for making glass knife boats as well as for hanging, protecting and stripping. 3" core.



77700 Silver Tape $\frac{3}{8}$ " x 72 yds each
77701 Silver Tape $\frac{1}{2}$ " x 72 yds each
77710 Gold Tape $\frac{3}{8}$ " x 72 yds each
77720 Black Tape $\frac{3}{8}$ " x 72 yds each

Write-On™ Color Coded Label Tape, See Tape section, page 1144 >>>>

Write-On™ Tape Dispenser, See Tape section, page 1144 >>>>

Multi-Roll Write-On™ Tape Dispenser, See Tape section, page 1144 >>>>

► Photo Gloss Spray

Photo-gloss spray adds high gloss finish and permanent protection to the photo. It enhances highlights, increases contrast, protects prints from dust, fingerprints, and water.

77601 Photo Spray, 16 oz each

► Photo Matte Spray

It offers surface protection. Eliminates glare and hotspots in photographs.

77602 Photo Matte Spray, 16 oz. can each

► Rubber Cement

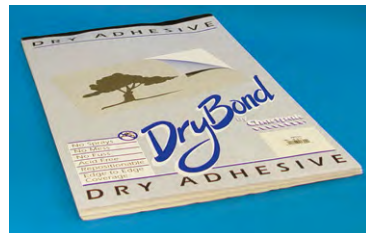
Excellent adhesive for all paper pasting and mountings of drawings and photographs. It is also used to adhere specimens to SEM Stubs. Any excess cured cement can be easily removed. 4 oz bottle comes with a brush in the cap.



72170 each

➤ **Repositionable Adhesive**

1. DryBond™ Pads
DryBond Pad Adhesive Sheets eliminates the need for messy and noxious adhesives. The dry adhesive composition is clean and easy to use.



DryBond creates a strong effective bond while the artwork remains completely repositionable. Use DryBond in place of cements, spray glues, and wax adhesives for mounting all types of art work. Available in 25 sheets/pad; size 11"x17" (28cm x 43cm).

77612-25 DryBond Pad, 25 sheets 25/pk

➤ **Repositionable Dry Mounts (RDM)**

This is a pressure-sensitive mounting material. RDM is a microthin, clear Mylar® film coated on both sides with an adhesive; specially formulated for photographic purposes. This "delayed-set" adhesive allows for repositioning of prints before providing a permanent bond. Low temperature 185° F is needed. The Mylar® base will not absorb moisture or change its characteristics through time; thereby it eliminates the common mounting problems that are experienced with other mounting materials. RDM sheets are made ¼" oversize which eliminates alignment problems and makes it easier to use.



77604 RDM, Size 8"x10" (20.3x25.3cm) 6/pk
77606 RDM, Size 11x14" (28x35.5cm) 6/pk

➤ **Dust-Off®/Luminex™; Microfiber Cleaning Cloth**

For superior cleaning of delicate surfaces. Based on advanced microfiber technology, the Dust-Off/Luminex Microfiber Cleaning Cloth is a superior cleaning product. It actually gets under dirt and oily films and lifts them away, leaving the surface clean, polished and lint free. Ideal for: Camera, Lenses/Filters, Microscopes, Computer, Eyeglasses, Plastic, Metal. Any smooth surface...



UNSURPASSED FEATURES:

- Environmentally responsible - Lifts away oily film and dirt with no chemicals.
- Will not streak or smear surfaces.
- Non-abrasive and 100% lint-free.
- Reusable - Machine or hand washable - Long lasting.

Size: 7½"x7½" (19x19cm).

71716-01 Luminex Cleaning Cloth each
71716-12 Luminex Cleaning Cloth 12/pk

➤ **Lens Tissue – EMS (Ross)**

EMS (Ross) Lens tissue does not lint or scratch and it is free from mineral or vegetable filler.

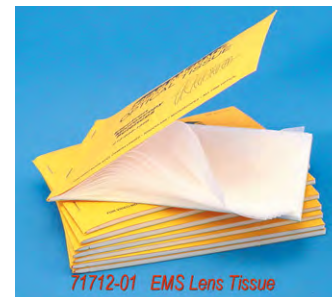


71700 Lens Tissue, 4½" x 5" 1000 sheets/box

➤ **EMS Lens Tissue**

EMS Lens Tissue is the world's finest optical tissue. It's extremely soft and virtually lint-free. Safe for any optical surface such as camera lenses, microscopes, telescopes, and eye-glasses. Each tissue is perforated for easy removal from the booklet.

Tissue size: 4"x6", 50 sheets/bk



71712-01 EMS Booklet Lens Tissue 50/bk
71712-10 EMS Booklet Lens Tissue 10 bk/lot

➤ **Micro Fiber Cleaning Cloth**



Chemical free. Safely and easily removes finger-prints and smudges from all glass and plastic lenses. The advanced technology of the Micro Fiber Cleaning Cloth makes it ideal for cleaning any high gloss surface such as:

- Camera Lenses
- Scopes & Binoculars
- Eye Glasses
- Jewelry
- Photographs
- Scanners
- Computers
- Copy Machines
- TV Screens
- Mirrors & Chrome
- Compact & Laser Discs
- Musical Instruments

Care of the Cloth: Machine or hand wash and dry. The unique properties will not change. May be ironed with cool iron, if desired.

71717-01 Micro Fiber Cleaning Cloth each
71717-12 Micro Fiber Cleaning Cloth 12/pk.

► Photographic Darkroom Timer

A new improved Model 300 Darkroom Timer. Shows minutes and seconds in total darkness. The 60-minute time range can be set in minutes for developing and seconds for enlarging control. Two hands permit quick setting by seconds, minutes, or combinations of seconds and minutes. Two separate outlet receptacles control an enlarger or printer and safelight by a combination time/focus switch. Each outlet has a 750-watts capacity. This model also can be used with a relay for heavier loads. Easy to read numerals on a large 6½" diameter face. Luminated by phosphor- fluorescence. Input voltage: 100 to 130 VAC, 50 or 60 Hz (U.S. and Canada); 210 to 250 VAC, 50 or 60 Hz for use in other countries.



74395	Darkroom Timer	each
74395-22	Darkroom Timer (210/250 volt)	each

► Pro-Size 10"X12" Safelight

The large format flooding darkroom with safe, workable light. Easy filter change is possible to accommodate a standard 10x12" filter for specialized applications. Can be used as a table top unit, mounted on the wall, or hung from the ceiling. Comes complete with a 25 watt bulb, 6 foot cord with "On/Off" switch, and a filter and chain. Baked enamel finish.



74320-R	Safelight	each
74320-OC	Safelight	each
74322-R	Filter only, Red	each
74322-OC	Filter only, Amber	each

► Paterson Safelight

Perfect for small darkrooms. It is designed to stand on a bench, hang on the wall, or suspend from the ceiling. The safelight measures 4" diameter x 6½" high. Ready to use with bulb, choice of cover dome color and molded mains plug. Red/Orange dome "A" (general purpose use). The unit comes with 15W bulb, 120VAC, one dome and 3-prong cord.



74327-10	Paterson Safelight, "A" Dome	each
74327-16	Replacement Bulb, 15W	each
74327-18	Replacement "A" Dome	each

► Kodak Safelight Filters

Scientifically designed for safelight lamps. Provides maximum safe illumination, when used as directed, plus offers protection from white light when using sensitized materials.

0A / greenish yellow - For black-and-white contact and duplicating materials and projection films. Available in 5½" dia.; 3¼x4¾"; 5x7"; 8x10" and 10x12".

0C / light amber - For contact and enlarging papers. Available in 5½" dia.; 3¼ x4¾"; 5x7"; 8x10" and 10x12".

1 / red - For some blue-sensitive materials, most phototypesetting materials, KODAGRAPH Projection, and some KODAK LINAGRAPH Papers. Available in 5½" dia.; 5x7"; 8x10" and 10x12".

1A / light red - For slow orthochromatic materials. KODALITH and KODAGRAPH Orthochromatic Materials, and High Resolution Plates. Available in 5½" dia.; 5x7"; 8x10" and 10x12".

2 / dark red - For fast orthochromatic materials, some green-sensitive x-ray films, KODAK EKTALINE Papers, and KODAK ortho-chromatic LINAGRAPH Papers. Available in 5½" dia.; 8x10" and 10x12".

3 / dark green - For some panchromatic materials. Available in 5½" dia.; 8x10" and 10x12".

10 / dark amber - For KODAK VERICOLOR Slide Film 5072, KODAK VERICOLOR Print Film 4111 (ESTAR Thick Base) KODAK PANALURE* Papers. Available only in 8x10".

11 / appears opaque; transmits infrared radiation - For use with infrared scope and similar inspection devices. Available only in 5½" diameter.

13 / amber - For all KODAK EKTACOLOR*, all KODAK PANALURE, and KODAK RESISTO Rapid Pan Papers. Available in 5½" dia.; 8x10" and 10x12".

*Requires reduced bulb wattage.

ORDERING INFORMATION:

Filter Type	5½"	3¼"x4¾"	5x7"	8x10"	10x12"
0A	74915-0A	74916-0A	74917-0A	74918-0A	74919-0A
0C	74915-0C	74916-0C	74917-0C	74918-0C	74919-0C
1	74915-01	—	74917-01	74918-01	74919-01
1A	74915-1A	—	74917-1A	74918-1A	74919-1A
2	74915-02	—	—	—	74919-02
3	74915-03	—	—	74918-03	74919-03
13	74915-13	—	—	74918-13	74919-13

► OMNI Darkroom Safelight

A specially formulated, permanently pigmented dome filter safe for contact With orthochromatic materials. For table top or wall hanging. OMNI emits safe light in 5 directions. Comes with a 15 watt bulb and "On/Off" line switch. Size 5"x7":



74324-R	Omni Safelight w/Red Filter	each
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DARKROOM SAFETY

Darkroom Safelights*

In photography, the term "safelight" describes darkroom illumination that does not fog or otherwise cause a visible change to light-sensitive material when it is correctly handled and processed. The word "safe" is relative. Most sensitized materials will become fogged if you expose them to safelight illumination for an extended period of time. Because photographic materials vary in speed and sensitivity to different colors of light, the recommended bulb wattage and colors of safelight filters also vary.

Important facts about safelights:

- No safelight provides completely safe exposure for an indefinite period of time.
- Safelight filters are designed for specific types of film and paper.
- Safelight filters fade with use.
- Some photographic materials require handling in TOTAL darkness.
- Poor safelight conditions can produce a loss in photographic quality before actual fogging is visible.

Therefore, you should:

- Test your safelight conditions regularly.
- Replace your safelight filters when necessary.
- Follow all safelight recommendations for your film or paper. See product instructions for recommended safelight filter, bulb wattage, and minimum safelight distance.

Ideally, safelight filters should transmit only what is outside the color-sensitivity (wavelength) range of the photographic materials for which they are recommended. The safelight filters recommended by Kodak provide maximum transmission of colors to which the film or paper emulsion is relatively insensitive. However, the color sensitivity of most emulsions does not end abruptly at a particular wavelength in the spectrum. Most emulsions are somewhat sensitive to colors outside their intended range. This means that most films and papers have some sensitivity even to the colors of light transmitted by the recommended safelight filters. Therefore, always minimize the exposure of photographic materials to safelight illuminations. The apparent color of a safelight filter is only a partial indication of its transmission characteristics. Colored bulbs or other improvised safelights may appear to be the right color, but they may actually emit light (or other forms of radiant energy) that will fog a photographic emulsion. Kodak Safelight Filters are made to precise light-transmission and absorption standards that relate to the spectral sensitivities of photographic materials. Safelight filters gradually fade with use. This means that they transmit more and more light of the colors that they absorb when they are new. You should plan to change safelight filters periodically. For example, if you use safelight lamps for 8 to 12 hours a day, you may need to change the filters every three months. Bulbs eventually blacken and produce less light. We recommend that you change bulbs before running safelight tests. To keep the illumination level consistent, change bulbs periodically too. Noting the replacement dates on a sticker on the safelight housing will help you keep track of bulb and filter changes.

Safelight Precautions

Many factors can cause unsafe illumination: an incorrect safelight filter, a faded or cracked filter, incorrect bulb wattage (too high), safelight location, or too many safelights. You can also experience light fogging from other sources, such as light escaping from an enlarger head, lighted dials on equipment controls, or non-opaque darkroom construction materials. For example, pinholes between the darkroom space and lighted areas can admit visible light, or plywood that appears opaque may admit infrared illumination. Even when you use the correct safelight filter and bulb, and observe the recommended safelight distance for the product, you should still test your darkroom conditions to be certain that they are safe for the length of time that the photographic material will be under the safelight. Using an exposure test series that is described in Kodak Publication K-4, How Safe is Your Safelight?, you can determine a safe time for your darkroom conditions, and limit your safelight exposure to that time. This publication is available by writing to Eastman Kodak Company, Department 412L, Rochester, NY 14650-0532. Excessive exposure to safelight illumination may show up only in the image area of your negative or print, because that area receives additional exposure from TEM or enlarger. This means that you may not recognize a change in image quality caused by excessive safelight exposure unless you perform a safelight test.

Note: Safelight tests that involve partially covering a piece of photographic material with an opaque object (such as a coin) and then exposing the material to safelight illumination can be misleading. They test only for fog - not for the added effects of safelight, TEM and enlarger exposures. Always keep safelight exposure to a minimum. Store film and paper in light proof containers, and make a habit of handling paper with the emulsion side down (away from the safelights). Place your enlarger so that the easel area receives very little safelight illumination. When you develop prints, insert the paper into the developer with the emulsion side down; turn the paper emulsion side up when experience tells you that the image has become visible. Let the results of your safelight test and your own practical experience guide you in determining how much time you have in handling photographic materials.

* Courtesy of Eastman Kodak

► Light Boxes:

For viewing and editing slides, transparencies, negatives, micrographs, etc. They also serve as a base for orientation of embedding specimens when observing tissues using a magnifier. Scientifically designed to provide even distribution and uniformity of light. All metal welded construction with a white baked-enamel finish. The viewing surface is a translucent acrylic that is break resistant. It can be used flat on a table, inclined, standing, or hung on the wall. It comes with a ANSI standard 5000K fluorescent lamp, 10 feet cord, on-off switch. Four models to choose from.

(1) Model A:

Viewing surface measures: 8 $\frac{3}{4}$ "x11 $\frac{1}{2}$ " (22x29.2cm)

Overall measurements: 9 $\frac{1}{2}$ "x12 $\frac{1}{2}$ "x2"H (24.1x31.6x5cm)

It is compact and can be used on a desk. Small enough to carry in a briefcase or store in a drawer. Weight 4.5 lbs.

71650	Light Box, Model A	each
71650-RB	Replacement Light Bulb	each

(2) Model B:

Viewing surface measures: 12"x17" (30.5x43.18cm)

Overall measurements: 14 $\frac{1}{2}$ "x18x3 $\frac{1}{2}$ " (36.7x45.2x8.8cm)

Portable with a vinyl cover and heavy duty strap handle. 5000K fluorescent lamp. Weight: 11 lbs.

71652	Light Box, Model B	each
71652-RB	Replacement Light Bulb	each



71650



71652

► Illuminated Slide Viewing Box

Sorting and viewing 2x2" slides easily and quickly is made possible with this slide sorter unit. All metal frame; its baked white enamel finish reflects light for perfect viewing of slides. Translucent styrene viewing panel. Folds flat for storage. Uses standard 60-watt household bulbs (Bulb not included).

Model S-40: Holds 40 slides, 12x16"; Viewing surface: (30.4x40.6cm)

71660	Slide Viewing Box, Model S-40	each
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► Tru-View Light Box

Battery operated "Tru-View" light box. Portable unit uses 6 "C" cell batteries (not included) and a Daylight fluorescent tube to achieve an extremely bright, evenly illuminated surface. Can operate on AC current with an AC adapter (included). Unit easily fits into a brief case or stores in a drawer and has a translucent acrylic surface of 5 $\frac{1}{2}$ "x9 $\frac{1}{2}$ " (140x240mm). Built-in flip-up stand provides a comfortable 10° working angle. It comes with a clamping bar for holding sheet film and keyhole slots for wall mounting. Its overall size is 12 $\frac{1}{4}$ "x8 $\frac{3}{4}$ " (312x202mm). Weight: 3 lbs (1.35kg)

71648	Tru-View Light Box	each
71648-RB	Replacement Light Bulb	each



► Slim-Edge Light Pad

For viewing and editing slides, transparencies and negatives. Now with a larger (11 $\frac{1}{2}$ " x 16") viewing surface, and only $\frac{3}{8}$ " thin. New technology provides bright, even illumination of viewing area. Has 2-5400K color-corrected lamps with 20,000-hour life. Viewing panel has opening to display transparencies. The unit can be used on a table, standing on an incline, or hung on the wall. Powered by 12VAC adapter. Overall size is 14" x 19 $\frac{1}{4}$ " x $\frac{3}{8}$ ". Weight: 7 $\frac{1}{2}$ lbs.

71649-3A	Light Pad, Model A-3A	each
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► **Mini Light Box**

These small and compact light boxes save space and can be stored in your desk drawer. Ideal for viewing and inspecting cell culture plates, slides, petri dishes, multiwell plates, embedding orientation, colony counter and much more. A mini 1.75X magnifier (as an option) facilitates your viewing. The unit has a 4"x5" (10.2x12.8cm) lighted area that is operated by four "C" batteries (not included). There is a built-in 6V DC adapter jack. The unit comes with one counting grid. It measures: 5 7/8"(L)x6 1/4"(W) x1 1/4"(H) (13.8x16x4.5cm). Weight:9 oz. without batteries.



71664-10	Mini Light Box	each
71664-12	1.75X Mini Magnifier	each
71664-15	Counting Grids	5/pk
71664-20	AC Adapter for Mini Light Box	each



► **Ultra Thin Light Box - Light Pad**

Very thin - only 1/2" thick (14 mm). Modern technology provides extremely even, bright illumination. 8"x10" viewing surface, with two 5400 K color corrected lamps with 20,000 hour life. The unit can be used flat on a table, standing at an incline, or hung on a wall. The Light Pad is also designed to display photo transparencies held under a clear plastic panel. Fits in a briefcase or stores in a desk drawer. It is powered by a 12V, DC adapter. The overall size is 12 1/4"x9 1/4"x 1/2". Weight: 2 lbs



71649-5A	Ultra Thin Light Box	each
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DUST-OFF; The Photography Cleaning Tool, See Cleaning Section, pages 945-946 >>>>



► **Burnishers**

These burnishers are especially designed for dry transfer products. They are pressure adjustable allowing you to set and maintain the proper pressure for any burnishing style. For maximum adhesion, place the backing sheet over the newly transferred letters and reburnish with the "bone end." The rolling tip burnisher is ideal for large transfers, the standard tip is ideal for standard work, and the fine tip for detail work.

77615-01	Standard Tip Burnisher	each
77615-02	Fine Tip Burnisher	each
77615-03	Rolling Tip Burnisher	each



► **Frisket Knife**

Designed for easy handling. The frisket Knife is lightweight and disposable. It comes with a fixed #11 scalpel blade, and a locking safety cap when it is not in use.

77618-01	Frisket Knife	each
77618-03	Frisket Knife	3/pk
77618-12	Frisket Knife	12/pk

► **Correction Transfer Sheets**

Correction sheets are used in place of ink pens or brushes to touch up black and white prints. They are used to sharpen corners, smooth out edges, add or subtract lines or whole areas. To use simply position the symbol or shape which is desired and burnish down.

84054-01	Correction Symbols, White	each
84054-10	Correction Symbols, White	10/pk

Dry Transfer Sheet Cabinet

This cabinet offers protection as well as organization for dry transfer sheets. Each cabinet has 12 drawers and holds up to 600 sheets, sizes are 8 1/4" x 1 1/4" (20.5cm x 28.2cm). The overall cabinet measures: 10" (W) x 11 3/4" (D) x 16 1/4" (H). (25.4 cm x 29.8cm x 41.3cm). Available in red only.

77635	Dry Transfer Sheet Cabinet	each
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► Graphic Supplies; Dry Transfer Lettering

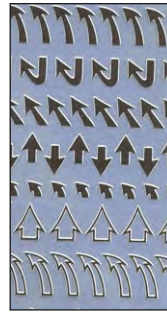
We now offer a selection of BLACK-ON-WHITE (black letters; white background) dry transfer lettering sheets. Each sheet is 8¼"x11¼".

► Black on White

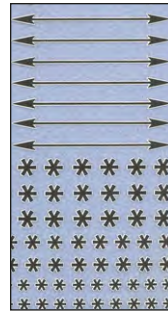
84002	Multi-style Arrows	each
84003	Multi-style Arrows	10/pk
84004	Straight arrows and asterisks	each
84005	Straight arrows and asterisks	10/pk
84006	16pt and 18pt numbers (0-9), Angstroms, arrows, parentheses, round & square dots, brackets, microns, nanometers, and short lines	each
84007	16pt & 18pt Number & Signs	10/pk
84008	12pt & 18pt microns and nanometers	each
84009	12pt & 18pt microns and nanometers	10/pk
84010	12 pt & 18 pt 1.0, 0.5, 0.1 microns	each
84011	12 pt & 18 pt 1.0, 0.5, 0.1 microns	10/pk
84012	12 pt upper/lower case letters/numbers(0-9)	each
84013	12 pt upper/lower case letters/numbers(0-9)	10/pk
84014	14 pt upper/lower case letters/numbers (0-9)	each
84015	14 pt upper/lower case letters/numbers (0-9)	10/pk
84016	16 pt upper/lower case letters/numbers(0-9)	each
84017	16 pt upper/lower case letters/numbers(0-9)	10/pk
84018	18 pt upper/lower case letters/numbers(0-9)	each
84019	18 pt upper/lower case letters/numbers(0-9)	10/pk
84020	10 pt & 12 pt upper/lower case letters A,B,C,D.	each
84021	10 pt & 12 pt upper/lower case letters A,B,C,D.	10/pk
84022	14 pt & 18 pt upper case letters A,B,C,D.	each
84023	14 pt & 18 pt upper case letters A,B,C,D.	10/pk
84024	18 pt upper case letters M,G,N,	each
84025	18 pt upper case letters M,G,N,	10/pk
84026	24 pt upper/lower case letters/numbers	each
84026-10	24 pt upper/lower case letters/numbers	10/pk
84028	36 pt upper/lower case letters/numbers	each
84028-10	36 pt upper/lower case letters/numbers	10/pk
Upper Case Letters, Helvetica Medium		
84100-01	16 pt upper case letters (A to Z)	each
84100-05	16 pt upper case letters (A to Z)	10/pk
84101-01	18 pt upper case letters (A to Z)	each
84101-05	18 pt upper case letters (A to Z)	10/pk
84102-01	24 pt upper case letters (A to Z)	each
84102-05	24 pt upper case letters (A to Z)	10/pk
84105-01	16 pt numbers (0-9)	each
84105-05	16 pt numbers (0-9)	10/pk
84106-01	18 pt numbers (0-9)	each
84106-05	18 pt numbers (0-9)	10/pk
84107-01	24 pt numbers (0-9)	each
84107-05	24 pt numbers (0-9)	10/pk
84110-01	12, 18, 24 pt Mathematical Symbols	each
84110-05	12, 18, 24 pt Mathematical Symbols	10/pk
84112-01	12, 16, 18 pt Brackets, Period, comma, @, %, #, &	each
84112-05	12, 16, 18 pt Brackets, Period, comma, @, %, #, &	10/pk

► Black or White Dry Transfer Sheets:

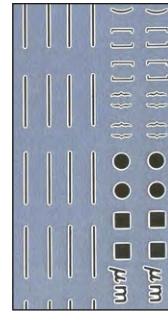
84030-01	Solid Arrows, White	each
84030-10	Solid Arrows, White	10/pk
84031-01	Solid Arrows, Black	each
84031-10	Solid Arrows, Black	10/pk
84032-01	Open Arrows, Black	each
84032-10	Open Arrows, Black	10/pk
84034-01	Mixed Arrows, Black	each
84034-10	Mixed Arrows, Black	10/pk
84036-01	Arrowheads, Black	each
84036-10	Arrowheads, Black	10/pk



84002



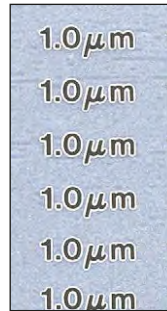
84004



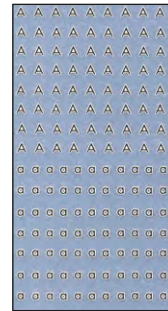
84006



84008



84010

84012, 84014,
84016 & 84018

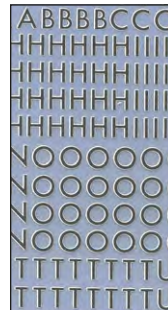
84020



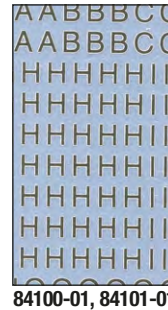
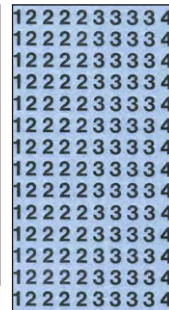
84022



84024



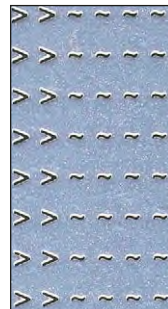
84026, 84028

84100-01, 84101-01
& 84102-01

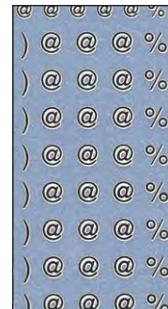
84105-01



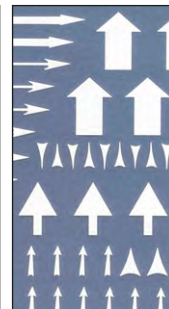
84106-01, 84107-01



84110-01



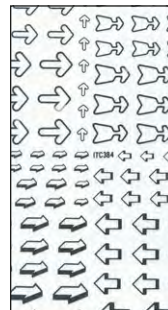
84112-01



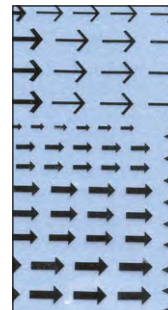
84030-01



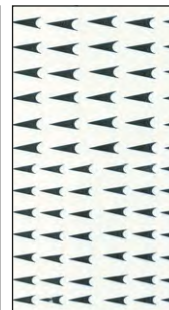
84031-01



84032-01



84034-01



84036-01

continued...

84038-01	Combination Arrows, White	each
84038-10	Combination Arrows, White	10/pk
84039-01	Combination Arrows, Black	each
84039-10	Combination Arrows, Black	10/pk
84040-01	Number-in-Solid Circle	each
84040-10	Number-in-Solid Circle	10/pk
84042-01	Call Out Numbers, Black	each
84042-10	Call Out Numbers, Black	10/pk
84044-01	Number-in-Solid Square	each
84044-10	Number-in-Solid Square	10/pk
84046-01	Call Out Numbers, 18pt.,Black	each
84046-10	Call Out Numbers, 18pt.,Black	10/pk
84048-01	Open Circles, Black	each
84048-10	Open Circles, Black	10/pk
84050-01	Squares/Circles/Stars, Black	each
84050-10	Squares/Circles/Stars, Black	10/pk
84052-01	Greek Alphabet, 12pt, Black	each
84052-10	Greek Alphabet, 12pt, Black	10/pk
84054-01	Correction Symbols, White	each
84054-10	Correction Symbols, White	10/pk
84056-01	Dotted Lines w/Corner, Black	each
84056-05	Dotted Lines w/corner , Black	10/pk
84057-01	Line Rules w/Corner, Black	each
84057-05	Line Rules w/Corner, Black	10/pk
84058-01	Line Rules with Corners, Black	each
84058-05	Line Rules with Corners, Black	10/pk
84060-01	Punctuation, Helvetica, Med. Black	each
84060-05	Punctuation, Helvetica, Med., Black	10/pk
84061-01	Charting Data, Black	each
84061-05	Charting Data, Black	10/pk
84062-01	International Accent Marks, Black	each
84062-05	International Accent Marks, Black	10/pk
84063-01	Brackets, Black	each
84063-05	Brackets, Black	10/pk
84064-01	Solid Dots and Rules, Black	each
84064-05	Solid Dots and Rules, Black	10/pk

White or Black Transfer Letters

(Lower and Upper cases), Helvetica Medium

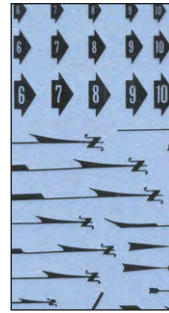
84130-01	8 pt, upper/lower case letters, White	each
84130-05	8 pt, upper/lower case letters, Black	each
84132-01	12 pt, upper/lower case letters,White	each
84132-05	12 pt, upper/lower case letters, Black	each
84134-01	16 pt, upper/lower case letters, White	each
84134-05	16 pt, upper/lower case letters, Black	each
84135-01	18 pt, upper/lower case letters, White	each
84135-05	18 pt, upper/lower case letters, Black	each
84137-01	24 pt, upper/lower case letters, White	each
84137-05	24 pt, upper/lower case letters, Black	each
84139-01	36 pt, upper/lower case letters, White	each
84139-05	36 pt, upper/lower case letters, Black	each

White or Black Transfer Numbers, Helvetica Medium

84150-01	8 pt, numbers ,White	each
84150-05	8 pt, numbers ,Black	each
84152-01	12 pt, numbers ,White	each
84152-05	12 pt, numbers ,Black	each
84154-01	16 pt, numbers ,White	each
84154-05	16 pt, numbers ,Black	each
84155-01	18 pt, numbers ,White	each
84155-05	18 pt, numbers ,Black	each
84157-01	24 pt, numbers ,White	each
84157-05	24 pt, numbers ,Black	each
84159-01	36 pt, numbers ,White	each
84159-05	36 pt, numbers ,Black	each



84038-01



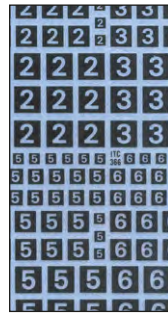
84039-01



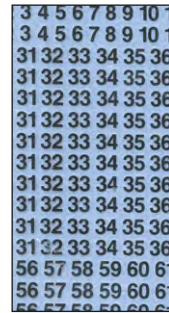
84040-01



84042-01



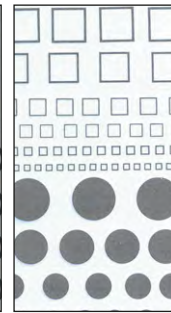
84044-01



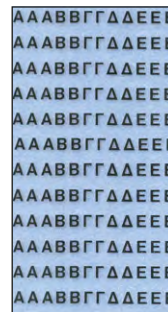
84046-01



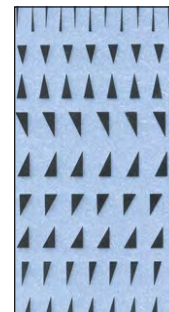
84048-01



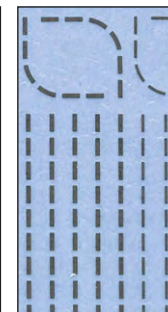
84050-01



84052-01



84054-01



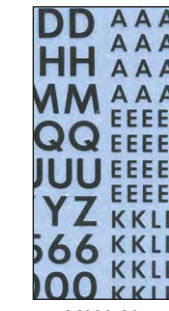
84056-01



84057-01



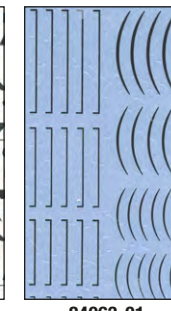
84058-01



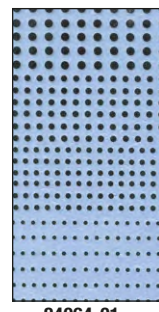
84061-01



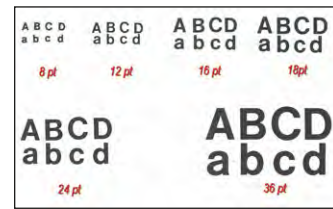
84062-01



84063-01



84064-01



84130 to 84139



84150 to 84159

► Negative Storage

► Glassine and Kraft Paper Envelopes

Note: Actual size of Glassine and Kraft envelopes: 3¼"x4" = 3½"x4½"; 4x5" = 4½"x5½"; 8x10" = 8½"x10½"; 35mm = 1½"x9½"; 7x7cm = 2½"x3"; 6.5x9cm = 2½"x3½"

A. Glassine Envelopes:

Glassine envelopes, acid free for negative storage. Open end, thumb-cut, side-seamed.

74050	For 3¼"x4" Films, Plain	100/pk	74074	For 35mm Strips, Plain	1000/pk
74052	For 3¼"x4" Films, Plain	500/pk	74080	For 6½"x9cm Films, Plain	100/pk
74054	For 3¼"x4" Films, Plain	1000/pk	74081	For 6½"x9cm Films, Plain	500/pk
74058	For 3¼"x4" Films, Imprinted	1000/pk	74082	For 6½"x9cm Films, Plain	1000/pk
74060	For 4"x5" Films, Plain	100/pk	74085	For 7x7cm Films, Plain	100/pk
74062	For 4"x5" Films, Plain	500/pk	74086	For 7x7cm Films, Plain	500/pk
74064	For 4"x5" Films, Plain	1000/pk	74087	For 7x7cm Films, Plain	1000/pk
74068	For 4"x5" Films, Imprinted	1000/pk	74090	For 8"x10" Films, Plain	100/pk
74070	For 35mm Strips, Plain	100/pk	74092	For 8"x10" Films, Plain	500/pk
74072	For 35mm Strips, Plain	500/pk			

B. Kraft Paper Envelopes:

Thumb cut, imprinted.

74056	For 3¼"x4" Films, Imprinted	500/pk
74066	For 4"x5" Film, Imprinted	500/pk
74094	For 8"x10" Film, Imprinted	100/pk

C. Polypropylene Film Sleeves

Archival quality, crystal clear. Specially formulated 3-mil polypropylene has a physical density that is less than other sleeving materials, making it more pliable and gentle to the film and inhibits it from becoming brittle.

73950	Polypropylene Sleeve for 3¼ x 4" Films	100/pk
73952	Polypropylene Sleeve for 4 x 5" Films	100/pk
73953	Polypropylene Sleeve for 6 x 35mm Strips	100/pk
73954	Polypropylene Sleeve for 6.5 x 9cm Film	100/pk
73956	Polypropylene Sleeve for 7 x 7cm Film	100/pk

D. Polyethylene Storage Sheets; Polyview Pages

Completely transparent. Fits all U.S. standard 3-ring binders: 8½"x11½". Convenient. Offers good protection for your valuable negatives and prints.

120 film strips, 3 strips of 4 per page

74010	Polyview Sheets, 120 size	25/pk
74012	Polyview Sheets, 120 size	100/pk
74013	Polyview Sheets, 120 size	500/p

3¼"x4" film, 6/page

74014	Polyview Sheets, 31/4"x4"	25/pk
74016	Polyview Sheets, 31/4"x4"	100/pk
74017	Polyview Sheets, 31/4"x4"	500/pk

20 mounted 35mm slides per page

74018	Polyview Sheets, 35mm Slide	25/pk
74020	Polyview Sheets, 35mm Slide	100/pk
74021	Polyview Sheets, 35mm Slide	500/pk

6 strips of 6 of 35mm negatives

74022	Polyview Sheets, 35mm Negative	25/pk
74024	Polyview Sheets, 35mm Negative	100/pk
74025	Polyview Sheets, 35mm Negative	500/pk

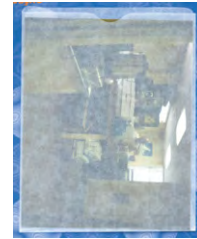
4"x5" films, 4 per page

74026	Polyview Sheets, 4"x5"	25/pk
74028	Polyview Sheets, 4"x5"	100/pk
74029	Polyview Sheets, 4"x5"	500/pk

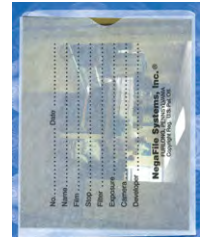
8"x10" films

74030	Polyview Sheets, 8"x10"	25/pk
74031	Polyview Sheets, 8"x10"	100/pk
73903	Size 4x5", Frosted Sealed Flap	100/pk
73904	Size 4x5", Frosted Sealed Flap	500/pk
73905	Size 4x5", Frosted Sealed Flap	1000/pk
73906	Size 5x7", Clear Open Flap	100/pk
73907	Size 5x7", Clear Open Flap	500/pk
73908	Size 5x7", Frosted Sealed Flap	100/pk
73909	Size 5x7", Frosted Sealed Flap	500/pk
73910	Size 8x10", Clear Open Flap	100/pk
73911	Size 8x10", Clear Open Flap	500/pk
73912	Size 8x10", Frosted Open Flap	100/pk
73913	Size 8x10", Frosted Open Flap	500/pk

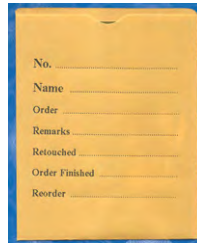
Sizes 8½ x 11"; 10 x 10"; 11 x 14"; 16 x 60"; 20 x 24" also available. Please call for price and availability.



Plain Glassine Envelope



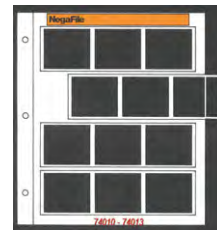
Imprinted Glassine Envelope



Imprinted Kraft Envelope



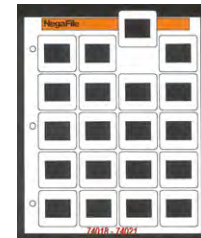
Polypropylene Film Sleeves



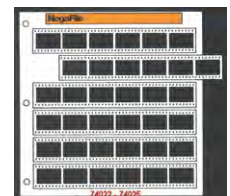
74010-74013



74014-74017



74018-74021



74022-74025



74026-74029



74030-74031



E. CD's / DVD's Storage (Polyethylene Storage Sheets; Polyview Pages)

Store 4 CD's / DVD's to one page, 2 for each side. Fits any 3-ring binder or just hanging from the current Print File Spinner rack.

- Protects from dust, scratches, and fingerprints.
- Archival quality NO PVC – safe for long-term storage.
- Self-closing, non-stick polypropylene.

74031-25	CD / DVD Storage	25/pk
74031-50	CD / DVD Storage	100/pk

► **Polyview Page Storage Box**

Made from archival polypropylene.

■ **Accepts all Format Pages.**

■ **Lifetime hinge for most secure closing**

The contents are kept completely safe from dust, water, and any other possible contaminants.

74698-01 Polyview Page Storage Box each



► **Lineco Archival Collectors Album**

Your most treasured photographs, letters, tech-notes, formula sheets, clippings or other collectibles are safe in Lineco's collector album. Made completely from acid-free materials. It is your best choice for long lasting storage and protection. The optional Mylar Page Protection with Blue/Gray inserts are acid-free envelopes on the inside back cover which offers safe temporary storage prior to mounting. The album comes without the Mylar pages.

74697-01 Lineco Collectors Album each

74697-50 Mylar Page With Blue/Gray Inserts 50/pk



► **Polyguard Polypropylene Film Sleeves**

Polyguard Polypropylene film sleeves are the finest archival quality material, and are guaranteed to give you ultimate protection for your most important film negatives. Polyguard is 100% acid free, as well as being free from optical distortion. It is resistant to water, grease, oil, alkalis, and organic solvents. Polyguard is durable, yet pliable and gentle to the film and will not become brittle, crack, or abrade the film. All sizes are available in a clear open flap, clear front with frosted backing, and sealed flap. Available in the following configurations:

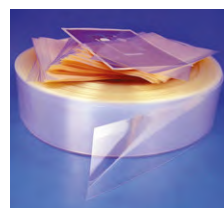
A. Sheet Film Sleeves

73900	Size 4x5", Clear Open Flap	100/pk
73901	Size 4x5", Clear Open Flap	500/pk
73902	Size 4x5", Clear Open Flap	1000/pk

B. Roll Film Sleeves

Cut Lengths

73930	135mm/20 exp., Clear Open Flap	100/pk
73931	135mm/20 exp., Clear Open Flap	500/pk
73932	135mm/20 exp., Frosted Open Flap	100/pk
73933	135mm/20 exp., Frosted Open Flap	500/pk
73934	135mm/24 exp., Clear Open Flap	100/pk
73935	135mm/24 exp., Clear Open Flap	500/pk
73936	135mm/24 exp., Frosted Open Flap	100/pk
73937	135mm/24 exp., Frosted Open Flap	500/pk
73938	135mm/36 exp., Clear Open Flap	100/pk
73939	135mm/36 exp., Clear Open Flap	500/pk
73940	135mm/36 exp., Frosted Open Flap.	100/pk
73941	135mm/36 exp., Frosted Open Flap.	500/pk



Roll Dispensed: Clear, Open Flap:

73944	135mm, Unperforated, 3 mil	1000ft/roll
73946	120/220mm, Unperforated, 3 mil	1000ft/roll
73948	70mm, Unperforated, 3 mil	1000ft/roll

► **Digital Output Sleeving – PRO-LINE Archival Sleeving**



Our specially formulated 3-mil archival polypropylene has a physical density that is less than other sleeving materials, making it more pliable and gentle to your film. Strong and durable, PRO-LINE won't become brittle or abrade film. PRO-LINE sleeving is optically clear, neutral in color, and has a unique anti-Newton ring surface that reduces distracting Newton ring as well as minimizing the actual surface area that is in contact with your film. All sleeving is available in clear both sides and clear front with frosted back for even light distribution.

DIGITAL OUTPUT SLEEVING BENEFITS

- Protects inkjet & Thermal Prints from moisture, fingerprints, scratching, dirt etc. Offers a Professional Presentation.
- Allows Safe Viewing Through Crystal Clear Archival Sleeve.
- Eliminates Prints from scratching each other during shipments.
- Available in all Inkjet Format and Clear-Open Flap (COF) or Clear-Sealed Flap (CSF).

Catalog #	Product Description	PRO-LINE	Qty
73915-CO	8 x 10" COF	PL14503	200/pk
73915-CS	8 x 10" CSF	PL14501	200/pk
73916-CO	8½ x 11" COF	PL14604	200/pk
73916-CS	8½ x 11" CSF	PL14605	200/pk
73917-CO	8 x 12" COF	PL14609	200/pk
73917-CS	8 x 12" CSF	PL14608	200/pk
73918-CO	8½ x 12" COF	PL14606	200/pk
73918-CS	8½ x 12" CSF	PL14607	200/pk
73919-CO	A4 – 8¼ x 11¾" COF	PL14610	200/pk
73919-CS	A4 – 8¼ x 11¾" CSF	PL14611	200/pk
73920-CO	A3 – 11¼ x 16½" COF	PL14612	100/pk
73920-CS	A3 – 11¼ x 16½" CSF	PL14613	100/pk
73921-CO	11 x 14" COF	PL14703	100/pk
73921-CS	11 x 14" CSF	PL14701	100/pk
73922-CO	11 x 17" COF	PL14614	100/pk
73922-CS	11 x 17" CSF	PL14615	100/pk
73923-CO	Super B –13 x 19" COF	PL14616	100/pk
73923-CS	Super B -13 x 19" CSF	PL14617	100/pk

► CDs Storage Shell and Envelope

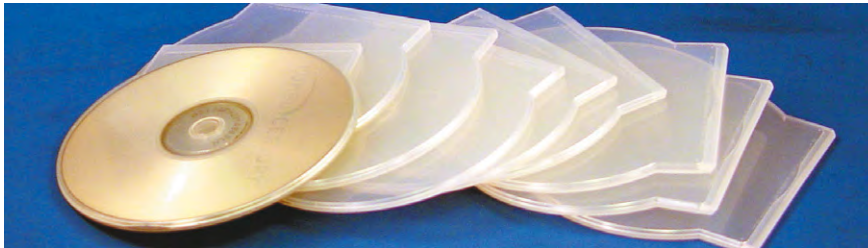
For years, the hard plastic jewel case was the only product available for the protection and storage of compact disks (CDs), which are very brittle, easily broken, and too bulky for storage. Now we are able to introduce alternatives: the C-Shell™ and Paper Sleeves.

► C-Shell™

C-Shell™ is designed to provide filling, storage, and protection for compact disks or DVDs during shipping. The C-Shell™ is an ultra slim (only 4.5 mm thick), one-piece polypropylene shell with a living hinge.

- Durable and completely protect the contents
- Lightweight and ultra thin

- Open and close with a simple center snap
- Impact resistance—protect contents during shipping



► Paper Sleeves

- Economical—cost per sleeve is far less than plastic jewel case
- Space saving
- Durable
- Clarity

74006-10	C-Shell™ CDs Storage	10/pk.
74006-50	C-Shell™ CDs Storage	50/pk.
74008-10	Paper Sleeve CDs Storage	100/pk.
74008-50	Paper Sleeve CDs Storage	500/pk.

► Space Saver - Steel File Cabinet System

1. Slide Cabinet System

- Store up to 54,000 slides in only 2 square feet of space.
- Low cost slide storage.
- Ideal for use in Pathology, Cytology, Hematology, Histology, Dermatology, Research, Education...
- Sturdy - Built to last.

Our newly introduced cabinets for filing 3x1" slides is the most effective system available to the ever-growing problem of slide storage and retrieval.

They are compact, sturdy and economical!!!

The cabinets are stackable and are secured by interlocks. The base (order separately) lifts the cabinets 4¾" off the floor. All units are constructed from heavy gauge reinforced cold rolled steel, electrostatically finished in dura-baked enamel in an attractive green color. Drawers are easily removable and interchangeable. They have rolled edges on each side for added strength. The riveted card holder on the front of the drawer speeds up slide retrieval.

Each cabinet has 6 drawers, with two compartments per row, so you can store as many as 750 slides per drawer. The outside walls and center divider are lower than the slides, allowing for easy removal of any slide.

Each drawer has an exclusive built-in hand grip at the rear and a full sized handle at the front which allows the drawers to be removed and used as trays.

Each cabinet comes with a package of Memorandum Markers, a set of movable Compressor Blocks and four No-Mar Feet.

The cabinet measures: 15¾"(W)x18¾"(D)x4¾"(H) (40x47x12cm).

74780-10	EMS Cabinet System Base	each
74780-20	EMS Micro-Slide Cabinet	each
74780-25	Micro-Slide Memorandum Markers	100/pk

2. 35mm Slide Cabinets

For 2x2 Slides and Kodachrome Transparencies.

These slide cabinets have the same construction and features as our Micro-Slide Cabinet (Cat# 74780-20). Each file comes with three drawers and can store up to 2,250 slides.

35mm Slide Cabinets interlock with themselves and with Micro-Slide Cabinets, for total flexibility and storage convenience. The depth and width dimensions are the same as (Cat#74780-10) shown above; the height is about 1" (25cm) lower and uses the same base as our (Cat# 74780-10).

74780-30	EMS 35mm Slide Cabinet	each
74780-35	35mm Slide Memorandum Markers	100/pk



➤ Scanning Electron Microscope Digital Imaging

➤ SEM Digi-CAM 2

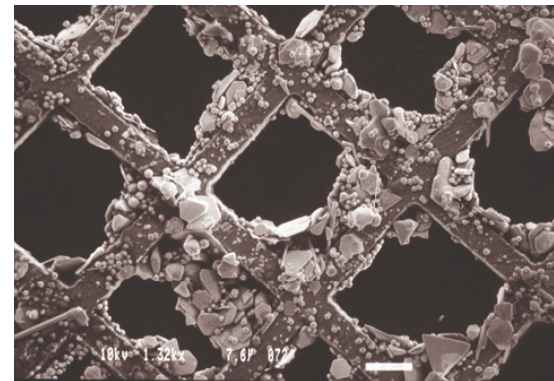
The easy, inexpensive way to upgrade your scanning electron microscope or STEM to digital imaging just got better with an increase in camera resolution to 14 MP!!



By now you've heard: Polaroid is no longer producing film for it's cameras. With the existing supply of Polaroid film decreasing every day, the price has been skyrocketing. How will you document the samples you are imaging in the future? Sure, you could digitize your entire SEM but these conversions are time consuming and can cost in the range of \$15,000 or more!

Originally designed to solve our own in-house digitization needs, the **SEM Digi-CAM 2** is easy to set up and is less expensive than a frame grabber and higher resolution in most cases. If you want us to supply a dedicated mini PC an additional charge will apply, but to the best of our knowledge almost any PC or MAC will suffice.

But what about quality? You be the judge! The image at right is an actual images taken using the SEM Digi-Cam 1 with 6.1 MP.



SEM DIGI-CAM FEATURES:

- 14 MP Nikon SLR Digital Camera - Custom Configured for this application!
- Images can be transferred wirelessly to the PC, or MAC, without need to use WiFi or any other in house network. This overcomes restrictions many customers had regarding security issues when using their normal Institutions network. This has an ad hoc system. You will need an internet connection for initial setup or registration.
 - A USB cable is also included if you do not wish to transfer images wireless
- Remote Controlled Shutter Operation - accommodates even the longest CRT searl times
- Includes software or use your own imaging program such as Photoshop, iPhoto, etc.
- One year warranty on camera. Ext. warranty available.
- AC Adapter for Digital Camera
- Mounting hardware for your particular instrument

Advantages over other digital imaging acquisition systems:

- Resolution is actually better than many more expensive frame grabbers!
- Much lower cost!
- Easily setup & installed - No Service Technician needed!
- Camera can be removed from adapter and used as you like!
- Works on STEM's and slow scan instruments.
- Free One Year Technical Support included!

95200	SEM Digi-CAM	each
95210	SEM Digi-CAM with PC included	each

► Infinity Digital Microscope Cameras

Electron Microscopy Sciences is proud to announce the release of a complete line of Digital Microscope Cameras by "Lumenera". **For a complete brochure on each of the individual types of cameras or for more information please call or contact us today.** Lumenera offers a wide range of cameras based on high performance sensors, providing a variety of unique capabilities to satisfy all of your imaging applications.

► INFINITY1 CMOS Cameras

HIGHLIGHTS

- 2, 3 and 5 megapixel resolution
- Perfect for documentation and archiving applications
- Fast frame rates

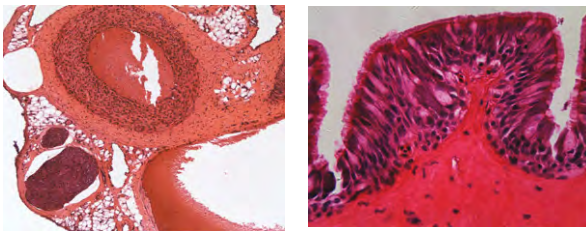
APPLICATIONS

Brightfield, Darkfield, DIC, Live Cell Imaging, Histology, Pathology, Cytology, Defect Analysis, Semiconductor Inspection, Metrology

Lumenera's INFINITY1 digital cameras are designed to be a cost-effective, versatile solution for clinical, life science, materials science and educational professionals. The camera is available with 1.3 to 5 megapixel resolution.

The INFINITY1-2C is the newest camera in the series and features a unique color sensor with 1600x1200 resolution and on-board processing. This camera delivers outstanding image quality and excellent value.

The INFINITY CMOS USB 2.0 cameras are designed to be a cost effective, versatile solution for a variety of microscopy imaging applications. Features include auto white balance, full exposure control, programmable gain, sub-windowing and region of interest. It is an excellent fit for documentation and archiving applications.



For camera software and specifications, see page 754 >>>>

Cat #	Description	Qty.
95000	INFINITY1-2C 2.0 Megapixel CMOS Color Camera	each
95100	INFINITY1-1M 1.3 Megapixel CMOS Monochrome Camera	each
95102	INFINITY1-3 C 3.1 Megapixel CMOS Color Camera	each
95103	INFINITY1-5 C 5.0 Megapixel CMOS Color Camera	each

► INFINITY2 CCD Cameras

HIGHLIGHTS

- 1, 2 and 3 megapixel resolution
- Higher dynamic range for quantitative analysis
- Fast frame rates
- Low noise electronics

APPLICATIONS

Brightfield, Darkfield, DIC, Live Cell Imaging, Histology, Pathology, Cytology, Defect Analysis, Semiconductor Inspection, Metrology, Gel Documentation, Moderate Light Fluorescence



Equipped with a high-quality, Sony CCD sensor, INFINITY CCD USB 2.0 cameras offer excellent sensitivity, high dynamic range and a 12-bit digital output. Features include binning, auto white balance, full exposure control, programmable gain, sub-windowing and region of interest. It is ideal for higher-end scientific, medical, ophthalmic and life science applications.

For camera software and specifications, see page 754 >>>>



Cat #	Description	Qty.	Cat #	Description	Qty.
95105	INFINITY2-1 C 1.4 Megapixel CCD Color Camera	each	95109	INFINITY2-3 3.3 Megapixel CCD Color Camera	each
95106	INFINITY2-1M 1.4 Megapixel CCD Monochrome Camera	each	95118	INFINITY2-5 5.0 Megapixel CCD Color Camera	each
95107	INFINITY2-2 C 2.0 Megapixel CCD Color Camera	each	95121	INFINITY2-5 5.0 Megapixel CCD Monochrome Camera	each
95108	INFINITY2-2M 2.0 Megapixel CCD Monochrome Camera	each			

► **NEW INFINITY 3-3UR Research-Grade Microscopy Camera**

2.8 MP USB 3.0 Camera Offering Low Noise and High Sensitivity

Highlights

- 53 fps at 2.8 megapixel, 66 fps at full HD (1936 x 1456)
- Industry leading Sony EXview HAD II sensor technology
- Color or monochrome ICX674 CCD sensor with 2/3" optical format
- High-speed USB 3.0 interface for ease of installation on any computer
- 128 MB of onboard memory for frame buffering results in reliable image delivery for demanding systems
- Select 8 and 14-bit pixel data modes

Applications

- Brightfield
- Darkfield
- Histology, Pathology, Cytology
- Live Cell Imaging
- Semiconductor Inspection, Metrology
- Gel Documentation
- Whole Slide Imaging
- Low Light Fluorescence
- Quantitative Analysis

The new INFINITY3-3UR uncooled scientific digital camera features a Sony ICX674 CCD sensor, offers 53 fps at full 2.8 megapixel resolution via a high-speed USB 3.0 interface. Designed for use in scientific and industrial applications requiring optimal color reproduction, extreme sensitivity, increased resolution and high speed. Cooled performance from an uncooled camera.

The INFINITY3-3UR provides unmatched light sensitivity needed for low light applications. Relying on Sony's EXview HAD II technology, this camera offers extremely high dynamic range, 4.54 x 4.54 µm pixels and very low noise. The INFINITY3-3UR delivers outstanding image quality and value for challenging low light applications such as fluorescence and NIR imaging.

The INFINITY3-3UR uses the latest USB 3.0 technology at 5 Gbits/sec to deliver the fastest image transfer - even at its highest resolution. Image captures can be synchronized using either a hardware or software trigger. 128 MB of onboard memory for frame buffering ensures dependable and reliable image delivery at full frame rate and highest resolution even in the most demanding systems.

INFINITY CAPTURE, an intuitive image capture program, and INFINITY ANALYZE, a full image analysis package offering camera control, measurement, annotation, tiling and post capture enhancement, are included with the camera. Camera and software combine to create a complete microscopy imaging solution for your application.

Technical Specifications*

Camera Sensor

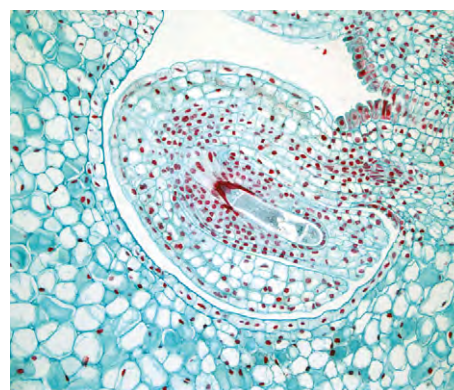
Image Sensor	Sony ICX674 , CCD, color or mono
Optical Format	2/3"
Pixel Size	4.54 x 4.54 µm square pixels
Frame Rate	53 fps at 1936 x 1456, 66 fps at 1920 x 1088, 109 fps at 640 x 480
Bit Depth	8 and 14-bit
Binning Modes	2 x 2, 4 x 4, 8 x 8 (3 x 3 mono only)
Region of Interest Control	Any multiple of 16 x 16 pixels (quad tap mode)
Dark Current Noise	<1 e-/s (at 22 °C ambient, 41 °C internal)
Read Noise	6.2 e- (4 taps, 16 fps, 25 °C ambient, 41 °C internal)

Camera Controls

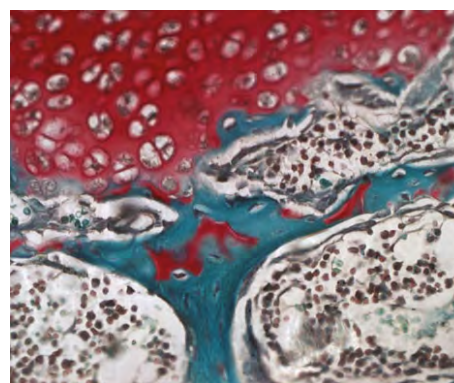
Mass	340 g
Power Requirement	External 5 V DC, 1.2 A, power supply (included)
Power Consumption	6 W maximum in full frame rate mode
Operating Temperature	0 to 50 °C
Operating Humidity	5 to 95%, non-condensing
Data Interface	USB 3.0
Dimensions	57.15 x 97.79 x 39.62 mm 2.75 x 3.85 x 1.56 inch
Lens Mount	Adjustable C-mount standard

*Preliminary specifications.

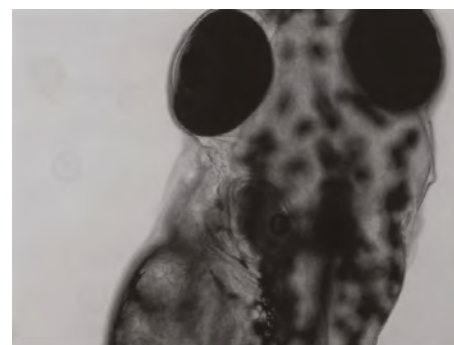
95123	INFINITY3-3URC — 2.8 Megapixel Uncooled CCD Color USB 3.0 Camera	each
95124	INFINITY3-3URM — 2.8 Megapixel Uncooled CCD Monochrome USB 3.0 Camera	each
95125	INFINITY Advanced Features Pack 2: Includes USB Key for extra INFINITY ANALYZE license +	each
95126	Advanced Features Module, additional 3 year warranty, 1 advance product replacement.	each
95127	Power Supply: 5 V DC, 12.5 W (included with camera)	each



Ilium Brownii 10x Objective, 10ms Exposure, 1.2x Gain, 1.0 Gamma



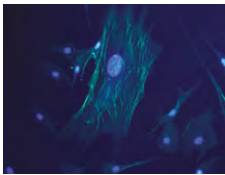
Tissue 40x Objective, 6.75ms Exposure, 1.5x Gain, 1.0 Gamma



Live Zebra Fish 10x Objective, Brightfield

► INFINITY3 Low Light CCD Cameras

Now available with and without cooling



For low light fluorescence applications the INFINITY cooled CCD USB 2.0 cameras offer cooling to 25° C below ambient. The Sony ICX285 ExView HAD sensor has very a high dynamic range, excellent sensitivity and a 12-bit digital output. Features include binning, auto white balance, full exposure control, programmable gain, sub-windowing and region of interest.

HIGHLIGHTS

- 1 megapixel resolution
- High signal to noise ratio for low light, long exposure applications
- Available with cooling to 25° C below ambient
- Fast frame rates
- Low noise electronics

APPLICATIONS

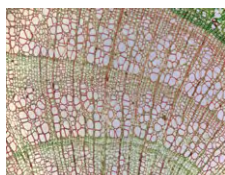
Brightfield, Darkfield, DIC, Live Cell Imaging, Histology, Pathology, Cytology, Defect Analysis, Semiconductor Inspection, Metrology, Low Light Fluorescence, Chemiluminescence, Bioluminescence, Flow Analysis, GFP, FISH, NIR, FRET



For camera software and specifications, see page 754 >>>>

Cat #	Description	Qty.
95110	INFINITY3-1C 1.4 Megapixel Cooled CCD Color Camera	each
95111	INFINITY3-1M 1.4 Megapixel Cooled CCD Monochrome Camera	each
95119	INFINITY3-1U 1.4 Megapixel CCD Color	each
95120	INFINITY3-1U 1.4 Megapixel CCD Monochrome	each

► INFINITY4-11 Large Format



The INFINITY4 camera series offers large format megapixel Kodak sensors for a wide field of view. The perfect choice for demanding high resolution imaging requiring excellent color rendition. Features include a 12-bit digital output, binning, progressive scan electronic shutter, full exposure control, auto white balance, programmable gain, sub-windowing and region of interest — ideal for high end ophthalmic, medical, clinical and life science applications.

HIGHLIGHTS

- 11 megapixel resolution
- Superior light sensitivity with high fidelity color reproduction
- Large format sensor
- Low noise electronics
- F-mount lens adapter

APPLICATIONS

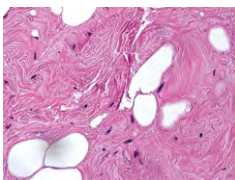
Brightfield, Darkfield, DIC, Live Cell Imaging, Histology, Pathology, Cytology, Defect Analysis, Semiconductor Inspection, Metrology, Gel Documentation, Moderate Light Fluorescence



For camera software and specifications, see page 754 >>>>

Cat #	Description	Qty.
95114	INFINITY4-11 10.7 Megapixel CCD Color Camera	each
95115	INFINITY4-11 10.7 Megapixel CCD Monochrome Camera	each

► INFINITYX-32 High Resolution Camera



Using patented pixel shifting technology, each CCD pixel captures full chromatic information resulting in increased color resolution with no degradation. The INFINITYX-32 is the first pixel shifting camera to utilize the highly sensitive SONY ICS274 sensor. Available at a fraction of the cost of competitive cameras, this complete imaging solution is an affordable, extraordinary tool for professionals in clinical, life and material sciences where megapixel resolution, color accuracy and light sensitivity are essential.

HIGHLIGHTS

- 32 megapixel pixel shifting camera
- 2, 8, 16 and 32 megapixel resolution on capture
- Highly sensitive, low noise CCD with remarkable color quality for the most demanding applications
- 12 fps at full 1616X1216 resolution, 25 fps at smaller regions of interest
- 8 & 12-bit selectable output format



For camera software and specifications, see page 754 >>>>

Cat #	Description	Qty.
95116	INFINITYX-32C 32 Megapixel CMOS Color Camera	each
95117	INFINITYX-32M 32 Megapixel CMOS Monochrome Camera	each

► **NEW INFINITYHD 1080p60 HD Microscopy Camera**

Lumenera's INFINITYHD high definition CMOS color microscopy camera is a full featured, standalone, high definition scientific imaging solution offering full 1080p60 preview with superb color reproduction and extremely fast frame rates streaming direct to monitor.



Operate the camera by directly connecting to a monitor without connecting to a PC, or utilize the plug-and-play USB 2.0 image capture. With extremely fast response times, the INFINITYHD quickly reacts to lighting changes in any life science, clinical or material application. Video output over HDMI connector to either a DVI or HDMI monitor. 3 on-camera buttons allow easy access to power, white balance and image capture.

Superior Color Reproduction:

Years of experience in the microscopy market have allowed Lumenera to develop specialized color algorithms ensuring excellent color reproduction. This results in a sample preview on a monitor that closely matches the view on the microscope eyepiece.

Full Frame Rates:

The INFINITYHD camera provides the required 60 fps for true high definition, unlike many competitors professing to be HD but offering considerably lower frame rates. This allows for smooth manipulation on the preview without any lag.

INFINITYHD Software

The included INFINITYHD software allows for image capture. The software is intuitive and can be set up in minutes. Once the camera is initially installed, the camera can run independently or used via the high-speed USB 2.0 connection.

HIGHLIGHTS

- 1/3" (16:9) CMOS 2 megapixel sensor
- 1080p60 high definition format 1920 x 1080
- Direct output to HDMI monitor
- 3 on-camera buttons for power, white balance and capture
- Optional USB 2.0 output to PC
- INFINITYHD software compatible with Windows XP, Vista, Windows 7, 32 and 64-bit, for image capture

APPLICATIONS

Brightfield, Darkfield, Live Cell Imaging, Histology, Pathology, Cytology, Defect Analysis, Semiconductor Inspection, Metrology

For camera software and specifications, see page 754 >>>>

Cat #	Description	Qty.
95128	INFINITY HD 2 MP HD Color Camera	each

► **NEW INFINITYlite 1.5 Megapixel CMOS USB 2.0 Camera**

The INFINITYlite is specifically designed for the educational market as well as entry level microscopy applications. It is a compact, affordable microscopy camera that delivers outstanding image quality and excellent value. Highlights include live video preview and focus for the efficient capture of optimal images, as well as full integration to popular third-party imaging applications through our TWAIN drivers.



HIGHLIGHTS

- Progressive scan 1.5 megapixel CMOS sensor
- Full color sub-windowing allows for rapid focus and scanning of samples
- Software compatible with Windows XP, Windows Vista and Windows 7, 32 and 64-bits
- Includes TWAIN and DirectX/Direct Show support

APPLICATIONS

All typical entry-level industrial, clinical and life science applications including: Teaching Labs, Brightfield/Darkfield, Histology, Pathology, Cytology, Defect Analysis, Veterinary Pathology, Geology, Histology, Semiconductor Inspection, Documentation, DIC, Live Cell Imaging

Technical Specifications:

Camera Sensor	
Image Sensor	1.5 Megapixel 1/2.5" CMOS format, color, 6.0 x 4.5 mm array
Resolution / Pixel Size	1440 x 1080, 4.2µm square pixels
Frame Rate	10 fps at full resolution
Dynamic Range	47.5 dB
Bit Depth	8-bits uncompressed
Read Noise	53 e-
Camera Controls	
Mass	245 g
Power Requirement	USB bus power
Power Consumption	~2.5 W
Operating Temperature	0 to +50 °C
Operating Humidity	5 to 95 %, Non-condensing
Exposure Range	81 µs to 339 ms (video), 81 µs to 339 ms (snapshot)
Region of Interest Control	Any multiple of 8 x 8 pixels, 32 x 32 pixels minimum
Exposure	Manual and automatic control
White Balance	Manual and automatic control
Gain	1 to 7.75 x
Interface Connector	USB 2.0 high-speed interface
Dimensions (L x W x H)	2.60 x 1.91 inch
Lens Mount	C-Mount lens adapter

Cat #	Description	Qty.
95129	INFINITYliteB 1.5 Megapixel CMOS Camera	each

INFINITY Software

All Lumenera INFINITY cameras include INFINITY ANALYZE software at no extra charge, allowing complete camera control and advanced image acquisition and analysis.

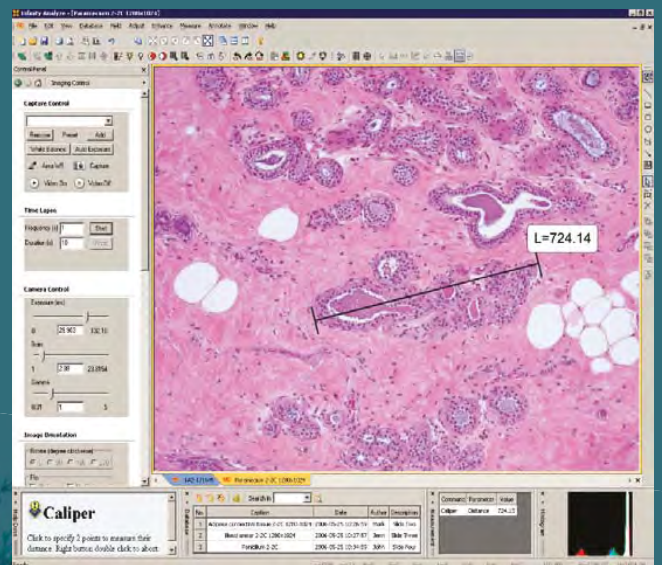
Also included is INFINITY CAPTURE, an intuitive user interface that contains all of the basic features needed to control the camera and capture images.

Easily integrate your INFINITY camera with 3rd party software applications through our TWAIN and DirectX/WDM interface (included) as well as 3rd party drivers for most image analysis packages.

An Advanced Features Model is available as an accessory to perform depth of focus and spherical aberration correction.

INFINITY ANALYZE Features Include:

- Real time video preview
- Measurement and annotation
- Archiving with search for date, author, description
- Fluorescent image composition including RGB Look-Up Tables (LUT)
- Single capture and time lapse
- Image stitching
- Automatic/manual exposure and white balance
- Hue, saturation, gain, contrast, brightness and gamma controls
- Advanced image processing
- Customize interface for specific applications
- Thumbnail worksheet
- Drag and drop measurement data to Microsoft Excel for analysis
- Save and restore camera settings
- Context sensitive help for all functions
- Optional focus enhancement
- Interactive color composition
- Available in 9 languages: English, Latin, Spanish, Castilian Spanish, Italian, Russian, Japanese, Chinese, Korean and French



Note: INFINITY ANALYZE not included with INFINITYHD, only the INFINITYHD software.

Specification Guide

- Auto/Manual Exposure
- Auto/Manual White Balance
- Programmable Gain, 1 to 10X Optimizable
- C-Mount Lens Adapter
- USB 2.0 High-Speed Interface (USB 480 MB/s vs. Firewire 400 MB/s)
- Power: INFINITY1 & 2 - USB Bus Power, INFINITY3 - External 5VDC - 500mA, INFINITYX - External 6VDC - 500mA
- Operating Temperature 0°C to +50°C
- Operating Humidity 5% to 95%, Non-condensing



Model (Color/Mono)	Megapixel	Resolution	Sensor	C-Mount Coupler	Pixel Pitch	Frame Rate	Bit Depth	Read Noise	Binning/ Sub Sampling	Region of Interest
INFINITY1										
INFINITY1-2 C	2.0	1600 x 1200	1/2" CMOS	0.5X	4.20	15	8 or 10	20 e-	N/Y	Y
INFINITY1-3 C	3.1	2048 x 1536	1/2" CMOS	0.5X	3.20	12	8 or 10	20 e-	N/Y	Y
INFINITY1-5 C or M	5.0	2592 x 1944	1/2.5" CMOS	0.5X	2.20	5	8 or 10	20 e-	N/Y	Y
INFINITY2										
INFINITY2-1R C or M	1.4	1392 x 1040	1/2" CCD	0.5X	4.65	15	8 or 14	8.5 e-	Y/Y	Y
INFINITY2-2 C or M	2.0	1616 x 1216	1/1.8" CCD	0.5X	4.40	12	8 or 12	12 e-	Y/Y	Y
INFINITY2-3 C	3.3	2080 x 1536	1/1.8" CCD	0.5X	3.45	5	8 or 12	12 e-	Y/Y	Y
INFINITY2-5 C or M	5.0	2448 x 2048	2/3" CCD	0.63X	3.45	8	8 or 12	12 e-	Y/Y	Y
INFINITY3										
INFINITY3-1 C or M	1.4	1392 x 1040	2/3" Cooled CCD	0.67X	6.45	15	8 or 12	8 e-	Y/Y	Y
INFINITY3-1UR C or M	1.4	1392 x 1040	2/3" CCD	0.67X	6.45	30	8 or 14	6 e-	Y/Y	Y
INFINITY3-3UR										
INFINITY3-3UR C or M	SEE PAGE 751 FOR TECHNICAL SPECIFICATIONS									
INFINITY4										
INFINITY4-11 C or M	10.7	4008 x 2672	35mm Format CCD (43.3mm)	Custom F-Mount	9.00	3.5	8 or 12	12 e-	Y/Y	Y
INFINITYX										
INFINITYX-32 C or M	32	6464 x 4864	1/1.8" CCD	0.5X	4.40	12	8 or 12	12 e-	Y/Y	Y
INFINITYHD										
INFINITYHD C	2.0	1920 x 1080	1/3" CMOS	0.33, 0.4 or 0.5X	2.70	60	8	8.7 e-	N/A	N/A

SECTION 20

Tweezers, Micro-Tools, Tools, and Gadgets

EMS's Tweezer Line

Dumont Tweezers

Rubis Steel, Plastic, and Wafer Tweezers

High Tech Tweezers (Nano, Ion, Grip)

Plastic Tweezers and Tweezer Accessories

Dissecting Tools and Instruments

- *Diamond Dissecting Scalpel Blade*

- *MicroPoint Scissors, Micro Forceps, and Micro Dissecting*

- *Forceps, Scissors, Needles, and Dissecting Kits*

Files, Calipers, Scribes, Burnishing Tools,
Sharpening Stones

Flexible Shaft Machine and Abrasive Wheels

Vises, Clamps, Wrenches, Screwdrivers, Pliers, and
Tool Kits

Micro Manipulators and Probes

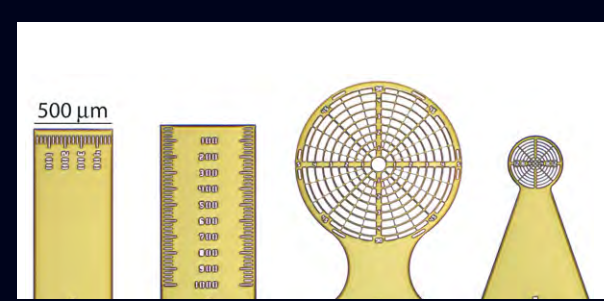
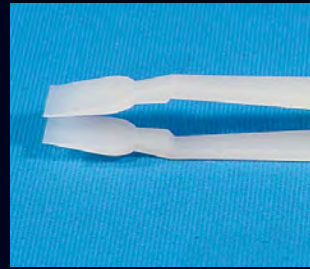
Mini-Tools, Pin Vise, Diamond Scribing Tools, and
Spatulas

Forceps Warmer, Heaters, Demagnetizer and Third
Hand

Timers, pH, Counters, Light Meters, Thermometers,
Microwave Detectors

Smart Tweezers, Vacuum Pick-up, and Pen Vac

MicroSample Manipulation and Measurements :
Tools



**Electron
Microscopy
Sciences**



► Tweezers: EMS, Dumont, and Rubis

For more than 36 years, Electron Microscopy Sciences has supplied the highest quality tweezers available from the finest manufacturers in the world. These high-quality tweezers are all available in a variety of materials and many different types, finished to the highest precision and finest quality.

► EMS's Personal Fine and General Purpose Tweezers

EMS proudly introduces a full selection of tweezers and forceps with all hand-crafted to a perfect tip symmetry and balance, high quality and innovative tweezers, that are well suited for many applications:

EM Labs – General Labs - Electronic – Aerospace – Precision assembly – Optic – Biotech – Chemistry – Surgery - etc.

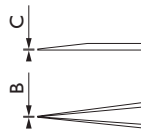
MATERIALS USED:

- **Type SA low carbon austenitic steel** - non magnetic, generally used where corrosion resistance and toughness are primary requirements.
- **Super-Alloy Type NC:** Ni-Cr-Mo super-alloy. Excellent chemical resistance. Withstands temperatures up to 800°C. Fully non-magnetic with a very high shape retention and resistance to fatigue. Recommended for all precision work.
- **Aluminum alloy AL:** low density, high electrical and thermal conductivity, good corrosion resistance in common environments, lightweight – only used for the making of tweezers handle.
- **Titanium alloy TA:** relatively low density (4.5g/cm³), good mechanical properties and high use temperature (1600°F/870°C); good corrosion resistance and non-magnetic. Generally it is used in addition to the high heat and corrosion resistance, a very high strength-to-weight ratio is required.
- **PTFE coatings, TE:** superior anti-scratch, non-stick material. Insulation and very high corrosion resistance. Continuous use temperature 150°C (300°F)
- **Ceramic MZ:** zirconia toughened alumina (ZTA). Non-porous. Superior of hardness, corrosion, heat resistance, and insulation.
- **Conductive plastic CF (PA66/CF30):** polyamide 66 reinforced with 30% carbon fiber
- **Non-conductive plastic RF (PET'GF30):** polyethylene terephthalate reinforced with 30% glass fiber.
- **PEEK/CF30:** Polyetheretherketone reinforced with 30% wt% carbon fiber - High Performance Plastic Type CP. Very hard, high tensile and flexural strength, high wear resistance. High heat (260 -300°C) resistant. Excellent resistance to most chemicals. ESD safe, low surface resistivity (10² ohm). Directly substitute for all CF or RF
- **Soft ESD cushion grip** static dissipative (ESD safe). NBR vulcanized rubber
- **Synthetic fiber SV:** PVDF, polyvinylidene fluoride carbon fiber reinforced
- **Nickel plating: NP-** Superior corrosion resistance to saltwater, alkalies and organic acids.

► 1. NEW EMS High End Medical Tweezers

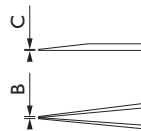
EMS is proud to introduce this new category of Tweezers. They are all handcrafted to perfect tip symmetry and balance and the surface has an electropolish finish. With high precision fine tips and Dot Serrated handles for a perfect grip. All of these tweezers can be sterilized and they are all made from Inox.

► 1LUSO.S Surgical Tweezers



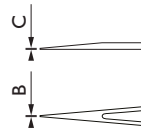
Cat. No.	OAL [mm]	[inch]	B [mm]	[inch]	C [mm]	[inch]	Qty.
78920-01	120	4.7244	0.20	0.0079	0.12	0.0047	each

► 2LUSO.S Surgical Tweezers



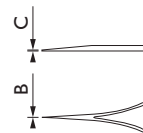
Cat. No.	OAL [mm]	[inch]	B [mm]	[inch]	C [mm]	[inch]	Qty.
78920-02	120	4.7244	0.34	0.0134	0.14	0.0055	each

► 3LUSO.S Surgical Tweezers



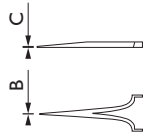
Cat. No.	OAL [mm]	[inch]	B [mm]	[inch]	C [mm]	[inch]	Qty.
78920-03	120	4.7244	0.17	0.0067	0.10	0.0039	each

► **4LUSO.S**
Surgical Tweezers



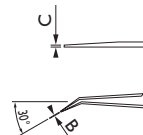
Cat. No.	OAL [mm]	[inch]	B [mm]	[inch]	C [mm]	[inch]	Qty.
78920-04	110	4.3307	0.13	0.0051	0.08	0.0031	each

► **5ALUSO.S**
Surgical Tweezers



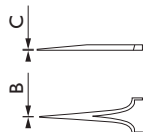
Cat. No.	OAL [mm]	[inch]	B [mm]	[inch]	C [mm]	[inch]	Qty.
78920-05	115	4.5275	0.13	0.0051	0.08	0.0031	each

► **5BLUSO.S**
Surgical Tweezers



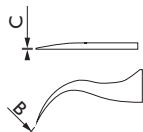
Cat. No.	OAL [mm]	[inch]	B [mm]	[inch]	C [mm]	[inch]	Qty.
78920-06	110	4.3307	0.10	0.0039	0.06	0.0024	each

► **5LUSO.S**
Surgical Tweezers



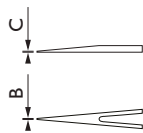
Cat. No.	OAL [mm]	[inch]	B [mm]	[inch]	C [mm]	[inch]	Qty.
78920-07	110	4.3307	0.10	0.0039	0.06	0.0024	each

► **7LUSO.S**
Surgical Tweezers



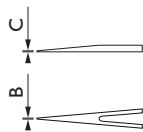
Cat. No.	OAL [mm]	[inch]	B [mm]	[inch]	C [mm]	[inch]	Qty.
78920-08	115	4.5275	0.17	0.0067	0.10	0.0039	each

► **27LUSO.S**
Surgical Tweezers



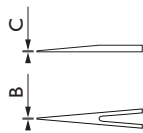
Cat. No.	OAL [mm]	[inch]	B [mm]	[inch]	C [mm]	[inch]	Qty.
78920-09	135	5.3150	0.17	0.0067	0.10	0.0039	each

► **65ALUO.S**
Surgical Tweezers



Cat. No.	OAL [mm]	[inch]	B [mm]	[inch]	C [mm]	[inch]	Qty.
78920-10	140mm	5.5180	0.10	0.039	0.06	0.0224	each

► **SSLUSO.S**
Surgical Tweezers



Cat. No.	OAL [mm]	[inch]	B [mm]	[inch]	C [mm]	[inch]	Qty.
78920-11	140	5.5118	0.10	0.0039	0.06	0.0024	each

► 2. EMS High Precision and Ultra Fine Tweezers

- Very popular tweezers.
- Tweezers possess the highest quality.
- These tweezers have an anti-glare satin finish.
- All tweezers are antimagnetic/anti-acid steel-SA (otherwise, specified).

► Style 0

Flat edges, fine tips. Length: 4¾" (120mm)

78310-0	EMS 0, SA	each
78510-0	EMS 0, NC – Ultra-Fine	each



► Style 00

Flat edges, strong tips. Length: 4¾" (120mm)

78311-00	EMS 00, SA	each
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► Style 000

Same as 00 with radiused edges. Length: 4¾" (120mm)

78312-000	EMS 000, SA	each
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► Style 00B

Same as 00 with serrated grips. Length: 4¾" (120mm)

78313-00B	EMS 00B, SA	each
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► Style 00D

Same as 00 with serrated tips and grips. Length: 4¾" (120mm)

78314-00D	EMS 00D, SA	each
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► Style 0A

Straight point with radiused outside edges, fine tips. Length: 4¾" (120mm)

72919-0A	EMS 0A, SA	each
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► Style 1

Fine, accurate, strong tips. Length: 4¾" (120mm)

78316-1	EMS 1, SA	each
78516-1	EMS 1, NC – Ultra Fine	each



► Style 10G

Fine tips, general purpose uses. Length: 4¾" (110mm)

78324-10G	EMS 10G, SA	each
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► Style 15A

Sharp with 12mm flat cutting jaws. Carbon Steel. Length 4½" (115mm)

78360-15A	EMS 15A, SA	each
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► Style 15ASW

10mm curved cutting jaws. Carbon Steel. Length: 4½" (115mm)

78360-15ASW	EMS 15ASW, SA	each
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➤ 2. EMS High Precision and Ultra Fine Tweezers (continued)

➤ Style 2

Strong, sharp tips. Length: 4¾" (120mm)

78317-2	EMS 2, SA	each
78517-2	EMS 2, NC – Ultra Fine	each



78317-2

➤ Style 2AZ

Same tip as 2 but 'Z' shape. Length 4¾" (120mm)

78317-2AZ	EMS 2AZ, SA	each
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78317-2AZ

➤ Style 2AX

Flat, round tips with self-closing. Length: 4¾" (120mm)

78317-2AX	EMS 2AX, SA	each
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78317-2AX

➤ Style 2A and 2 AB

Provides a larger flat gripping surface for better handling of small objects without puncturing them (membrane, wafer etc.). Available with either straight tips (style 2A) or curved tips (style 2AB). Length 4¾" (120mm)

72919-2A	EMS 2A, SA	each
72919-2ATe	EMS 2A PTFE Coating	each
72919-2ATa	EMS 2A Titanium Alloy	each
72919-2AB	EMS 2AB, SA	each



72919-2A



72919-2ATe



72919-2ATA



72919-2AB

➤ Style 26

Very strong, sharp tips. Length: 5¼" (135mm)

78328-26	EMS 26, SA	each
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78328-26

➤ Style 3

Very Fine Tips and superior finish. Length: 4¾" (120mm)

78318-3	EMS 3, SA	each
78518-3	EMS 3, NC – Ultra-Fine	each
78318-3GP	EMS #3 with Gold Plating	each



78318-3

➤ Style 3C

Shorter than style 3. Very fine tips and superior finish. Length 4¼" (110mm)

78318-3C	EMS 3C, SA	each
78518-3C	EMS 3C, NC – Ultra-Fine	each
78318-3CTa	EMS Titanium Alloy	each



78318-3GP



78318-3C

➤ Style 3CB

Very sharp, superior finish, bent tips. Length: 4¼" (110mm)

78318-3CB	EMS 3CB, SA	each
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78318-3CB

➤ Style 3F

Tips are touching over 3mm (parallel tips), useful for handling tiny wires. Length: 4¾" (120mm)

78318-3F	EMS 3F, SA	each
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78318-3F

➤ Style 3R

Very sharp, reverse action tweezers. Length is 4¾" (120mm)

78318-3R	EMS 3R, SA	each
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➤ Style 3X

Very sharp tips, self-closing. Length: 4¾" (120mm)

78318-3X	EMS 3X, SA	each
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78319-4R

► 2. EMS High Precision and Ultra Fine Tweezers (continued)

► Style 4

Extra fine tips. Superior finish. Length: 4¼" (110mm)

78319-4	EMS 4, SA	each
78519-4	EMS 4, NC – Ultra Fine	each

► Style 4A

Extra fine and strong tips. Length: 4¼" (110mm)

78319-4A	EMS 4A, SA	each
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► Style 4R

Extra fine tips, reverse action tweezers. Length: 4¼" (110 mm)

78319-4R	EMS 4R, SA	each
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► Style 4X

Extra fine tips, self-closing. Length: 4¼" (110mm)

78319-4X	EMS 4X, SA	each
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78319-4R



78318-3X



78319-4



78319-4A



78319-4X

► Style 5

Extra fine tips, superior finish. Length: 4¼" (110mm)

78320-5	EMS 5, SA	each
78520-5	EMS 5, NC - Ultra Fine	each
78320-5Te	EMS 5, SA, PTFE Coating	each
78320-5GP	EMS 5, SA, Gold Plating	each
78320-5Ti	EMS 5, SA, Titanium Alloy	each



78320-5



78320-5Te



78320-5GP



78320-5Ti

► Style 5A

Extra fine tips. Length 4½" (115mm)

78320-5A	EMS 5A, SA	each
78520-5A	EMS 5A, NC – Ultra Fine	each



► Style 5B

Extra fine, bent tips, maximum visibility. Length 4¼" (110mm)

78320-5B	EMS 5B, SA	each
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► Style 5C

Extra fine, double bent tips. Length: 4½" (115mm)

78320-5C	EMS 5C, SA	each
78520-5C	EMS 5C, NC – Ultra Fine	each



➤ 2. EMS High Precision and Ultra Fine Tweezers (continued)

➤ Style 5AX

Extra fine tips, self-closing. Length 4½" (115mm)

78320-5AX	EMS 5AX, SA	each
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➤ Style 5TTH

Anti-capillary, extra fine tips with locking ring. Useful for handling E.M. grids. Length: 4½" (110mm)

78320-5TTH	EMS 5TTH, SA	each
78520-5TTH	EMS 5TTH, NC – Ultra Fine	each



➤ Style 5X

Extra fine tips, self-closing. Length: 4½" (110mm)

78320-5X	EMS 5X, SA	each
78520-5X	EMS 5X, NC – Ultra Fine	each
78320-5XGP	EMS 5X, SA, with Gold Plating	each



➤ Style 51S

Extra fine, bent tips. Useful for handling EM grids. Length: 4½" (115mm)

78340-51S	EMS 51S, SA	each
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➤ Style 52A

Crush proof, flat tips, smooth action design. Length: 4¾" (120mm)

78341-52A	EMS 52A, SA	each
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➤ Style 6

Fine, angled tips. Length: 4½" (115mm)

78321-6	EMS 6, SA	each
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➤ Style 62A

Flat, blunt tips. Ideal for handling coverglass. Length: 4¾" (120mm)

78350-62A	EMS 62A, SA	each
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➤ Style 7

Fine Curved tips. Length 4½" (115mm)

78322-7	EMS 7, SA	each
78522-7	EMS 7, NC – Ultra Fine	each
78322-7Te	EMS 7, SA with PTFE Coating	each
78322-7GP	EMS 7, SA Gold Plating	each
78322-7Ta	EMS 7, Titanium Alloy	each



➤ Style 7B

Fine, curved and serrated tips. Length: 4½" (115mm)

78322-7B	EMS 7B, SA	each
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➤ Style 7E

Fine, curved tips and flat edges. Length 4½" (115mm)

78322-7E	EMS 7E, SA	each
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► 3. EMS Super Slim and Long Tweezers

These long and slender tweezers work well in multiple precision applications and are especially well suited for working near heat sources. Made from SA steel.

► Style 60

Sharp, relieve tips. Length: 5½" (140mm)

78348-60	EMS 60, SA	each
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► Style 64A

Sharp, curve tips. Length: 5½" (140mm)

78351-64A	EMS 64A, SA	each
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► Style 65A

Sharp, bent tips. Length 5½" (140mm)

78351-65A	EMS 65A, SA	each
78551-65A	EMS 65A, NC – Ultra Fine	each



► Style 66

Sharp, double bent tips allow more visibility. Length: 5½" (140mm)

78351-66	EMS 66, SA	each
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► Style SS

Long and narrow straight tips. Length: 5½" (140mm)

72919-SS	EMS SS, SA	each
72919-SSUF	EMS SS, NC – Ultra Fine	each



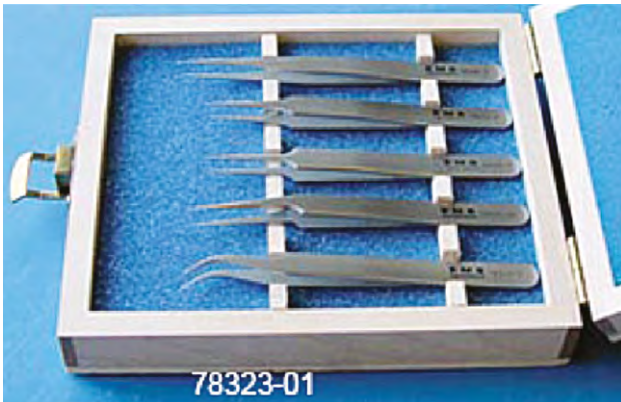
► Style SSL

Long and narrow tips, ergonomic shape. Length: 6" (150mm)

78353-SSL	EMS SSL, SA	each
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► EMS Tweezers Sets in Wooden Case



Set 1: For fine and precision work, this set includes one each of: Style 3 (#78318-3), style 4 (#78319-4), style 5 (#78320-5), Style 5A (#78320-5A), and style 7 (#78322-7)

78323-01	Fine EMS Tweezers Set 1	5/set
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Set 2: For general fine and miniature work, this set includes one each of: Style 0 (78310-0), style OOB (&8313-00B), style 2 (#78317-2), style 2A (#72919-2A) and style 2AX (78317-2AX)

78323-02	EMS Tweezers Set 2	5/set
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► The Tweezer Repair Kit

This repair kit allows you to straighten, resharpen, and repair your tweezers that have been damaged or have become dull. Instructions are included with the kit

The kit includes:

■ 1 Sharpening stone ■ Ten O-rings ■ Instrument Oil, 50 ml ■ Chain nose pliers



Cat. #	Description	Qty.
72892-10	The Tweezer Repair Kit	Kit

► 4. EMS Ergonomic Tweezers

They are ultra lightweight and very soft tension. Provides extraordinary relief from hand fatigue and Carpal Tunnel Syndrome. The handle is made from Aluminum and SA (stainless steel low carbon austenitic steel) tips. These tweezers have 30% less weight and 50 % less tension.

► Style E00 SA/AL

Flat edges, thick and strong tips. Length: 5½" (136mm)

78380-E00 EMS E00 SA/AL each



► Style E2A SA/AL

Flat and round tips. Length: 5½" (136mm)

78382-E2A EMS E2A SA/AL each



► Style E3 SA/AL

Very sharp tips and superior finish. Length: 5½" (136mm)

78383-E3 EMS E3 SA/AL each



► Style E5 SA/AL

Extra fine tips and superior finish. Length: 5½" (136mm)

78385-E5 EMS E5 SA/AL each



► Style E7 SA/AL

Fine curve tips. Length: 5½" (136mm)

78387-E7 EMS E00 SA/AL each



► 5. EMS Flat-Tip Tweezers

Made from SA steel and they have serrated grips.

► Style 125

Smooth, flat, and no scratch tips. Length: 4¾"(120mm). Tip 4.4mm wide.

78332-125 EMS 125 each



► Style 125A

Same as #125 but with elongated tips. Tip 2.7mm wide.

78332-125A EMS 125A each



► Style 127 and Style 128

Thin and square tips, straight (Style 127), curved (style 128). Length: 4" (105mm)

72972-SP EMS 127 each

72972-AP EMS 128 each



72972-SP



72972-AP

► Style 33A

Flat round tips. Length 4½" (115mm). Tip 6.6mm wide.

78333-33A EMS 33A each



► Style 34A

Smooth and wide tips, good for handling delicate parts. Length: 4¾" (120mm) Tip 6.3mm wide

78334-34A EMS 34A each



► 5. EMS Flat Tip Tweezers (continued)

► Style 35A

Smooth and short wide tips. Length: 4¾" (120mm). Tip 6.7mm wide

78335-35A	EMS 35A	each
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► Style 35B

Same as Style 35A, but with curved tips. Length 118mm (4¾")

78211-01	Tweezers Style 35B	each
78211-06	Tweezers Style 35B	6/pk

► Style 574/A

Flat and tips bent upward, tip width: 6mm. Length 145mm (5¾")

78212-01	EMS Style 574/A Tweezers	each
78212-06	EMS Style 574/A Tweezers	6/pk

► Style 36A

Same as #34A but upward bent tips. Length 4¾" (120mm). Tip 6.2mm wide

78336-36A	EMS 36A	each
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► Style 50

Flat and narrow tips. Length: 4¾" (120mm). Tip 3.8mm wide

78337-50	EMS 50	each
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► 6. EMS ESD Safe Tweezers

Soft ESD safe cushion grips (resistively 10E8 ohm). These tweezers are ergonomically designed.

► Style 00 SA/DR

Flat edges and strong tips. Length: 4¾" (120mm)

78390-00	EMS 00SA/DR	each
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► Style 2A SA/DR

Flat round tips. Length 4½" (115mm)

78392-2A	EMS 2A SA/DR	each
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► Style 3 SA/DR

Very sharp and superior finish. Length: 4¾" (120mm)

78393-3	EMS 3 SA/DR	each
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► Style 3C SA/DR

Very sharp and superior finish. Length: 4¾" (110mm)

78393-3C	EMS 3C SA/DR	each
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► Style 5 SA/DR

Very sharp and superior finish. Length: 4¾" (120mm)

78395-5	EMS 5 SA/DR	each
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► Style 7 SA/DR

Fine and curve tips. Length: 4½" (115mm)

78397-7	EMS 7 SA/DR	each
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► 7. EMS Ceramic Tweezers

General Information: The wide range of materials that falls within this classification includes traditional ceramics (clay minerals, cement and glass) and advanced ceramics (pure and partially modified ceramics compounds such as alumina or zirconia ceramics).

These materials are typically:

- Insulating to the passage of electricity and heat.

- More resistant to higher temperatures and harsher environments than metal and plastic tweezers.
- Ceramics are hard but usually very brittle.

Applications: For the production of our EMS precision tools, we have chosen an uniquely advanced ceramic compound; Zirconia Toughened Alumina (ZTA) It was chosen due to its fracture toughness and its high flexural strength.

MZ – Zirconia Toughened Alumina (ZTA):

- A superior combination of high strength (from zirconia) and extreme hardness (from alumina).
- Possesses relatively low density; no open porosity.
- Offers a very hard surface with good abrasion and wear resistance.
- Has good flexural strength and fracture toughness.

- Excellent thermal properties and high temperature stability.
- Extreme corrosion resistance, nearly chemically inert.
- Electrically insulating.
- Typically applications include soldering processes, handling of components during thermal and chemical processes. Generally these tweezers are used when very rigid tips are required.

Ceramic Tweezers are best suited for working with acids (except HF), for SDM, solders pot, and high temperature exposure. Clean room approved. Can be sterilized. Solder repellent.

► **Style 8501**

Straight, tips 1mm wide, serrated. Length: 5" (125mm)

78126 EMS Ceramic Tweezers 8501 each



► **Style 8501 FGG**

Straight, tips 0.3mm wide, smooth, very fine. Length: 5" (125mm)

78122 EMS Ceramic Tweezers 8501 FGG each



► **Style 8507**

Curved, tips 1mm wide, smooth. Length: 5" (125mm)

78120 EMS Ceramic Tweezers 8507 each



► 8. EMS Ceramic Tip Tweezers

These tweezers have Zirconia ceramic precision tips. Surface resistivity 10E12 ohm. Contamination free, high temperature (1000°C). Aluminum handles. Lightweight.

► **Style 2A MZ**

Ceramic tip length 35mm. Tip width: 2 mm. Length: 5¼" (134mm)

78127-2A EMS 2A MZ Ceramic Tip each



► **Style 71 MZ**

Ceramic tip length: 30mm. Tip width 0.3mm. Length: 5¼" (134mm)

78127-71 EMS 71 MZ Ceramic Tip each



► **Style 72 MZ**

Ceramic tip length: 30mm. Tip width 0.2mm. Length: 5¼" (134mm)

78127-72 EMS 72 MZ Ceramic Tip each



► **Style 73 MZ**

Ceramic tip length: 33mm. Tip width 0.3mm. Length: 5¼" (134mm)

78127-73 EMS 73 MZ Ceramic Tip each



► **Style 74 MZ**

Ceramic tip length 40mm. Tip width 0.5mm. Length: 5¼" (134mm)

78127-74 EMS 74 MZ Ceramic Tip each



► **Style 7 MZ**

Ceramic tip length: 43.5mm. Tip width 0.6mm. Length: 5¼" (134mm)

78127-7 EMS 7 MZ Ceramic Tip each



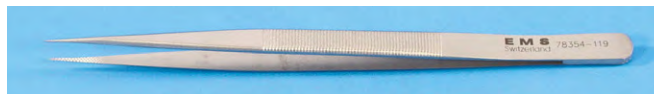
► 9. EMS General Purpose Tweezers

Very well made tweezers that serves a wide range of applications, from electronics to dentistry and anatomy. The tweezers have extremely accurate serration quality: different lengths and tip sizes, and they come either straight or curved.

► Style 119

Fine and extremely accurate serration tips. Length: 6" (150mm)

78354-119 EMS 119 each



► Style 119L

Long, and strong tips. Length: 7" (180mm)

78354-119L EMS 119L each



► Style 120

Strong and dull tips. Length: 6" (150mm)

78355-120 EMS 120 each



► Style 120A

Short, fine and sturdy tips. Length: 4¼" (110mm)

78355-120A EMS 120 each



► Style 122

Fine, bent, serrated tips. Length: 6" (150mm)

78357-122 EMS 122 each



► Style 123

Fine, double bent tips. Length: 6" (150mm)

78358-123 EMS 123 each



► Style 124

Same as 122 but stronger and blunt tips. Length: 6" (150mm)

78359-124 EMS 124 each



► Style 321

Flat and elongated tips. Length: 4¾" (120mm)

78362-321 EMS 321 each



► Style 646

Curved, serrated tips with guide pin. Length 6" (150mm)

78365-646 EMS 646 each



► Style 775

Bent and fine tips with PVC coated handle. Length: 6½" (155mm)

78369-775 EMS 775 each



► Style 61A

Curved tips with slits on both tips. Used for handling thin discs. Length: 4¼" (110mm)

78349-61A EMS 61A each



► Style GG

Long and strong tips. Length: 5" (130mm). Nickel Plated

78372-GG EMS GG each



► 10. EMS Fiber Tip Tweezers

The handles are made from Antimagnetic Steel (SA), Tip from Synthetic Fibers.

Synthetic Fibers

High-performance Plastic type CP - PEEK/CF30 (Polyetheretherketone reinforced with 30 wt% carbon fiber)

- Very hard, high tensile and flexural strength.
- High heat- 260 – 300°C – resistance to thermal ageing.
- Excellent chemical resistance.
- ESD safe – low surface resistivity (10^2 Ohm).

Engineering Plastic type CF - PA66/CF30 (Polyamide 66 reinforced with 30 wt% carbon fiber).

- Heat stable(-40°C to 190°C).
- Rigidity, excellent tensile strength and flexural strength.
- Good chemical resistance (oils, greases, fuels, non-polar solvents); not resistant to strong acids, alkalis and hot water or steam.
- ESD safe, (avoids dust attraction, sparks, ignition sources).
- Good conductivity.

► Style 00

A = 5" (130mm); B = 0.04" (1.0mm); C = 0.08" (2.0mm)

78080-CP	EMS 00 PEEK	each
78080-CF	EMS 00 CF	each

► Style 2A

A = 5" (130mm); B = 0.07" (1.8mm); C = 0.04" (1.0mm)

78084-CP	EMS 2A PEEK	each
78084-CF	EMS 2A CF	each

► Style 2AB

A = 5" (130mm); B = 0.07" (1.8mm); C = 0.04" (1.0mm)

78085-CP	EMS 2AB PEEK	each
78085-CF	EMS 2AB CF	each

► Style 3

A = 5" (130mm); B = 0.03" (0.8mm); C = 0.05" (1.3mm)

78090-CP	EMS 3 PEEK	each
78090-CF	EMS 3 CF	each

► Style 5

A = 5" (130mm); B = 0.02" (0.5mm); C = 0.025" (0.6mm)

78092-CP	EMS 5 PEEK	each
78092-CF	EMS 5 CF	each

► Style 5X

A = 5" (130mm); B = 0.02" (0.5mm); C = 0.025" (0.6mm)

78094-CP	EMS 5X PEEK	each
78094-CF	EMS 5X CF	each

► Style 7

A = 5" (130mm); B = 0.025" (0.6mm); C = 0.025" (0.6mm)

78095-CP	EMS 7 PEEK	each
78095-CF	EMS 7 CF	each

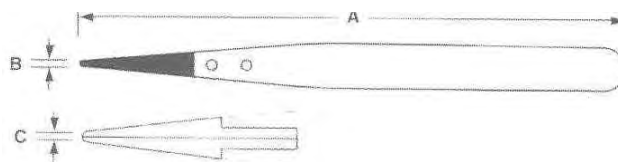
► Style 259

A = 5" (130mm); B = 0.025" (0.6mm); C = 0.04" (1.0mm)

78010-CP	EMS 259 PEEK	each
78010-RF	EMS 259 RF	each

Non Conductive Plastic RF – PET/GF30 (Polyethylene terephthalate reinforced with 30 wt% glass fiber)

- High tensile and flexural strength.
- Good chemical resistance and low moisture absorption.
- Electrically insulation.
- High temperature capability.
- White in color.



► **Style 269**

A = 5" (130mm); B = 0.12" (3.0mm); C = 0.07" (1.8mm)

78012-CP	EMS 269 PEEK	each
78012-RF	EMS 269 RF	each

► **Style 248**

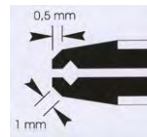
A = 5" (130mm); B = 0.4" (10mm); C = 0.07" (1.8mm)

78014-CP	EMS 248 PEEK	each
78014-RF	EMS 248 RF	each

► **Style 250**

A = 5" (130mm); B = 0.4" (10mm); C = 0.07" (1.8mm)

78016-CP	EMS 250 PEEK	each
78016-RF	EMS 250 RF	each

► **11. EMS Synthetic Fiber Tweezers**

These fiber tweezers are made from SV plastic which is based on polyvinylidene fluoride (PVDF).

Features:

- Good mechanical strength and toughness.
- Smooth surface.
- Continuous use temperature up to 150°C.
- High purity (clean room and medical devices approved, low extraction value).

- Excellent chemical resistance to most aggressive substances.
- Outstanding resistance to HF, HNO₃, HCl (all concentrations. 90°C).
- Resistant to UV and radiation (sterilization).
- ESD safe, very low surface resistivity.
- Typical applications include the handling of very soft and contamination sensitive materials as well as the handling of wafers during chemical processes etc.

► **Style 702A**

Flat tips. 4 5/8" (116mm)

78460-702A	EMS Fiber Tweezers 702A	each
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► **Style 705**

Flat tips. 4 1/2" (114mm)

78460-705	EMS Fiber Tweezers 705	each
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► **Style 707**

Pointed tips. 4 1/2" (114mm)

78460-707	EMS Fiber Tweezers 707	each
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► **Style 708**

Pointed and hook tips. 4 3/8" (110mm)

78460-708	EMS Fiber Tweezers 708	each
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► **Style 709**

Flat tips, 3mm wide. 4 1/8" (116mm)

78460-709	EMS Fiber Tweezers 709	each
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► **Style 710**

Flat tip, 8mm wide. 4 1/8" (116mm)

78460-710	EMS Fiber Tweezers 710	each
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Set of all six tweezers listed above:

78460-06	EMS Fiber Tweezers Set	6/set
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► 12. EMS Surface Mount & Optoelectronic Tweezers

Made from SA steel. They offer comfort and smooth handling. They are available in different tips and angles for specific jobs and they have a satin antiglare finish with an ergonomic design.

► Style SM 108 (formerly SMD10)

Tips are cut on a 45 degree angle with a 1.5mm perfect inside gripping groove. Ideal for positioning and gripping 1mm diameter components. Length: 4¾" (120mm)

78250-10 EMS SM 108 each



► Style SM 105 (Formerly SMD 40)

Tips are 'T' shaped with 2mm flat gripping edges. Length: 4¾" (120mm)

78250-40 EMS SM 105 each



► Style SM 103 (Formerly SMD 50)

Same as SM105, but with bent tips. Length 4¾" (120mm)

78250-50 EMS SM 103 each



► Style SM112 (Formerly SMD 60)

Tips are bent and cut on a 45 degree angle (2mm edge) and has a raised thickness inside for perfect control (anti-capillary). Length 4¾" (120mm)

78250-60 EMS SM 112 each



► Style SM115 (Formerly SMD 70)

Very fine rounded tips with groove inside on a 30-degree angle. Ideal for holding and positioning cylindrical devices (up to 1mm diameter). Length: 4¾" (120mm)

78250-70 EMS SM 115 each



► Style SM107 (Formerly SDM 90)

A perfect flat tip 60 degrees angle. The tips measure 1.2mm wide. For positioning all flat devices. Length: 4¾" (120mm)

78250-90 EMS SM 107 each



► Style SM110 (Formerly SMD 100)

Straight 'T' shaped tips with a vertical grooved inside for holding cylindrical objects up to 1mm diameter. Length: 4¾" (120mm)

78250-100 EMS SM 110 each



► Style SM 111 (Formerly SMD 110)

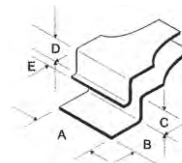
Same as SM 110, but the tips are bent on a 45 degree angle. Length: 4¾" (120mm)

78250-110 EMS SM 111 each



► 13. EMS Wafer Tweezers

These tweezers are especially designed for the handling of delicate and fragile silicon wafers, scintillation discs, glass slides, coverslips etc. Made from antimagnetic/anti acid steel with a very smooth surface and a non-glare finish.



► Style 2W

A: 6.5mm (0.25"); B: 5.0mm (0.20"); C: 2.5mm (0.10"); D: 4.0mm (0.15")

78410-2W EMS 2W each



► Style 2WFCPR

Tips are made of PEEK/CF30. These tips offer gently holding wafers. Replacement tips are available. A: 0.25" (6.6mm); B: 0.41" (2.0mm); C: 0.08" (2.0mm); D: 0.14" (3.5mm); E: 0.18" (4.5mm)

78410-2WFC EMS 2WFCPR each

78410-2WFR Replacement tips set set



► Style 35B

A: 12.0mm (0.47"); B: 13.0mm (0.51"); D: 2.5mm (0.10")

78411-35B EMS 35B each



► Style 35S

A: 29.0mm (1.14"); B: 5.5mm (0.20"); D: 3.0mm (0.12")

78411-35S EMS 35S each



► Style 37S

A: 7.8mm (0.3"); B: 6.0mm (0.24"); E: 6.0mm (0.24")

78411-37S EMS 2W each



► Style 38FG

A: 9.5mm (0.37"); B: 11.0mm (0.34"); D: 4.0mm (0.15"); E: 2.5mm (0.10")

78411-38FG EMS 38FG each



► Style 3WF

A: 9.5mm (0.37"); B: 10.0mm (0.39"); C: 2.5mm (0.10"); D: 4.0mm (0.15"); E: 2.5mm (0.10")

78411-3WF EMS 3WF each



► Style 39S2

A: 6.5mm (0.25"); B: 8.5mm (0.33"); D: 5.5mm (0.20"); E: 2.4mm (0.09")

78412-39S2 EMS 39S2 each



► Style 39S3

A: 9.5mm (0.37"); B: 8.5mm (0.23"); D: 5.5mm (0.20"); E: 2.4mm (0.09")

78412-39S3 EMS 39S3 each



► Style 41W

A: 28.0mm (1.1"); B: 12.0mm (0.47"); D: 5.0mm (0.20"); E: 5.0mm (0.2")

78414-41W EMS 41W each



► **Style 43 WFG**

A: 9.5mm (0.37"); B: 8.5mm (0.33"); D: 3.5mm (0.14"); E: 2.5mm (0.10")

78414-43WFG EMS 43WFG each



► **Style 44 WF**

A: 12.0mm (0.47"); B: 8.5mm (0.33"); D: 3.5mm (0.14"); E: 2.5mm (0.10")

78414-44WF EMS 44WF each



► **Style 4 WF**

A: 12.0mm (0.47"); B: 9.0mm (0.33"); D: 4.0mm (0.15"); E: 2.5mm (0.10")

78414-4WF EMS 4WF each



► **Style 4WFCPR**

Tips are made of PEEK/CF30 - These tips offer gently holding wafers. Replacement tips are available. A: 0.46" (12mm); B: 0.41" (2.0mm); C: 0.08" (2.0mm); D: 0.14" (3.5mm); E: 0.18" (4.5mm)

78414-4WFC EMS 4WFCPR each

78414-4WFR Replacement Tips set set



► **Style 48 WF**

A: 28.0mm (1.1"); B: 9.0mm (0.35"); D: 4.0m (0.15"); E: 2.5mm (0.10")

78414-48WF EMS 48WF each



► **Style 8WF**

A: 28.5mm (1.12"); B: 12.0mm (0.47"); C: 2.2mm (0.08"); D: 3.5mm (0.14"); E: 2.5mm (0.10")

78420-8WF EMS 8WF each



► **Style 8WNY**

A: 65.0mm (2.55"); B: 19.0mm (0.75"); C: 1.3mm (0.05"); D: 2.0mm (0.08")

78422-8WNY EMS 8WNY each



► **Style 600M - Bent**

A: 20.0mm (0.79"); B: 11.0mm (0.43"); E: 2.3mm (0.09")

78425-600M EMS 600M each



► **Style 96 - Self-Closing**

A: 14.5mm (0.57"); B: 10.5mm (0.41"); C: 9.0mm (0.35")

78426-96 EMS 96 each



Dumont:

Fine and Accurate Tweezers

Developed in 1875 by Arnold Dumont in La Sagne, Switzerland. Dumont produces high quality handmade tweezers, and has gained the popularity of all researchers over the years. There is a variety of material which is used to make Dumont tweezers, as is shown in the list below:

- **Biological Grade:** Made from Dumoxel steel, the highest quality steel that is available. These tweezers have very fine points, they are non-magnetic, and anti-corrosive. They are the most reliable for all of your precision work.
- **High Precision Grade:** Made from (Inox) stainless steel, these tweezers have fine points and they can be used as a substitute for Biological Grade when non-magnetic tweezers are not required.

- **Epoxy Coated:** Made from non-magnetic steel with an epoxy covered handle (tips are not coated); ideal for working in conductive environments.
- **Medical Grade:** These tweezers are made from stainless steel and they are anti-magnetic and come with a clamping ring, which slides easily into a locking or release position. The tweezers have serrated handles.

Carbon Steel is an extremely hard alloy (> 59 HRC) composed of C, Mn, and Si. While Carbon ensures strong tips, it will nevertheless easily rust. This alloy is magnetic and cannot be sterilized.

Inox 02 is a standard magnetic stainless steel composed of C, Mn, Cr and Si. This alloy is not as hard as carbon steels because it contains Chromium. Inox 02 will resist temperatures of around 400°C (DIN 50 914), but cannot be sterilized.

Inox 08 is a medical stainless steel composed of C, Mn, Cr, Mo and V that provides an excellent resistance to corrosion and a good resistance to salt. Although not as hard as Carbon steels, Inox 08 offers excellent resistance to corrosion. This magnetic alloy supports temperatures of around 400°C (DIN 50914) and is suitable for autoclave sterilization at 180°C.

Dumoxel is composed of C, Cr, Ni, Mo and Cu and is the most popular alloy among our customers. This alloy was developed and patented by Dumont to offer the best in resistance to corrosion thanks to its high concentration of molybdenum and chromium. Dumoxel also guarantees an excellent resistance to sulphuric environments, hydrochloric acid, as well as to all other mineral and organic acids. Dumoxel is 95% antimagnetic, resistant up to temperatures of around 400° C (DIN 50 914) and is suitable for autoclave sterilization at 270°C.

Dumostar — This Dumont patented alloy is composed of C, Cr, Mo, Mn, Co, Ni and Si. Dumostar is more elastic and more resistant to corrosion than the best stainless steels. It is also perfectly compatible with human tissues and is resistant to mineral and organic acids as well to salt. Although slightly more expensive than other alloys, Dumostar is 100% antimagnetic and is resistant to sterilization temperatures of up to 500°C. This is the most cost effective and appropriate alloy for laboratory use.

Antimagnetic is composed of C, Cr, Ni and Mo. It offers a good resistance to corrosion thanks to its high concentration of molybdenum and is 80% antimagnetic but is not as hard as Inox. Antimagnetic is resistant up to temperatures of around 400°C (DIN 50 914) and is suitable for autoclave sterilization at 270°C.

Titanium is an alloy composed of C, Fe, O, H, N and Ti. It is totally resistant to corrosion from nitric acid, chloride, salt water, and the like. This alloy is not as hard as Inox 08 but is 40% lighter and more flexible. Titanium 100% antimagnetic and resistant up to temperatures of around 430°C.

Nickel is a 100% antimagnetic alloy composed of Cu, Ni, Mn and Zn. It is widely appreciated as it does not damage the components handled by it.

Black Ceramic — Ceramic ZrO₂ is even harder than stainless steel and does not contain carbon or other metal additives. It offers good resistance to chemicals and is Electro Static Discharge safe. Black Ceramic is antimagnetic (Zero residual magnetism) and microwave-sterilization compatible. It does not produce metallic contamination and offers good thermal isolation for soldering; solder will not adhere to its surface. Black ceramic is clean room safe and is available in antistatic versions for CMOS.

White Ceramic — Ceramic ZrO₂ is even harder than stainless steel and does not contain carbon or other metal additives. It offers good resistance to chemicals and is Electro Static Discharge safe. White Ceramic is antimagnetic (Zero residual magnetism) and microwave-sterilization compatible. It does not produce metallic contamination and offers good thermal isolation for soldering; solder will not adhere to its surface. White ceramic is clean room safe and is available in anti-static versions for CMOS.

Brass is composed of Cu, Pb, Sn, Ni and Zn. This alloy is 100% antimagnetic and is widely used for handling delicate components, especially in watch-making.

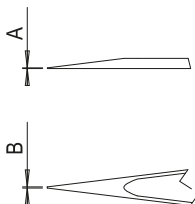
➤ A. Positive Action Tweezers; Standard, Biological, and Electronic Grade – Dumont

➤ Straight, Curved and Bent

➤ Style 0

Geneva pattern, thin tips

Length: 115mm

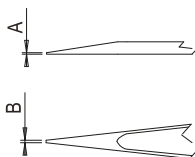


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-0-PO	0.1	0.17	High Precision	Polished	Dumoxel®	each
0102-0-PO	0.1	0.17	High Precision	Polished	Inox 02	6/pk
0101-0-PO	0.08	0.13	High Precision	Polished	Carbon	6/pk
0203-0-PO	0.04	0.08	Biological	Polished	Dumoxel®	each
0208-0-PO	0.04	0.08	Biological	Polished	Inox 8	each
0302-0-PO	0.1	0.17	Electronic	Polished	Inox 2	each
0304-0-CO	0.1	0.17	Electronic	Epoxy Coated	Antimagnetic	each
0304-0-PO	0.1	0.17	Electronic	Polished	Antimagnetic	6/pack

➤ Style 00

Geneva pattern, strong tips, heavy body.

Length: 115mm



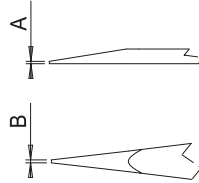
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-00-PO	0.25	0.45	High Precision	Polished	Dumoxel®	each
0102-00-PO	0.25	0.45	High Precision	Polished	Inox 02	6/pk
0101-00-PO	0.25	0.45	High Precision	Polished	Carbon	6/pk
0302-00-CO	0.25	0.45	Electronic	Epoxy Coated	Inox 02	each
0304-00-CO	0.25	0.45	Electronic	Epoxy Coated	Antimagnetic	each
0304-00-PO	0.25	0.45	Electronic	Polished	Antimagnetic	6/pk

► A. Positive Action Tweezers; Standard, Biological, and Electronic Grade – Dumont (continued)

► Style 00C

Geneva pattern, strong tips, short shanks.

Length: 105mm



NEW STYLE

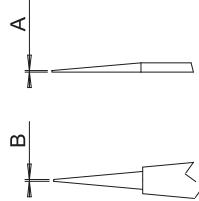
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0102-00C-PO	0.25	0.45	High Precision	Polished	Inox 02	6/pk
0101-00C-PO	0.25	0.45	High Precision	Polished	Carbon	6/pk
0302-00C-PO	0.25	0.45	Electronic	Polished	Inox 02	6/pk



► Style 0A

Thin tips

Length: 120mm



NEW STYLE

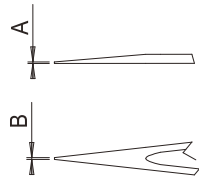
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0102-0A-PO	0.08	0.13	High Precision	Polished	Inox 02	6/pk
0103-0A-PO	0.08	0.13	High Precision	Polished	Dumoxel®	6/pk
0101-0A-PO	0.06	0.1	High Precision	Polished	Carbon	6/pk



► Style 0C100

Geneva pattern

Length: 100mm



NEW STYLE

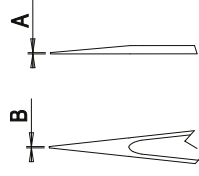
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0102-0C100-PO	0.17		High Precision	Polished	Inox 02	6/pk
0101-0C100-PO	0.08	0.13	High Precision	Polished	Carbon	6/pk
0302-0C100-CO	0.1	0.17	Electronic	Epoxy Coated	Inox 02	6/pk
0302-0C100-PO	0.1	0.17	Electronic	Polished	Inox 02	6/pk
0304-0C100-PO	0.1	0.17	Electronic	Polished	Antimagnetic	6/pk



► Style 0C90

Geneva pattern, short

Length: 90mm



NEW STYLE

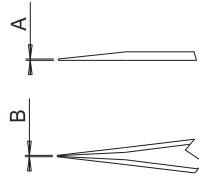
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0101-0C90-PO	0.08	0.13	High Precision	Polished	Carbon	6/pk
0102-0C90-PO	0.1	0.17	High Precision	Polished	Inox 02	6/pk
0302-0C90-CO	0.1	0.17	Electronic	Epoxy Coated	Inox 02	6/pk
0302-0C90-PO	0.1	0.17	Electronic	Polished	Inox 02	6/pk
0304-0C90-PO	0.1	0.17	Electronic	Polished	Antimagnetic	6/pk



► Style 1

Strong tips.

Length: 120mm



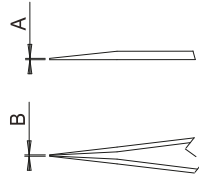
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-1-PO	0.12	0.2	High Precision	Polished	Dumoxel®	each
0109-1-PO	0.12	0.2	High Precision	Polished	Dumostar®	each
0102-1-PO	0.12	0.2	High Precision	Polished	Inox 02	6/pk
0101-1-PO	0.1	0.17	High Precision	Polished	Carbon	6/pk
0107-1TI-PO	0.12	0.2	High Precision	Polished	Titanium	6/pk
0302-1-PO	0.12	0.2	Electronic	Polished	Inox 2	each
0303-1-PO	0.12	0.2	Electronic	Polished	Dumoxel®	each
0304-1-CO	0.12	0.2	Electronic	Epoxy Coated	Antimagnetic	each
0304-1-PO	0.12	0.2	Electronic	Polished	Antimagnetic	6/pk



► Style 1AM

Strong tips. Very popular in watch-making.

Length: 120mm



NEW STYLE

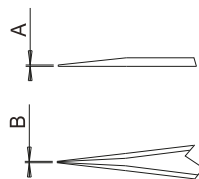
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
5306-1AM-PS	0.12	0.2	High Precision	Matt	Brass	6/pk



► Style 1L

Strong, flat round tips with inside chamfer.

Length: 125mm



Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
5306-1L-PS	0.2	2	High Precision	Matt	Brass	6/pk

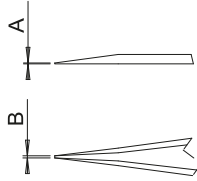


► A. Positive Action Tweezers; Standard, Biological, and Electronic Grade – Dumont (continued)

► **Style 2**

Strong long tips

Length: 120mm



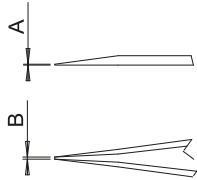
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-2-PO	0.14	0.34	High Precision	Polished	Dumoxel®	each
0109-2-PO	0.14	0.34	High Precision	Polished	Dumostar®	each
0102-2-PO	0.14	0.34	High Precision	Polished	Inox 02	6/pk
0101-2-PO	0.12	0.3	High Precision	Polished	Carbon	6/pk
0105-2NI-PO	0.14	0.34	High Precision	Polished	Nickel	6/pk
0208-2SP-PO	0.02	0.4	Biological	Polished	Inox 08	6/pk
3308-2-PO	0.07	0.17	Biological	Polished	Inox 08	6/pk
0303-2-PO	0.14	0.34	Electronic	Polished	Dumoxel®	each
0302-2-CO	0.14	0.34	Electronic	Epoxy Coated	Inox 2	each
0302-2-PO	0.14	0.34	Electronic	Polished	Inox 02	6/pk
0304-2-CO	0.14	0.34	Electronic	Epoxy Coated	Antimagnetic	each
0304-2-PO	0.14	0.34	Electronic	Polished	Antimagnetic	6/pk



► **Style 2A**

Flat round tips.

Length: 120mm



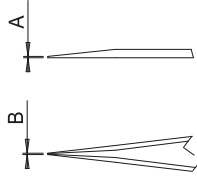
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-2A-PO	0.2	1.5	High Precision	Polished	Dumoxel®	each
0109-2A-PO	0.2	1.5	High Precision	Polished	Dumostar®	each
0102-2A-PO	0.2	1.5	High Precision	Polished	Inox 02	6/pk
0101-2A-PO	0.2	1.5	High Precision	Polished	Carbon	6/pk
0303-2A-PO	0.2	1.5	Electronic	Polished	Dumoxel®	each
0302-2A-PO	0.2	1.5	Electronic	Polished	Inox 02	6/pk
0302-2A-CO	0.2	1.5	Electronic	Epoxy Coated	Inox 2	each
0304-2A-CO	0.2	1.5	Electronic	Epoxy Coated	Antimagnetic	each
0304-2A-PO	0.2	1.5	Electronic	Polished	Antimagnetic	6/pk
0304-2A-TF	0.2	1.5	Electronic	PTFE Coated	Antimagnetic	6/pk



► **Style 2AM**

Strong tips with bevel.

Length: 120mm



NEW STYLE

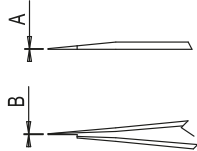
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
5306-2AM-PS	0.14	0.34	High Precision	Matt	Brass	6/pk



► **Style 2L**

Special tips, mirror finished inside.

Length: 111mm



NEW STYLE

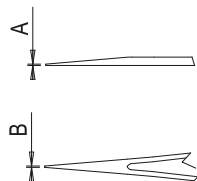
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
C5306-2L-PS	0.2	0.2	High Precision	Matt	Brass	6/pk



► **Style 3**

Thin tips.

Length: 120mm



Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-3-PO	0.1	0.17	High Precision	Polished	Dumoxel®	each
0109-3-PO	0.1	0.17	High Precision	Polished	Dumostar®	each
0102-3-PO	0.1	0.17	High Precision	Polished	Inox 02	6/pk
0101-3-PO	0.08	0.13	High Precision	Polished	Carbon	6/pk
0106-3-PO	0.1	0.17	High Precision	Polished	Brass	6/pk
0208-3-PO	0.04	0.08	Biological	Polished	Inox 8	each
72690-D	0.04	0.08	Biological	Polished	Dumoxel®	each
72690-DZ	0.04	0.08	Biological	Polished	Dumoxel®	doz
72693-01	0.04	0.08	Biological	Polished	Dumostar®	each
72693-12	0.04	0.08	Biological	Polished	Dumostar®	doz
72691-D	0.1	0.17	Biological	Polished Serration	Inox 8	each
72691-DZ	0.1	0.17	Biological	Polished	Inox 8	doz
0304-3-PO	0.1	0.17	Electronic	Polished	Antimagnetic	6/pk
72692-D	0.1	0.17	Electronic	Epoxy Coated	Antimagnetic	each
0304-3-CO	0.1	0.17	Electronic	Epoxy Coated	Antimagnetic	6/pk
72692-DZ	0.1	0.17	Electronic	Epoxy Coated	Antimagnetic	doz
0302-3-CO	0.1	0.17	Electronic	Epoxy Coated	Inox 02	6/pk
0304-3-TF	0.1	0.17	Electronic	PTFE Coated	Antimagnetic	6/pk
0306-3-CO	0.1	0.17	Electronic	Epoxy Coated	Brass	6/pk

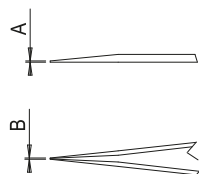


► A. Positive Action Tweezers; Standard, Biological, and Electronic Grade – Dumont (continued)

► Style 3AM

Thin tips.

Length: 120mm



NEW STYLE

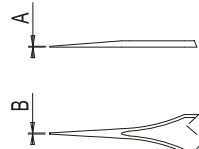


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
5306-3AM-PS	0.1	0.17	120	Matte	Brass	6/pk

► Style 3C

Type 3 short, thin tips.

Length: 110mm

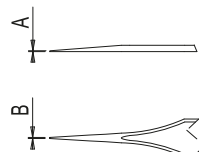


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-3C-PO	0.1	0.17	High Precision	Polished	Dumoxel®	each
0109-3C-PO	0.1	0.17	High Precision	Polished	Dumostar®	each
0102-3C-PO	0.1	0.17	High Precision	Polished	Inox 02	6/pk
72684-01	0.1	0.17	High Precision	Polished	Inox 8	each
0106-3C-PO	0.1	0.17	High Precision	Polished	Brass	6/pk
0107-3CTI-PO	0.1	0.17	High Precision	Polished	Titanium	6/pk
0101-3C-PO	0.08	0.13	High Precision	Polished	Carbon	6/pk
72680-D	0.04	0.08	Biological	Polished	Dumoxel®	each
72680-DZ	0.04	0.08	Biological	Polished	Dumoxel®	doz
72683-01	0.04	0.08	Biological	Polished	Dumostar®	each
72683-12	0.04	0.08	Biological	Polished	Dumostar®	doz
72681-D	0.04	0.08	Biological	Polished	Inox 8	each
72681-DZ	0.04	0.08	Biological	Polished	Inox 8	doz
72684-12	0.1	0.17	Biological	Polished	Inox 8	doz
72682-DZ	0.1	0.17	Biological	Epoxy Coated	Antimagnetic	doz
0304-3C-CO	0.1	0.17	Electronic	Epoxy Coated	Antimagnetic	each
72682-D	0.1	0.17	Electronic	Epoxy Coated	Antimagnetic	each
0302-3C-CO	0.1	0.17	Electronic	Epoxy Coated	Inox 02	6/pk
0302-3C-PO	0.1	0.17	Electronic	Polished	Inox 02	6/pk
0304-3C-PO	0.1	0.17	Electronic	Polished	Antimagnetic	6/pk
0302-3C-CO	0.1	0.17	Electronic	Epoxy Coated	Antimagnetic	6/pk

► Style 4

Strong thin tips.

Length: 110mm

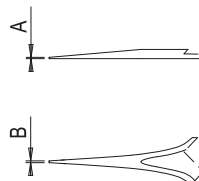


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-4-PO	0.08	0.13	High Precision	Polished	Dumoxel®	each
0109-4-PO	0.08	0.13	High Precision	Polished	Dumostar®	each
72696-D	0.1	0.17	High Precision	Polished	Inox 2	each
72696-DZ	0.1	0.17	High Precision	Polished	Inox 2	doz
0101-4-PO	0.06	0.1	High Precision	Polished	Carbon	6/pk
0102-4-PO	0.08	0.13	High Precision	Polished	Inox 02	6/pk
0109-4-PS	0.08	0.13	High Precision	Matte	Dumostar®	6/pk
5306-4-PS	0.08	0.13	High Precision	Matte	Brass	6/pk
72695-D	0.02	0.06	Biological	Polished	Dumoxel®	each
72695-DZ	0.02	0.06	Biological	Polished	Dumoxel®	doz
0209-4-PO	0.02	0.06	Biological	Polished	Dumostar®	each
0508-4-PO	0.08	0.13	Biological	Polished Serration	Inox 8	each
0303-4-PO	0.08	0.13	Electronic	Polished	Dumoxel®	each
0302-4-PO	0.08	0.13	Electronic	Polished	Inox 2	each
0302-4-CO	0.08	0.13	Electronic	Epoxy Coated	Inox 02	6/pk
0304-4-CO	0.08	0.13	Electronic	Epoxy Coated	Antimagnetic	each
0304-4-PO	0.08	0.13	Electronic	Polished	Antimagnetic	6/pk

► Style 4AM

Thin tips.

Length: 110mm

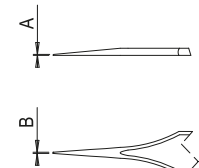


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
5305-4AM-PO	0.08	0.13	Biological	Polished	Nickel	each

► Style 4TM

Thin TM tips with special shape.

Length: 110mm



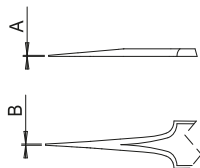
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
1708-4TM-PO	0.02	0.06	Biological	Polished	Inox 08	6/pk

► A. Positive Action Tweezers; Standard, Biological, and Electronic Grade – Dumont (continued)

► Style 5

Super thin tips.

Length: 110mm

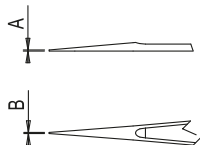


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-5-PO	0.06	0.1	High Precision	Polished	Dumoxel®	each
0103-5-TF	0.06	0.1	High Precision	PTFE Coated	Dumoxel®	each
72706-01	0.06	0.1	High Precision	Polished	Dumostar®	each
72706-12	0.06	0.1	High Precision	Polished	Dumostar®	doz
0109-5-PS	0.06	0.1	High Precision	Matt	Dumostar®	6/pk
0103-5-PS	0.06	0.1	High Precision	Matt	Dumoxel®	6/pk
0102-5-TF	0.06	0.1	High Precision	PTFE Coated	Inox 02	6/pk
0108-5-PO	0.06	0.1	High Precision	Polished	Inox 08	6/pk
0108-5-PS	0.06	0.1	High Precision	Matt	Inox 08	6/pk
72702-D	0.06	0.1	High Precision	Epoxy Coated	Antimagnetic	each
72702-DZ	0.06	0.1	High Precision	Epoxy Coated	Antimagnetic	doz
0101-5-PO	0.04	0.08	High Precision	Polished	Carbon	6/pk
72705-01	0.01	0.05	Biological	Polished	Dumostar®	each
72705-12	0.01	0.05	Biological	Polished	Dumostar®	doz
72700-D	0.01	0.05	Biological	Polished	Dumoxel®	each
72700-DZ	0.01	0.05	Biological	Polished	Dumoxel®	doz
72701-01	0.06	0.1	Biological	Polished Serration	Inox 8	each
72701-12	0.06	0.1	Biological	Polished	Inox 8	doz
0302-5-CO	0.06	0.1	Electronic	Epoxy Coated	Inox 2	each
72702-DTIP	0.06	0.1	Electronic	PTFE Coated, Tip Coated	Antimagnetic	doz
72702-DTIP-DZ	0.06	0.1	Electronic	PTFE Coated, Tip Coated	Antimagnetic	doz

► Style 55

Type 5, light shanks, very thin tips for hairsprings

Length: 110mm

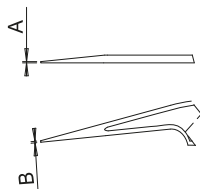


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-55-PO	0.08	0.13	High Precision	Polished	Dumoxel®	each
00102-55-PO	0.08	0.13	High Precision	Polished	Inox 02	6/pk
203-55-PO	0.01	0.05	Biological	Polished	Dumoxel®	each
72707-01	0.01	0.05	Biological	Polished	Dumostar®	each
72707-12	0.01	0.05	Biological	Polished	Dumostar®	doz

► Style 5A

Oblique tips.

Length: 115mm

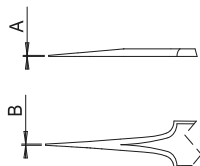


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-5A-PO	0.08	0.13	High Precision	Polished	Dumoxel®	6/pk
0109-5A-PO	0.08	0.13	High Precision	Polished	Dumostar®	6/pk
0109-5A-PS	0.08	0.13	High Precision	Matte	Dumostar®	6/pk
0108-5A-PO	0.08	0.13	High Precision	Polished	Inox 08	6/pk
0101-5A-PO	0.06	0.1	High Precision	Polished	Carbon	6/pk
72720-D	0.01	0.05	Biological	Polished	Dumoxel®	each
72720-DZ	0.01	0.05	Biological	Polished	Dumoxel®	doz
0508-5A-PO	0.08	0.13	Biological	Polished Serration	Inox 8	each
0302-5A-PO	0.08	0.13	Electronics	Polished	Inox 02	6/pk

► Style 5XL

Type 5, extra long, super thin tips, for large hands.

Length: 150mm

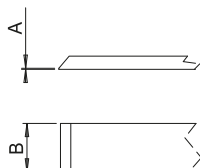


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0508-5XL-PO	0.06	0.1	Biological	Polished Serration	Inox 8	each

► Style 8

To straighten pivots.

Length: 110mm



NEW STYLE

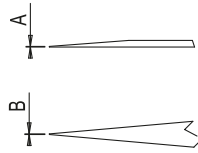
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0101-8-PO	0.2	9.2	Biological	Polished	Carbon	6/pk
0102-8-PO	0.2	9.2	Biological	Polished	Inox 02	6/pk

► A. Positive Action Tweezers; Standard, Biological, and Electronic Grade – Dumont (continued)

► Style 11

Strong tips. Ideal to manipulate delicate parts.

Length: 120mm



NEW STYLE

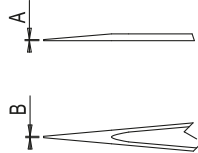


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0105-11NI-PO	0.14	0.24	High Precision	Polished	Nickel	6/pk
0105-11NI-PS	0.14	0.24	High Precision	Matt	Nickel	6/pk
0305-11NI-CO	0.14	0.24	Electronics	Epoxy Coated	Nickel	each
0305-11NI-PO	0.14	0.24	Electronics	Polished	Nickel	each

► Style 27

Thin tips

Length: 135mm



NEW STYLE

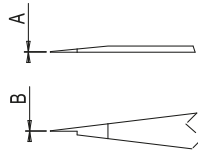


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-27-PO	0.12	0.2	High Precision	Polished	Dumoxel®	6/pk

► Style 10B

To curve centre of hairsprings.

Length: 120mm



NEW STYLE

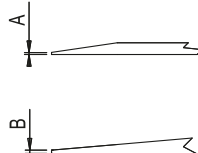


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0101-10B-PO	0.2	0.15	High Precision	Polished	Carbon	6/pk

► Style A

Strong tips.

Length: 115mm



NEW STYLE

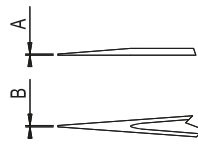


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0102-A-PO	0.35	0.6	High Precision	Polished	Inox 02	6/pk
0101-A-PO	0.35	0.6	High Precision	Polished	Carbon	6/pk
0302-A-PO	0.35	0.6	Electronics	Polished	Inox 02	6/pk

► Style AA

Strong tips.

Length: 125mm

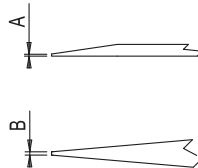


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-AA-PO	0.2	0.4	High Precision	Polished	Dumoxel®	each
0102-AA-PO	0.2	0.4	High Precision	Polished	Inox 02	6/pk
0303-AA-PO	0.2	0.4	Electronics	Polished	Dumoxel®	6/pk
0302-AA-CO	0.2	0.4	Electronics	Epoxy Coated	Inox 02	6/pk
0302-AA-PO	0.2	0.4	Electronics	Polished	Inox 02	6/pk
0304-AA-CO	0.2	0.4	Electronics	Epoxy Coated	Antimagnetic	6/pk
0304-AA-PO	0.2	0.4	Electronics	Polished	Antimagnetic	6/pk

► Style AC

Type A short.

Length: 105mm



NEW STYLE

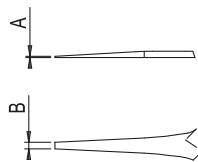


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0102-AC-PO	0.35	0.6	High Precision	Polished	Inox 02	6/pk
0101-AC-PO	0.35	0.6	High Precision	Polished	Carbon	6/pk

► Style F

Wide square tips.

Length: 120mm

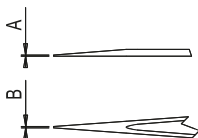


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
72814-D	0.2	2	High Precision	Polished	Dumoxel®	each
72814-DZ	0.2	2	High Precision	Polished	Dumoxel®	doz
0101-F-PO	0.2	2	High Precision	Polished	Carbon	6/pk
0102-F-PO	0.2	2	High Precision	Polished	Inox 02	6/pk
0103-F-PO	0.2	2	High Precision	Polished	Dumoxel®	each
0304-F-PO	0.2	2	Electronics	Polished	Antimagnetic	6/pk

► Style GG

Strong and very precise.

Length: 130mm



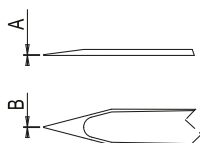
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
72816-D	0.2	0.12	High Precision	Polished	Dumoxel®	each
72816-DZ	0.2	0.12	High Precision	Polished	Dumoxel®	doz
0203-GG-PO	0.12	0.2	Electronics	Polished	Dumoxel®	each

► A. Positive Action Tweezers; Standard, Biological, and Electronic Grade – Dumont (continued)

► Style H

Triangle tips, short shanks.

Length: 90mm



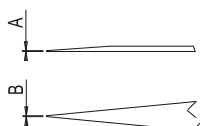
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-H-PO	0.1	0.17	High Precision	Polished	Dumoxel®	each
0102-H-PO	0.1	0.17	High Precision	Polished	Inox 02	6/pk
0101-H-PO	0.08	0.13	High Precision	Polished	Carbon	6/pk
0203-GG-PO	0.12	0.2	Electronic	Polished	Dumoxel®	each
0302-H-CO	0.1	0.17	Electronic	Epoxy Coated	Inox 02	6/pk
0302-H-PO	0.1	0.17	Electronic	Polished	Inox 02	6/pk
72816-D	0.12	0.2	Electronic	Polished	Antimagnetic	each
72816-DZ	0.12	0.2	Electronic	Polished	Antimagnetic	doz
0304-H-PO	0.1	0.17	Electronic	Polished	Antimagnetic	6/pk



► Style P

Strong tips.

Length: 120mm



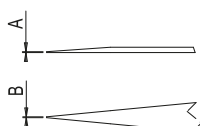
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0102-P-PO	0.14	0.24	High Precision	Polished	Dumoxel®	6/pk
0102-P-PO	0.14	0.24	High Precision	Polished	Inox 02	6/pk
0101-P-PO	0.12	0.2	High Precision	Polished	Carbon	6/pk



► Style PP

Strong tips.

Length: 135mm



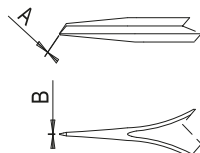
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0102-PP-PO	0.14	0.24	High Precision	Polished	Inox 02	each
0101-PP-PO	0.12	0.2	High Precision	Polished	Carbon	each
0508-PP-PO	0.14	0.24	Biological	Polished Serration	Inox 8	each



► Style 4AC

Anti-capillary, very thin tips.

Length: 110mm



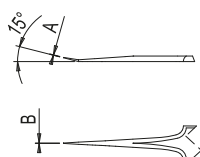
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0208-4AC-PO	0.02	0.06	Biological	Polished	Inox 8	each



► Style 5/15

Thin tips, bent 15 degrees, for hairsprings

Length: 105mm



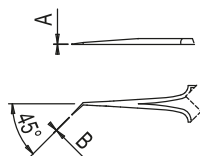
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
72708-D	0.06	0.1	High Precision	Polished	Dumoxel®	each
0103-5/15-PO	0.06	0.1	High Precision	Polished	Dumoxel®	6/pk
72708-DZ	0.06	0.1	High Precision	Polished	Dumoxel®	doz
0101-5/15-PO	0.04	0.08	High Precision	Polished	Carbon	6/pk
0203-5/15-PO	0.01	0.05	Biological	Polished	Dumoxel®	each
0203-5/15-PS	0.01	0.05	Biological	Matt	Dumoxel®	6/pk
0208-5/15-PS	0.01	0.05	Biological	Matt	Inox 08	6/pk
0302-5/15-PO	0.06	0.1	Electronic	Polished	Inox 02	6/pk
0304-5/15-PO	0.06	0.1	Electronic	Polished	Antimagnetic	each
0304-5/15-PO	0.06	0.1	Electronic	Polished	Antimagnetic	each



► Style 5/45

Thin tips, bent 45 degrees, for hairsprings

Length: 109mm



Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-5/45-PO	0.06	0.1	High Precision	Polished	Dumoxel®	6/pk
0108-5/45-PO	0.06	0.1	High Precision	Polished	Inox 08	6/pk
0101-5/45-PO	0.04	0.08	High Precision	Polished	Carbon	6/pk
72703-D	0.01	0.05	Biological	Polished	Dumoxel®	each
72703-DZ	0.01	0.05	Biological	Polished	Dumoxel®	doz
0203-5/45-PS	0.01	0.05	Biological	Matt	Dumoxel®	6/pk
0208-5/45-PO	0.01	0.05	Biological	Polished	Inox 8	each
0208-5/45-PO	0.01	0.05	Biological	Polished	Inox 08	each
0208-5/45-PS	0.01	0.05	Biological	Matt	Inox 08	6/pk
2408-5/45-MF	0.01	0.05	Biological	Mirror polished	Inox 08	6/pk
0508-5/45-PO	0.06	0.1	Biological	Polished Serration	Inox 8	each
0508-5/45-PO	0.06	0.1	Biological	Polished	Inox 08	each
0508-5/45-PS	0.06	0.1	Biological	Matt	Inox 08	6/pk
3808-5/45-MF	0.06	0.1	Biological	Mirror polished	Inox 08	6/pk
0302-5/45-PO	0.06	0.1	Electronic	Polished	Inox 02	6/pk
0304-5/45-PO	0.06	0.1	Electronic	Polished	Antimagnetic	each

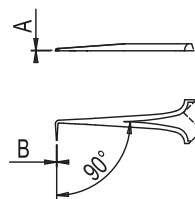


► A. Positive Action Tweezers; Standard, Biological, and Electronic Grade – Dumont (continued)

► Style 5/90

Thin tips, bent 90 degrees.

Length: 106mm

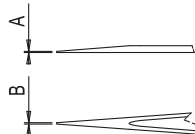


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
72704-D	0.01	0.05	Biological	Polished	Dumoxel®	each
72704-DZ	0.01	0.05	Biological	Polished	Dumoxel®	doz
0103-5/90-PO	0.06	0.1	Biological	Polished	Dumoxel®	6/pk
0203-5/90-PS	0.01	0.05	Biological	Matte	Dumoxel®	6/pk
0208-5/90-PO	0.01	0.05	Biological	Polished	Inox 8	each
0108-5/90-PO	0.06	0.1	Biological	Polished	Inox 08	6/pk
0508-5/90-PO	0.06	0.1	Biological	Polished Serration	Inox 8	each
0208-5/90-PS	0.01	0.05	Biological	Matte	Inox 08	6/pk
0508-5/90-PS	0.06	0.1	Biological	Matte	Inox 08	6/pk
3808-5/90-MF	0.06	0.1	Biological	Mirror polished	Inox 08	6/pk
2408-5/90-MF	0.01	0.05	Biological	Mirror polished	Inox 08	6/pk
0101-5/90-PO	0.04	0.08	Biological	Polished	Carbon	6/pk
0302-5/90-PO	0.06	0.1	Electronic	Polished	Inox 02	each
0304-5/90-PO	0.06	0.1	Electronic	Polished	Antimagnetic	each

► Style S

Thin tips

Length: 120mm



NEW STYLE

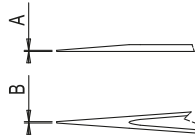


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-S-PO	0.12	0.2	High Precision	Polished	Dumoxel®	6/pk
0102-S-PO	0.12	0.2	High Precision	Polished	Inox 02	6/pk
0101-S-PO	0.1	0.14	High Precision	Polished	Carbon	6/pk

► Style S5

Long popular tweezers for handling, to manipulate delicate parts.

Length: 130mm



NEW STYLE

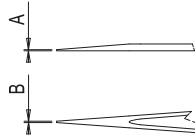


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
5305-S5-PO	0.3	0.2	High Precision	Polished	Nickel	6/pk
5306-S5-PO	0.3	0.2	High Precision	Polished	Brass	6/pk

► Style SS135

Long narrow shanks, thin tips

Length: 135mm



NEW STYLE

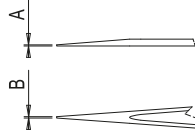


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0102-SS135-PO	0.12	0.2	High Precision	Polished	Inox 02	6/pk
0103-SS135-PO	0.12	0.2	High Precision	Polished	Dumoxel®	6/pk
0101-SS135-PO	0.1	0.14	High Precision	Polished	Carbon	6/pk
0105-SS135NI-PO	0.12	0.2	High Precision	Polished	Nickel	6/pk

► Style SS140

Long narrow shanks, thin tips

Length: 140mm



NEW STYLE

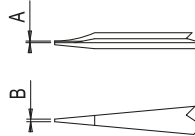


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-SS140-PO	0.12	0.2	High Precision	Polished	Dumoxel®	6/pk
0109-SS140-PO	0.12	0.2	High Precision	Polished	Dumostar®	6/pk
0102-SS140-PO	0.12	0.2	High Precision	Polished	Inox 02	6/pk
0107-SS140TI-PO	0.12	0.2	High Precision	Polished	Titanium	6/pk

► Style 60/3

To bend thin copper wires.

Length: 115mm



NEW STYLE



Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0101-60/3-PO	0.5	0.65	High Precision	Polished	Carbon	6/pk



► Plunging Tweezers for the CP3 (Cryoplunge™3)

Custom tweezers specifically made to fit the Gatan Cryoplunge™ an instrument used in the preparation of frozen hydrated specimens for cryoEM.



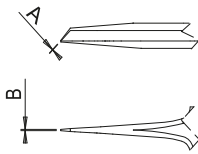
CP3690	Plunging Tweezers	each
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► A. Positive Action Tweezers; Standard, Biological, and Electronic Grade – Dumont (continued)

► Style 5AC

Anti-capillary, very thin tips.

Length: 115mm



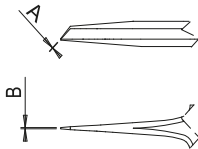
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
72730-D	0.02	0.07	Biological	Polished	Dumoxel®	each
72730-DZ	0.02	0.07	Biological	Polished	Dumoxel®	doz
0208-5AC-PO	0.02	0.07	Biological	Polished	Inox 8	each
0208-5AC-PS	0.02	0.07	Biological	Matte	Inox 08	6/pk
0207-5ACTI-PO	0.02	0.07	Biological	Polished	Titanium	6/pk
0207-5ACTI-PS	0.02	0.07	Biological	Matte	Titanium	6/pk



► Style 5AC

Oblique thin TM tips, with special shape.

Length: 110mm



NEW STYLE

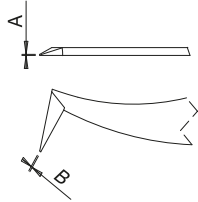
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
1708-5TM-PO	0.01	0.05	Biological	Polished	Inox 08	6/pk



► Style 6

Thin hooked tips.

Length: 115mm



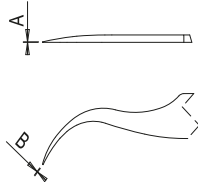
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
072750-D	0.1	0.17	High Precision	Polished	Dumoxel®	each
72750-DZ	0.1	0.17	High Precision	Polished	Dumoxel®	doz
0109-6-PO	0.1	0.17	High Precision	Polished	Dumostar®	6/pk
0102-6-PO	0.1	0.17	High Precision	Polished	Inox 02	6/pk
0101-6-PO	0.08	0.13	High Precision	Polished	Carbon	6/pk
203-6-PO	0.03	0.07	Biological	Polished	Dumoxel®	each
0203-6-PS	0.03	0.07	Biological	Matte	Dumoxel®	6/pk
0208-6-PO	0.03	0.07	Biological	Polished	Inox 8	each
0208-6-PS	0.03	0.07	Biological	Matte	Inox 08	6/pk
3808-6-MF	0.1	0.17	Biological	Mirror polished	Inox 08	6/pk
2408-6-MF	0.03	0.07	Biological	Mirror polished	Inox 08	6/pk
0207-6TI-PO	0.03	0.07	Biological	Polished	Titanium	6/pk
0207-6TI-PS	0.03	0.07	Biological	Matte	Titanium	6/pk



► Style 7

Thin curved tips.

Length: 115mm

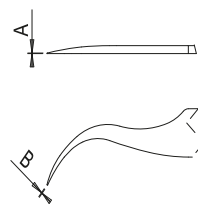


Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-7-PO	0.1	0.17	High Precision	Polished	Dumoxel®	each
0109-7-PO	0.1	0.17	High Precision	Polished	Dumostar®	each
72804-01	0.1	0.17	High Precision	Polished Serration	Dumostar®	each
72804-12	0.1	0.17	High Precision	Polished	Dumostar®	doz
72801-D	0.10	0.17	High Precision	Polished	Inox 2	each
72801-DZ	0.10	0.17	High Precision	Polished	Inox 2	doz
0102-7-PO	0.1	0.17	High Precision	Polished	Inox 02	6/pk
0102-7-TF	0.1	0.17	High Precision	PTFE Coated	Inox 02	6/pk
0101-7-PO	0.08	0.13	High Precision	Polished	Carbon	6/pk
0107-7TI-PO	0.1	0.17	High Precision	Polished	Titanium	6/pk
72800-D	0.03	0.07	Biological	Polished	Dumoxel®	each
72800-DZ	0.03	0.07	Biological	Polished	Dumoxel®	doz
0203-7-PS	0.03	0.07	Biological	Matte	Dumoxel®	6/pk
72803-01	0.03	0.07	Biological	Polished	Dumostar®	each
72803-12	0.03	0.07	Biological	Polished	Dumostar®	doz
0209-7-PS	0.03	0.07	Biological	Matte	Dumostar®	6/pk
0208-7-PO	0.03	0.07	Biological	Polished	Inox 8	each
0208-7-PS	0.03	0.07	Biological	Matte	Inox 08	6/pk
2408-7-MF	0.03	0.07	Biological	Mirror polished	Inox 08	6/pk
3308-7-PO	0.03	0.07	Biological	Polished	Inox 08	6/pk
3308-7-PS	0.03	0.07	Biological	Matte	Inox 08	6/pk
0207-7TI-PO	0.03	0.07	Biological	Polished	Titanium	6/pk
0207-7TI-PS	0.03	0.07	Biological	Matte	Titanium	6/pk
0508-7-PS	0.1	0.17	Biological	Matte	Inox 08	6/pk
3808-7-MF	0.1	0.17	Biological	Mirror polished	Inox 08	6/pk
772802-D	0.1	0.17	Electronic	Epoxy Coated	Inox 2	each
72802-DZ	0.1	0.17	Electronic	Epoxy Coated	Inox 2	doz



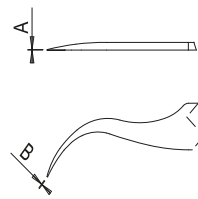
► A. Positive Action Tweezers; Standard, Biological, and Electronic Grade – Dumont (continued)

► **Style 7A**
Curved strong tips.
Length: 115mm



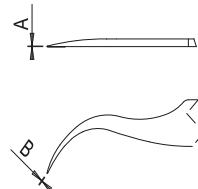
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-7A-PO	0.16	0.24	High Precision	Polished	Dumoxel®	6/pk
0102-7A-PO	0.16	0.24	High Precision	Polished	Inox 02	6/pk
0101-7A-PO	0.12	0.2	High Precision	Polished	Carbon	6/pk
5306-7SF-PS	0.16	0.24	High Precision	Matte	Brass	6/pk
0203-7A-PO	0.06	0.1	Biological	Polished	Dumoxel®	each
0203-7A-PS	0.06	0.1	Biological	Matte	Dumoxel®	6/pk
0208-7A-PS	0.06	0.1	Biological	Matte	Inox 08	6/pk
0508-7A-PO	0.06	0.1	Biological	Polished	Inox 08	6/pk
0302-7A-PO	0.16	0.24	Biological	Polished	Inox 02	6/pk
0304-7A-PO	0.16	0.24	Biological	Polished	Antimagnetic	6/pk
0303-7A-PO	0.16	0.24	Biological	Polished	Dumoxel®	6/pk
3808-7A-MF	0.16	0.24	Medical	Mirror polished	Inox 08	6/pk

► **Style 7B**
Curved tips with
inside serrations.
Length: 115mm



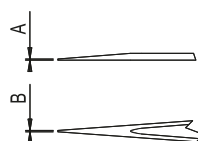
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0102-7B-PO	0.1	0.17	High Precision	Polished	Inox 02	6/pk
0103-7B-PO	0.1	0.17	High Precision	Polished	Dumoxel®	6/pk
0109-7B-PO	0.1	0.17	High Precision	Polished	Dumostar®	6/pk
0508-7B-PS	0.1	0.17	Biological	Matte	Inox 08	6/pk
0508-7B-PO	0.1	0.17	Biological	Polished Serration	Inox 8	each
0302-7B-PO	0.1	0.17	Biological	Polished	Inox 02	6/pk

► **Style 7XL**
Type 7, extra long,
curved thin tips,
for large hands.
Length: 150mm



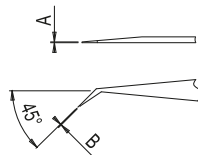
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
0508-7XL-PO	0.14	0.24	Biological	Polished Serration	Inox 8	each

► **Style 54**
Light, Super Fine,
110mm Long
Length: 110mm



Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
72709-D	0.02	0.06	Biological	Polished	Dumoxel®	each
72709-DZ	0.02	0.06	Biological	Polished	Dumoxel®	doz

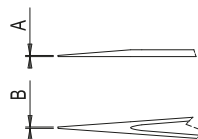
► **Style PP/45**
Strong tips,
bent 45 degrees.
Length: 133 mm



NEW STYLE

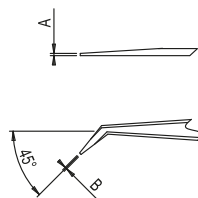
Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
3308-PP/45-PO	0.06	0.1	Biological	Polished	Inox 08	6/pk
3308-PP/45-PS	0.06	0.1	Biological	Matte	Inox 08	6/pk
3808-PP/45-MF	0.14	0.24	Medical	Mirror polished	Inox 08	6/pk
2408-PP/45-MF	0.06	0.1	Medical	Mirror polished	Inox 08	6/pk

► **Style SS**
Length: 135mm



Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
72812-D	0.06	0.1	Biological	Polished	Dumoxel®	each
72812-DZ	0.06	0.1	Biological	Polished	Dumoxel®	doz

► **Style SS/45**
Long narrow shanks,
thin tips,
bent 45 degrees.
Length: 133 mm



NEW STYLE

Cat. #	A mm	B mm	Grade	Finish	Alloy	Unit
3308-SS/45-PO	0.06	0.1	Biological	Polished	Inox 08	6/pk
3308-SS/45-PS	0.06	0.1	Biological	Matte	Inox 08	6/pk
0508-SS/45-PS	0.12	0.2	Biological	Matte	Inox 08	6/pk
3808-SS/45-MF	0.12	0.2	Medical	Mirror polished	Inox 08	6/pk
2408-SS/45-MF	0.06	0.1	Medical	Mirror polished	Inox 08	6/pk

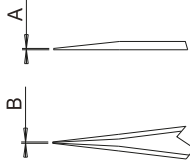
► B. Medical Tweezers; Dumont

► Straight Positive Action

► Style 1

Strong tips

Length: 120mm



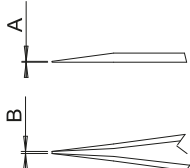
Cat. #	A mm	B mm	Finish	Alloy	Unit
72873-D	0.12	0.2	Mirror Polished	Inox 8	each
72873-DZ	0.12	0.2	Mirror Polished	Inox 8	doz
3808-1-MF	0.12	0.2	Mirror Polished	Inox 8	each
2408-1-MF	0.06	0.1	Mirror Polished	Inox 08	6/pk



► Style 2

Strong tips

Length: 120mm



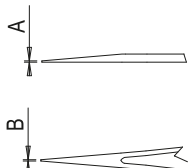
Cat. #	A mm	B mm	Finish	Alloy	Unit
72874-D	0.14	0.34	Mirror Polished	Inox 8	each
72874-DZ	0.14	0.34	Mirror Polished	Inox 8	doz
0208-2SP-PO	0.02	0.4	Polished	Inox 08	6/pk
3308-2-PO	0.07	0.17	Polished	Inox 08	6/pk



► Style 3

Thin tips.

Length: 120mm



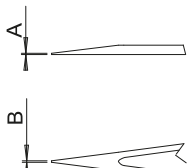
Cat. #	A mm	B mm	Finish	Alloy	Unit
72876-D	0.04	0.08	Mirror Polished	Inox 8	each
72876-DZ	0.04	0.08	Mirror Polished	Inox 8	doz
3308-3-PS	0.04	0.08	Matte	Inox 08	6/pk
72690-D	0.04	0.08	Polished	Dumoxel®	each
0208-3-PO	0.04	0.08	Polished	Inox 08	each



► Style 3C

Short, thin tips

Length: 110mm



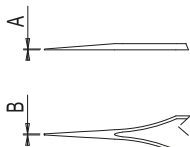
Cat. #	A mm	B mm	Finish	Alloy	Unit
0203-3C-PO	0.04	0.08	Polished	Dumoxel®	each
0203-3C-PS	0.04	0.08	Matte	Dumoxel®	6/pk
0208-3C-PO	0.04	0.08	Polished	Inox 08	each
0208-3C-PS	0.04	0.08	Matte	Inox 08	6/pk
0209-3C-PO	0.04	0.08	Polished	Dumostar®	each
0209-3C-PS	0.04	0.08	Matte	Dumostar®	6/pk



► Style 4

Very thin tips.

Length: 110mm



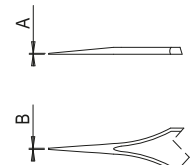
Cat. #	A mm	B mm	Finish	Alloy	Unit
0207-4TI-PO	0.02	0.06	Polished	Titanium	6/pk
0207-4TI-PS	0.02	0.06	Matte	Titanium	6/pk
0203-4-PO	0.02	0.06	Polished	Dumoxel®	each
0203-4-PS	0.02	0.06	Matte	Dumoxel®	6/pk
0208-4-PO	0.02	0.06	Polished	Inox 08	6/pk
0209-4-PO	0.02	0.06	Polished	Dumostar®	each
0209-4-PS	0.02	0.06	Matte	Dumostar®	6/pk
0508-4-PS	0.08	0.13	Matte	Inox 08	6/pk
0508-4-PO	0.08	0.13	Polished	Inox 08	each
3808-4-MF	0.02	0.06	Mirror Polished	Inox 08	6/pk
2408-4-MF	0.02	0.06	Mirror Polished	Inox 08	6/pk



► Style 4TM

Thin TM tips with special shape.

Length: 110mm



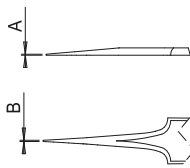
Cat. #	A mm	B mm	Finish	Alloy	Unit
1708-4TM-PO	0.02	0.06	Polished	Inox 08	6/pk



► Style 5

Super thin tips

Length: 110mm



Cat. #	A mm	B mm	Finish	Alloy	Unit
72877-D	0.01	0.05	Mirror Polished	Inox 8	each
72877-DZ	0.01	0.05	Mirror Polished	Inox 8	doz



► B. Medical Tweezers, Straight Positive Action – Dumont (continued)

► Style 24

Strong serrated tips

Length: 150mm

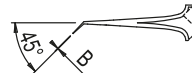


Cat. #	A mm	B mm	Finish	Alloy	Unit
72880-DS	0.50	0.50	Mirror Polished	Inox 8	each
72880-DB	0.50	0.50	Mirror Polished	Inox 8	each

► Style 24/45

Strong serrated tips, bent 45 degrees

Length: 150mm



Cat. #	A mm	B mm	Finish	Alloy	Unit
72880-DB	0.50	0.50	Mirror Polished	Inox 8	each

► Style 180

Long shanks, strong tips.

Length: 180mm



Cat. #	A mm	B mm	Finish	Alloy	Unit
72875-D	0.25	0.25	Mirror Polished	Inox 8	each

► Style PP

Strong tips.

Length: 135mm



Cat. #	A mm	B mm	Finish	Alloy	Unit
72878-DS	0.14	0.24	Mirror Polished	Inox 8	each

► Style 5A

Oblique tips.

Length: 115mm



Cat. #	A mm	B mm	Finish	Alloy	Unit
3808-6-MF	0.1	0.17	Mirror polished	Inox 08	6/pk
2408-6-MF	0.03	0.07	Mirror polished	Inox 08	6/pk
0203-5A-PO	0.01	0.05	Polished	Dumoxel®	each
0208-5A-PS	0.02	0.06	Matt	Inox 08	6/pk
0508-5A-PO	0.08	0.13	Polished	Inox 08	each

► Style 5XL

Type 5, extra long, super thin tips, for large hands.

Length: 150mm



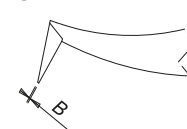
NEW STYLE

Cat. #	A mm	B mm	Finish	Alloy	Unit
0508-5XL-PO	0.06	0.1	Polished	Inox 08	each

► Style 6

Thin hooked tips.

Length: 115mm



Cat. #	A mm	B mm	Finish	Alloy	Unit
3808-6-MF	0.1	0.17	Mirror polished	Inox 08	6/pk
2408-6-MF	0.03	0.07	Mirror polished	Inox 08	6/pk

► Style 7

Thin curved tips.

Length: 115mm

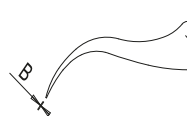


Cat. #	A mm	B mm	Finish	Alloy	Unit
3808-7-MF	0.1	0.17	Mirror polished	Inox 08	6/pk
2408-7-MF	0.03	0.07	Mirror polished	Inox 08	6/pk

► Style 7A

Curved strong tips.

Length: 115mm



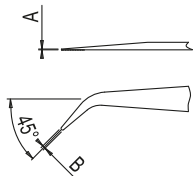
Cat. #	A mm	B mm	Finish	Alloy	Unit
3808-7A-MF	0.16	0.24	Mirror polished	Inox 08	6/pk

► B. Medical Tweezers, Straight Positive Action – Dumont (continued)

► Style 24/45

Strong tips, bent 45 degrees.

Length: 150mm



NEW STYLE

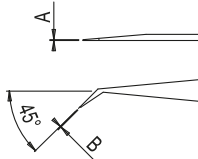
Cat. #	A mm	B mm	Finish	Alloy	Unit
72800-DB	0.5	0.5	Mirror polished	Inox 08	each



► Style PP/45

Strong tips, bent 45 degrees.

Length: 133 mm



NEW STYLE

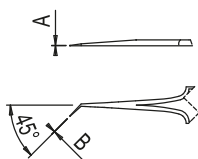
Cat. #	A mm	B mm	Finish	Alloy	Unit
3308-PP/45-PO	0.06	0.1	Polished	Inox 08	6/pk
3308-PP/45-PS	0.06	0.1	Matt	Inox 08	6/pk
3808-PP/45-MF	0.14	0.24	Mirror polished	Inox 08	6/pk
2408-PP/45-MF	0.06	0.1	Mirror polished	Inox 08	6/pk



► Style 5/45

Thin tips, bent 45 degrees, for hairsprings

Length: 109mm



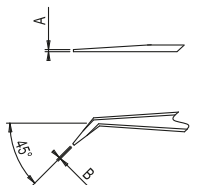
Cat. #	A mm	B mm	Finish	Alloy	Unit
3808-5/45-MF	0.06	0.1	Mirror polished	Inox 08	6/pk
2408-5/45-MF	0.01	0.05	Mirror polished	Inox 08	6/pk



► Style SS/45

Long narrow shanks, thin tips, bent 45 degrees.

Length: 133 mm



NEW STYLE

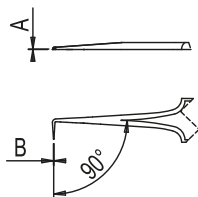
Cat. #	A mm	B mm	Finish	Alloy	Unit
3808-SS/45-MF	0.12	0.2	Mirror polished	Inox 08	6/pk
2408-SS/45-MF	0.06	0.1	Mirror polished	Inox 08	6/pk



► Style 5/90

Thin tips, bent 90 degrees.

Length: 106mm



Cat. #	A mm	B mm	Finish	Alloy	Unit
3808-5/90-MF	0.06	0.1	Mirror polished	Inox 08	6/pk
2408-5/90-MF	0.01	0.05	Mirror polished	Inox 08	6/pk



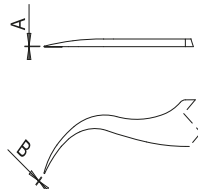
► C. Medical Tweezers; Clamp Style, Dumont

► Clamping Tweezers

► Style L7

Curved, fine points with clamp ring

Length: 115mm



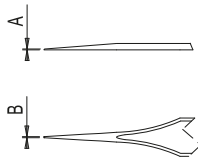
Cat. #	A mm	B mm	Finish	Alloy	Unit
72886-D	0.1	0.17	Polished	Inox 08	each
72886-DZ	0.1	0.17	Polished	Inox 08	doz



► Style L4

Extra thin tips, with clamping ring.

Length: 110mm



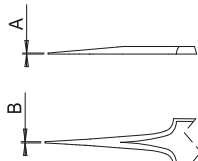
Cat. #	A mm	B mm	Finish	Alloy	Unit
0508-L4-PO	0.08	0.13	Polished	Inox 8	each
3308-L4-PO	0.02	0.06	Polished	Inox 08	6/pk



► Style L5

Super thin tips, with clamping ring.

Length: 110mm

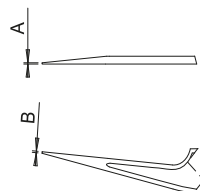


Cat. #	A mm	B mm	Finish	Alloy	Unit
0203-L5-PO	0.01	0.05	Polished	Dumoxel®	each
72882-D	0.06	0.1	Polished	Inox 8	each
72882-DZ	0.06	0.1	Polished	Inox 8	doz
3308-L5-PO	0.01	0.05	Polished	Inox 08	6/pk



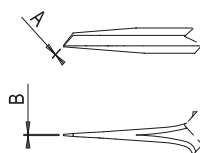
► C. Medical Tweezers; Clamp Style, Dumont (continued)

Style L5A
Oblique tips,
with clamping ring.
Length: 115mm



Cat. #	A mm	B mm	Finish	Alloy	Unit
72884-D	0.08	0.13	Polished	Inox 8	each
72884-DZ	0.08	0.13	Polished	Inox 8	doz

► **Style L5AC**
Anti-capillary, extra thin
tips, with clamping ring.
Length: 133 mm



NEW STYLE

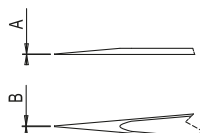


Cat. #	A mm	B mm	Finish	Alloy	Unit
0208-L5AC-PS	0.02	0.07	Matt	Inox 08	6/pk

► D. Standard Tweezers; Standard and Biological Grade, Dumont

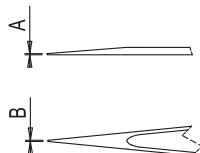
► Negative Action (self closing)

► **Style N0**
Type 0, thin tips.
Length: 115mm



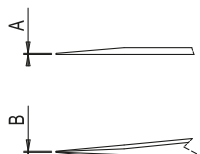
Cat #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-N0-PO	0.1	0.17	High Precision	Polished	Dumoxel®	6/pk
0203-N0-PO	0.04	0.08	Biological	Polished	Dumoxel®	each
0202-N0-PO	0.04	0.08	Biological	Polished	Inox 2	each

► **Style N0C**
Type 0 short, thin tips.
Length: 108mm



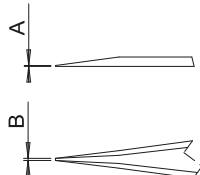
Cat #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-N0C-PO	0.1	0.17	High Precision	Polished	Dumoxel®	6/pk
0102-N0C-PO	0.1	0.17	High Precision	Polished	Inox02	6/pk
0202-N0C-PO	0.04	0.08	Biological	Polished	Inox 2	each
72868-D	0.04	0.08	Biological	Polished	Dumoxel®	each
72868-DZ	0.04	0.08	Biological	Polished	Dumoxel®	doz
0304-N0C-PO	0.1	0.17	Electronic	Polished	Antimagnetic	each
0302-N0C-PO	0.1	0.17	Electronic	Polished	Antimagnetic	6/pk

► **Style N1**
Type 1, strong tips.
Length: 118mm



Cat #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-N1-PO	0.12	0.2	High Precision	Polished	Dumoxel®	each
0102-N1-PO	0.12	0.2	High Precision	Polished	Inox 02	6/pk

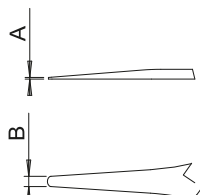
► **Style N2**
Type 2, long strong tips.
Length: 118mm



NEW STYLE

Cat #	A mm	B mm	Grade	Finish	Alloy	Unit
0102-N2-PO	0.14	0.03	High Precision	Polished	Inox 02	6/pk
0303-N1-PO	0.12	0.2	Electronic	Polished	Dumoxel®	6/pk
0302-N1-PO	0.12	0.2	Electronic	Polished	Inox 02	6/pk
0304-N2-PO	0.14	0.34	Electronic	Polished	Antimagnetic	each

► **Style N2A**
Type 2A, round tips.
Length: 118mm



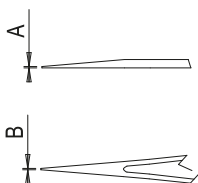
Cat #	A mm	B mm	Grade	Finish	Alloy	Unit
72872-D	0.2	1.5	High Precision	Polished	Dumoxel®	each
0102-N2A-PO	0.2	1.5	High Precision	Polished	Inox 02	6/pk
0403-N2A-PO	0.2	1.5	Electronic	Polished	Dumoxel®	6/pk
0303-N2A-PO	0.2	1.5	Electronic	Polished	Inox 02	6/pk
0304-N2A-PO	0.2	1.5	Electronic	Polished	Antimagnetic	each
0304-N2A-PO	0.2	1.5	Electronic	Polished	Antimagnetic	each

► D. Standard Tweezers; Standard and Biological Grade, Dumont – Negative Action (self closing) (continued)

► Style N3

Type 3, thin tips.

Length: 118mm



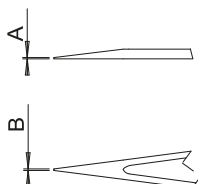
Cat #	A mm	B mm	Grade	Finish	Alloy	Unit
0102-N3-PO	0.1	0.17	High Precision	Polished	Inox 02	6/pk
72866-D	0.04	0.08	Biological	Polished	Dumoxel®	each
72866-DZ	0.04	0.08	Biological	Polished	Dumoxel®	doz
0304-N3-PO	0.1	0.17	Electronic	Polished	Antimagnetic	each



► Style N3C

Type 3 short, thin tips.

Length: 108mm



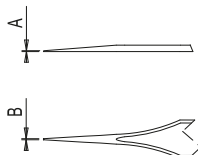
Cat #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-N3C-PO	0.1	0.17	High Precision	Polished	Dumoxel®	6/pk
72886-D	0.04	0.08	Biological	Polished	Dumoxel®	each
72886-DZ	0.04	0.08	Biological	Polished	Dumoxel®	doz



► Style N4

Type 4, very thin tips.

Length: 108mm



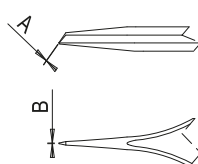
Cat #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-N4-PO	0.08	0.13	High Precision	Polished	Dumoxel®	each
0102-N4-PO	0.08	0.13	High Precision	Polished	Inox 02	6/pk
0203-N4-PO	0.02	0.06	Biological	Polished	Dumoxel®	6/pk



► Style N4AC

Anti-capillary, type 4, very thin tips.

Length: 108mm



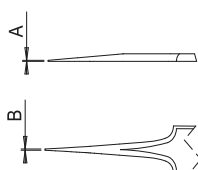
Cat #	A mm	B mm	Grade	Finish	Alloy	Unit
72870-D	0.02	0.07	Biological	Polished	Dumoxel®	each
72870-DZ	0.02	0.07	Biological	Polished	Dumoxel®	doz
0203-N4AC-PS	0.02	0.07	Biological	Matt	Dumoxel®	6/pk
0202-N4AC-PO	0.02	0.07	Biological	Polished	Inox 02	6/pk
0202-N4AC-PS	0.02	0.07	Biological	Matt	Inox 02	6/pk



► Style N5

Type 5, super thin tips.

Length: 108mm



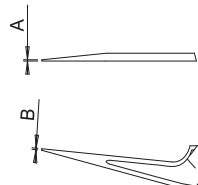
Cat #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-N5-PO	0.06	0.1	High Precision	Polished	Dumoxel®	each
0102-N5-PO	0.06	0.1	High Precision	Polished	Inox 02	6/pk
72854-D	0.01	0.05	Biological	Polished	Dumoxel®	each
72854-DZ	0.01	0.05	Biological	Polished	Dumoxel®	doz
0203-N5-PS	0.01	0.05	Biological	Matt	Dumoxel®	6/pk
0202-N5-PO	0.01	0.05	Biological	Polished	Inox 2	each
0202-N5-PS	0.01	0.05	Biological	Matte	Inox 02	6/pk
0207-N5TI-PO	0.01	0.05	Biological	Polished	Titanium	6/pk
0207-N5TI-PS	0.01	0.05	Biological	Matte	Titanium	6/pk



► Style N5A

Type 5A, super thin oblique tips.

Length: 113mm



NEW STYLE

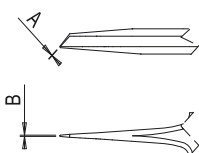
Cat #	A mm	B mm	Grade	Finish	Alloy	Unit
0203-N5A-PS	0.02	0.06	Biological	Matte	Dumoxel®	6/pk
0202-N5A-PS	0.02	0.06	Biological	Matte	Inox 02	6/pk



► Style N5AC

Anti-capillary, type 5, super thin tips.

Length: 113mm



Cat #	A mm	B mm	Grade	Finish	Alloy	Unit
72856-D	0.02	0.07	Biological	Polished	Dumoxel®	each
72856-DZ	0.02	0.07	Biological	Polished	Dumoxel®	doz
0203-N5AC-PS	0.02	0.07	Biological	Matte	Dumoxel®	6/pk
0202-N5AC-PO	0.02	0.07	Biological	Polished	Inox 2	each
0202-N5AC-PS	0.02	0.07	Biological	Matte	Inox 02	6/pk

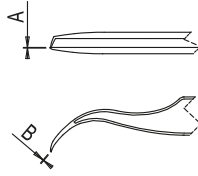


► D. Standard Tweezers; Standard and Biological Grade, Dumont – Negative Action (self closing) (continued)

► Style N7AC

Anti-capillary, type 7, super thin tips.

Length: 115mm

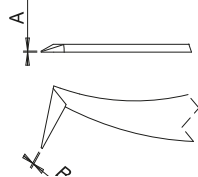


Cat #	A mm	B mm	Grade	Finish	Alloy	Unit
0203-N7AC-PO	0.04	0.09	Biological	Polished	Dumoxel®	each
0202-N7AC-PO	0.04	0.09	Biological	Polished	Inox 2	each

► Style N6

Thin hooked tips

Length: 113mm

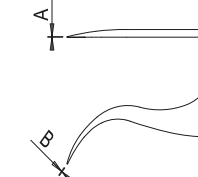


Cat #	A mm	B mm	Grade	Finish	Alloy	Unit
72860-D	0.03	0.07	Biological	Polished	Dumoxel®	each
72860-DZ	0.03	0.07	Biological	Polished	Dumoxel®	doz

► Style N7

Thin curved tips

Length: 115mm

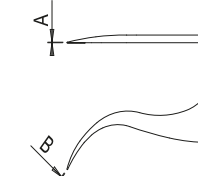


Cat #	A mm	B mm	Grade	Finish	Alloy	Unit
72864-D	0.03	0.07	Biological	Polished	Dumoxel®	each
72864-DZ	0.03	0.07	Biological	Polished	Dumoxel®	doz

► Style N7AC

Anti-capillary, type 7, super thin tips.

Length: 115mm



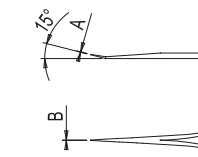
NEW STYLE

Cat #	A mm	B mm	Grade	Finish	Alloy	Unit
0203-N7AC-PS	0.04	0.09	Biological	Matt	Dumoxel®	6/pk
0202-N7AC-PO	0.04	0.09	Biological	Polished	Inox 02	each
0202-N7AC-PS	0.04	0.09	Biological	Matt	Inox 02	6/pk

► Style N5/15

Type 5, super thin tips, bent 15 degrees.

Length: 106mm



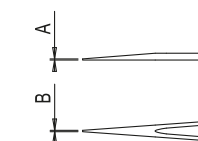
NEW STYLE

Cat #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-N5/15-PO	0.06	0.1	High Precision	Polished	Dumoxel®	6/pk

► Style NAA

Type AA, strong tips.

Length: 123mm



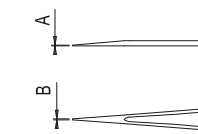
NEW STYLE

Cat #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-NAA-PO	0.2	0.4	High Precision	Polished	Dumoxel®	6/pk
0304-NAA-CO	0.2	0.4	Electronic	Epoxy Coated	Antimagnetic	6/pk

► Style NGG

Type GG, strong tips.

Length: 128mm



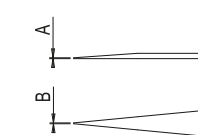
NEW STYLE

Cat #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-NGG-PO	0.12	0.2	High Precision	Polished	Dumoxel®	6/pk
0302-NGG-PO	0.12	0.2	Electronic	Polished	Inox 02	6/pk
0304-NGG-PO	0.12	0.2	Electronic	Polished	Antimagnetic	each

► Style NPP

Type PP, strong tips.

Length: 133mm



NEW STYLE

Cat #	A mm	B mm	Grade	Finish	Alloy	Unit
0103-NPP-PO	0.14	0.24	High Precision	Polished	Dumoxel®	6/pk
0102-NPP-PO	0.14	0.24	High Precision	Polished	Inox 02	6/pk
0304-NPP-PO	0.14	0.24	Electronic	Polished	Antimagnetic	6/pk

► E. Dumont Diamond Tweezers

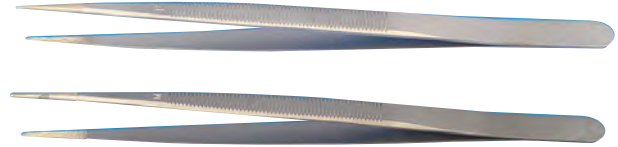
Dumont Stainless Steel tweezers coated with an extremely fine diamond dust on the inside tips. They are essential in applications where a tight grip is necessary. They are also available with an improved locking system. They are 5½"(150mm) long. They may not be suitable for use with EM grids.

► Fine Points Diamond Tweezers

78100 Tip measures 0.25 x 0.25mm each

► Medium Points:

78106 Tip measures 0.50 x 0.50 mm each



► F. Electronics and Micro Electronics Tweezers, Dumont

Electronic Grade: These tweezers have a slightly larger tips than the High Precision grade. These tweezers are made from carbon, stainless, and antimagnetic steel.

► Straight Positive Action

► Style 0

Geneva pattern, thin tips.

Length: 115mm



Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-0-PO	0.1	0.17	Polished	Inox 2	each
0304-0-CO	0.1	0.17	Epoxy Coated	Antimagnetic	each
0304-0-PO	0.1	0.17	Polished	Antimagnetic	6/pk



► Style 00

Geneva pattern, strong tips, thick shanks.

Length: 115mm



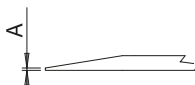
Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-00-CO	0.25	0.45	Epoxy Coated	Inox 2	each
0304-00-CO	0.25	0.45	Epoxy Coated	Antimagnetic	each
0304-00-PO	0.25	0.45	Polished	Antimagnetic	6/pk



► Style 00C

Geneva pattern, strong tips, short shanks.

Length: 105mm



NEW STYLE

Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-00C-PO	0.25	0.45	Polished	Inox 02	6/pk



► Style 0C100

Geneva pattern

Length: 115mm



NEW STYLE

Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-0C100-CO	0.1	0.17	Epoxy Coated	Inox 02	6/pk
0302-0C100-PO	0.1	0.17	Polished	Inox 02	6/pk
0304-0C100-PO	0.1	0.17	Polished	Antimagnetic	6/pk



► Style 0C90

Geneva pattern, short

Length: 90mm



NEW STYLE

Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-0C90-CO	0.1	0.17	Epoxy Coated	Inox 02	6/pk
0302-0C90-PO	0.1	0.17	Polished	Inox 02	6/pk
0304-0C90-PO	0.1	0.17	Polished	Antimagnetic	6/pk



► Style 1

Strong tips.

Length: 120mm



Cat. #	A mm	B mm	Finish	Alloy	Unit
0303-1-PO	0.12	0.2	Polished	Dumoxel®	each
0302-1-PO	0.12	0.2	Polished	Inox 2	each
0304-1-CO	0.12	0.2	Epoxy Coated	Antimagnetic	each
0304-1-PO	0.12	0.2	Polished	Antimagnetic	6/pk

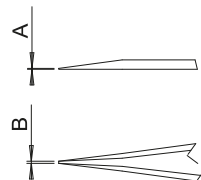


► F. Electronics and Micro Electronics Tweezers, Dumont, Straight Positive Action (continued)

► Style 2

Strong tips.

Length: 120mm

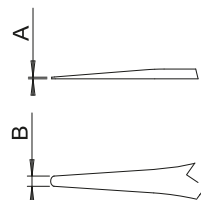


Cat. #	A mm	B mm	Finish	Alloy	Unit
0303-2-PO	0.14	0.34	Polished	Dumoxel®	each
0302-2-CO	0.14	0.34	Epoxy Coated	Inox 2	each
0304-2-CO	0.14	0.34	Epoxy Coated	Antimagnetic	each
0302-2-PO	0.14	0.34	Polished	Inox 2	6/pk
0304-2-PO	0.14	0.34	Polished	Antimagnetic	6/pk

► Style 2A

Flat round tips.

Length: 120mm

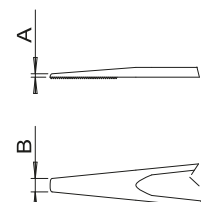


Cat. #	A mm	B mm	Finish	Alloy	Unit
0303-2A-PO	0.2	1.5	Polished	Dumoxel®	each
0302-2A-CO	0.2	1.5	Epoxy Coated	Inox 2	each
0302-2A-PO	0.2	1.5	Polished	Inox 02	6/pk
0304-2A-CO	0.2	1.5	Epoxy Coated	Antimagnetic	each
0304-2A-PO	0.2	1.5	Polished	Antimagnetic	6/pk
0304-2A-TF	0.2	1.5	PTFE Coated	Antimagnetic	6/pk

► Style 2B

Very strong tips with inside serrations.

Length: 160mm

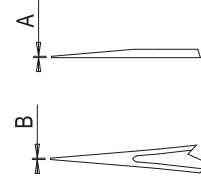


Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-2B-PO	0.6	3	Polished	Inox 02	6/pk
0302-2B3MM-PO	0.6	3	Polished	Inox 02	6/pk
0304-2B-PO	0.6	3	Polished	Antimagnetic	each
0304-2B3MM-PO	0.6	3	Polished	Antimagnetic	6/pk

► Style 3

Thin tips.

Length: 120mm

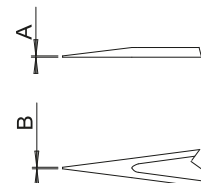


Cat. #	A mm	B mm	Finish	Alloy	Unit
0303-3-PO	0.1	0.17	Polished	Dumoxel®	each
0302-3-PO	0.1	0.17	Polished	Inox 2	each
0302-3-CO	0.1	0.17	Epoxy Coated	Inox 02	6/pk
72692-D	0.1	0.17	Epoxy Coated	Antimagnetic	each
72692-DZ	0.1	0.17	Epoxy Coated	Antimagnetic	doz
0304-3-CO	0.1	0.17	Epoxy Coated	Antimagnetic	6/pk
0304-3-PO	0.1	0.17	Polished	Antimagnetic	6/pk
0304-3-TF	0.1	0.17	PTFE Coated	Antimagnetic	6/pk
0306-3-CO	0.1	0.17	Epoxy Coated	Brass	6/pk

► Style 3C

Type 3 short, thin tips.

Length: 110mm

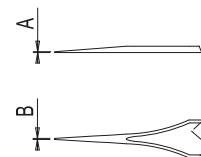


Cat. #	A mm	B mm	Finish	Alloy	Unit
0303-3C-PO	0.1	0.17	Polished	Dumoxel®	each
0304-3C-CO	0.1	0.17	Epoxy Coated	Antimagnetic	each
72682-D	0.1	0.17	Epoxy Coated	Antimagnetic	each
0302-3C-CO	0.1	0.17	Epoxy Coated	Inox 02	6/pk
0302-3C-PO	0.1	0.17	Polished	Inox 02	6/pk
0304-3C-PO	0.1	0.17	Polished	Antimagnetic	6/pk
0302-3C-CO	0.1	0.17	Epoxy Coated	Antimagnetic	6/pk

► Style 4

Strong thin tips.

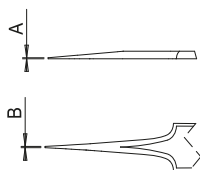
Length: 110mm



Cat. #	A mm	B mm	Finish	Alloy	Unit
0303-4-PO	0.08	0.13	Polished	Dumoxel®	each
0302-4-PO	0.08	0.13	Polished	Inox 2	each
0302-4-CO	0.08	0.13	Epoxy Coated	Inox 02	6/pk
0304-4-CO	0.08	0.13	Epoxy Coated	Antimagnetic	each
0304-4-PO	0.08	0.13	Polished	Antimagnetic	6/pk

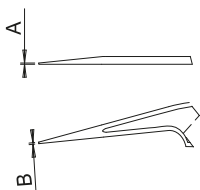
► F. Electronics and Micro Electronics Tweezers, Dumont, Straight Positive Action (continued)

- **Style 5**
Super thin tips.
Length: 110mm



Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-5-CO	0.06	0.1	Epoxy Coated	Inox 2	each
0302-5-PO	0.06	0.1	Polished	Inox 2	each
72702-D	0.06	0.1	Epoxy Coated	Antimagnetic	each
72702-DTIP	0.06	0.1	PTFE Coated, Tip Coated	Antimagnetic	each
72702-DTIP-DZ	0.06	0.1	PTFE Coated, Tip Coated	Antimagnetic	doz
0303-5-PO	0.06	0.1	Polished	Dumoxel®	each
0303-5-TF	0.06	0.1	PTFE Coated	Dumoxel®	each
0304-5-TF	0.06	0.1	PTFE Coated	Antimagnetic	each
72702-DZ	0.06	0.1	Epoxy Coated	Antimagnetic	doz
0302-5-PS	0.06	0.1	Matt	Inox 02	6/pk
0304-5-PO	0.06	0.1	Polished	Antimagnetic	6/pk
0304-5-PS	0.06	0.1	Matt	Antimagnetic	6/pk
0303-5-PS	0.06	0.1	Matt	Dumoxel®	6/pk

- **Style 5A**
Oblique tips
Length: 115mm

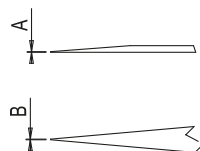


NEW STYLE



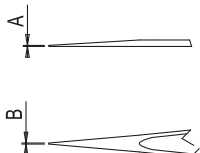
Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-5A-PO	0.08	0.13	Polished	Inox 02	6/pk

- **Style 11**
Strong tips. Ideal to manipulate delicate pieces.
Length: 120mm



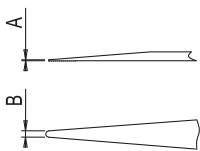
Cat. #	A mm	B mm	Finish	Alloy	Unit
0305-11NI-CO	0.14	0.24	Epoxy Coated	Nickel	each
0305-11NI-PO	0.14	0.24	Polished	Nickel	each

- **Style 12**
Thin tips. Ideal to manipulate delicate pieces.
Length: 120mm



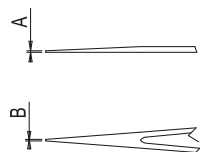
Cat. #	A mm	B mm	Finish	Alloy	Unit
0305-12NI-CO	0.1	0.17	Epoxy Coated	Nickel	each
0305-12NI-PO	0.1	0.17	Polished	Nickel	each

- **Style 24**
Strong tips with inside serrations.
Length: 150mm



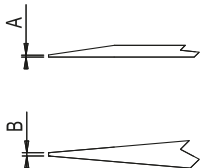
Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-24-PO	0.5	0.5	Polished	Inox 02	6/pk
0303-24-PO	0.5	0.5	Polished	Dumoxel®	each
0304-24-PO	0.5	0.5	Polished	Antimagnetic	each
0307-24TI-PO	0.5	0.5	Polished	Titanium	6/pk

- **Style 180**
Long shanks, strong tips.
Length: 180mm



Cat. #	A mm	B mm	Finish	Alloy	Unit
0304-180-PO	0.5	0.5	Polished	Antimagnetic	each

- **Style A**
Strong tips
Length: 115mm



NEW STYLE



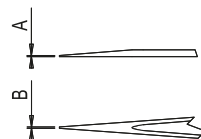
Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-A-PO	0.35	0.6	Polished	Inox 02	6/pk

► F. Electronics and Micro Electronics Tweezers, Dumont, Straight Positive Action (continued)

► Style AA

Strong tips

Length: 125mm



NEW STYLE

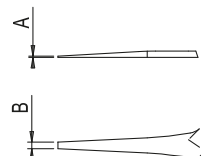


Cat. #	A mm	B mm	Finish	Alloy	Unit
0303-AA-PO	0.2	0.4	Polished	Dumoxel®	6/pk
0302-AA-CO	0.2	0.4	Epoxy Coated	Inox 02	6/pk
0302-AA-PO	0.2	0.4	Polished	Inox 02	6/pk
0304-AA-CO	0.2	0.4	Epoxy Coated	Antimagnetic	6/pk
0304-AA-PO	0.2	0.4	Polished	Antimagnetic	6/pk

► Style F

Wide square tips.

Length: 120mm



NEW STYLE

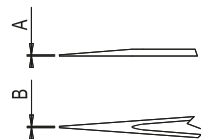


Cat. #	A mm	B mm	Finish	Alloy	Unit
0304-F-PO	0.2	2	Polished	Antimagnetic	6/pk

► Style GG

Strong and Very Precise

Length: 130mm



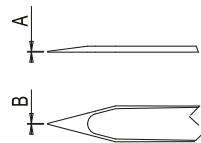
Cat. #	A mm	B mm	Finish	Alloy	Unit
72816-D	0.12	0.2	Polished	Antimagnetic	each
72816-DZ	0.12	0.2	Polished	Antimagnetic	doz
0203-GG-PO	0.12	0.2	Polished	Dumoxel®	each



► Style H

Tringle tips, short shanks.

Length: 90mm



NEW STYLE

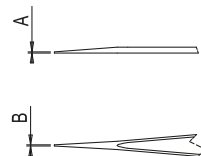


Cat. #	A mm	B mm	Finish	Alloy	Unit
72816-D	0.12	0.2	Polished	Antimagnetic	each
72816-DZ	0.12	0.2	Polished	Antimagnetic	doz
0203-GG-PO	0.12	0.2	Polished	Dumoxel®	each
0302-H-CO	0.1	0.17	Epoxy Coated	Inox 02	6/pk
0302-H-PO	0.1	0.17	Polished	Inox 02	6/pk
0304-H-PO	0.1	0.17	Polished	Antimagnetic	6/pk

► Style MM

Assembling tweezers.

Length: 127mm



NEW STYLE

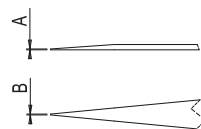


Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-MM-CO	0.22	0.26	Epoxy Coated	Inox 02	6/pk
0302-MM-PO	0.22	0.26	Polished	Inox 02	6/pk
0304-MM-PO	0.22	0.26	Polished	Antimagnetic	6/pk

► Style NN

Assembling tweezers.

Length: 115mm



NEW STYLE

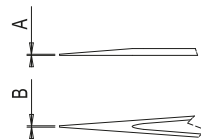


Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-MM-CO	0.22	0.26	Epoxy Coated	Inox 02	6/pk
00302-NN-PO	0.2	0.4	Polished	Inox 02	6/pk
0304-NN-CO	0.2	0.4	Epoxy Coated	Antimagnetic	6/pk

► Style SS135

Long narrow shanks, thin tips.

Length: 135mm



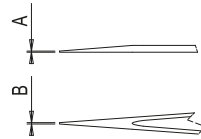
Cat. #	A mm	B mm	Finish	Alloy	Unit
0304-SS135-CO	0.12	0.2	Epoxy Coated	Antimagnetic	each
0304-SS135-PO	0.12	0.2	Polished	Antimagnetic	each



► Style SS140

Long narrow shanks, thin tips.

Length: 140mm



NEW STYLE



Cat. #	A mm	B mm	Finish	Alloy	Unit
0304-SS140-CO	0.12	0.2	Epoxy Coated	Antimagnetic	6/pk
0304-SS140-PO	0.12	0.2	Polished	Antimagnetic	6/pk

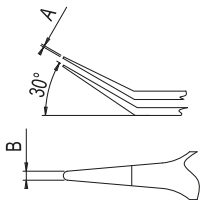
► Curved and Angled Positive Action; Electronic Grade, Dumont

Electronic Grade: These tweezers have a slightly larger tips than the High Precision grade. These tweezers are made from carbon, stainless, and antimagnetic steel.

► Style 2A/30

Flat round tips,
bent 30 degrees.

Length: 118mm



NEW STYLE

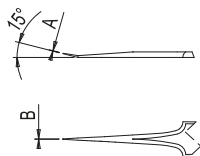


Cat. #	A mm	B mm	Finish	Alloy	Unit
0303-2A/30-PO	0.2	1.5	Polished	Dumoxel®	6/pk

► Style 5/15

Thin tips, bent 15 degrees.

Length: 105mm



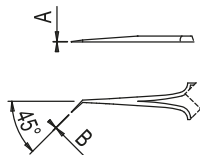
Cat. #	A mm	B mm	Finish	Alloy	Unit
0304-5/15-PO	0.06	0.1	Polished	Antimagnetic	each
0302-5/15-PO	0.06	0.1	Polished	Inox 02	6/pk
0304-5/15-PO	0.06	0.1	Polished	Antimagnetic	each



► Style 5/45

Thin tips, bent 45 degrees.

Length: 109mm



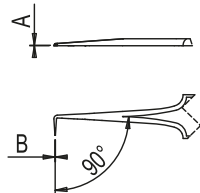
Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-5/45-PO	0.06	0.1	Polished	Inox 02	6/pk
0304-5/45-PO	0.06	0.1	Polished	Antimagnetic	each



► Style 5/90

Thin tips, bent 90 degrees.

Length: 106mm



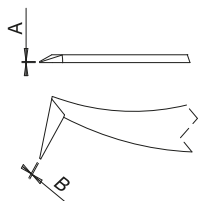
Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-5/90-PO	0.06	0.1	Polished	Inox 02	each
0304-5/90-PO	0.06	0.1	Polished	Antimagnetic	each



► Style 6

Thin hooked tips.

Length: 115mm



NEW STYLE

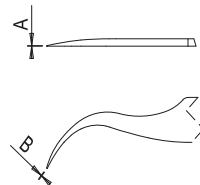


Cat. #	A mm	B mm	Finish	Alloy	Unit
0303-2A/30-PO	0.2	1.5	Polished	Dumoxel®	6/pk
0304-6-CO	0.1	0.17	Epoxy Coated	Antimagnetic	6/pk
0304-6-PO	0.1	0.17	Polished	Antimagnetic	6/pk

► Style 7

Thin curved tips.

Length: 115mm



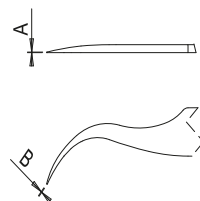
Cat. #	A mm	B mm	Finish	Alloy	Unit
72802-D	0.1	0.17	Epoxy Coated	Inox 2	each
0302-7-PO	0.1	0.17	Polished	Inox 02	6/pk
0304-7-PO	0.1	0.17	Polished	Antimagnetic	each
0303-7-PO	0.1	0.17	Polished	Dumoxel®	each
72802-DZ	0.1	0.17	Epoxy Coated	Inox 02	doz
0303-7-PS	0.1	0.17	Matt	Dumoxel®	6/pk



► Style 7A

Curved strong tips.

Length: 115mm



NEW STYLE



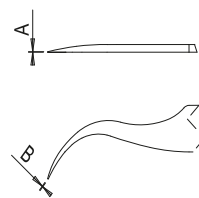
Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-7A-PO	0.16	0.24	Polished	Inox 02	6/pk
0304-7A-PO	0.16	0.24	Polished	Antimagnetic	6/pk
0303-7A-PO	0.16	0.24	Polished	Dumoxel®	6/pk

▶ Curved and Angled Positive Action; Electronic Grade, Dumont (continued)

▶ Style 7B

Curved tips with inside serrations

Length: 115mm



NEW STYLE

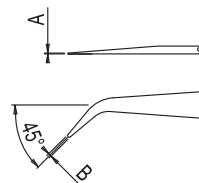
Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-7B-PO	0.1	0.17	Polished	Inox 02	6/pk



▶ Style 24/45

Strong tips, bent 45 degrees.

Length: 145mm



NEW STYLE

Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-24/45-PO	0.5	0.5	Polished	Inox 02	6/pk
0304-24/45-PO	0.5	0.5	Polished	Antimagnetic	6/pk



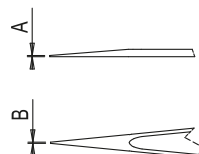
▶ Negative-Action Style; Electronic Grade, Dumont

Electronic Grade: These tweezers have a slightly larger tips than the High Precision grade.

▶ Style N0C

Type 0 short, thin tips.

Length: 108mm



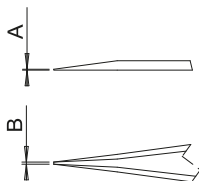
Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-N0C-PO	0.1	0.17	Polished	Antimagnetic	6/pk
0304-N0C-PO	0.1	0.17	Polished	Antimagnetic	each



▶ Style N2

Type 2, long strong tips.

Length: 118mm



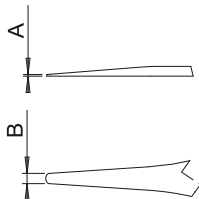
Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-N1-PO	0.12	0.2	Polished	Inox 02	6/pk
0303-N1-PO	0.12	0.2	Polished	Dumoxel®	6/pk
0304-N2-PO	0.14	0.34	Polished	Antimagnetic	each



▶ Style N2A

Type 2A, round tips.

Length: 118mm



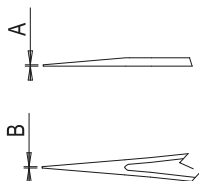
Cat. #	A mm	B mm	Finish	Alloy	Unit
0304-N2A-PO	0.2	1.5	Polished	Antimagnetic	each
0302-N2A-PO	0.2	1.5	Polished	Inox 02	6/pk
0304-N2A-PO	0.2	1.5	Polished	Antimagnetic	each
0403-N2A-PO	0.2	1.5	Polished	Dumoxel®	6/pk



▶ Style N3

Type 3, thin tips.

Length: 118mm



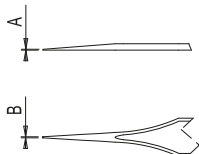
Cat. #	A mm	B mm	Finish	Alloy	Unit
0304-N3-PO	0.1	0.17	Polished	Antimagnetic	each



▶ Style N4

Type 4, very thin tips.

Length: 108mm



Cat. #	A mm	B mm	Finish	Alloy	Unit
0304-N4-PO	0.08	0.13	Polished	Inox 02	6/pk

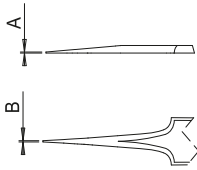


► Negative-Action Style; Electronic Grade, Dumont (continued)

► Style N5

Type 5, super thin tips.

Length: 108mm

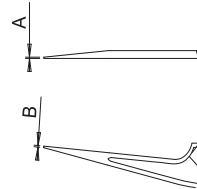


Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-N5-PO	0.06	0.1	Polished	Inox 02	6/pk
0304-N5-PO	0.06	0.1	Polished	Antimagnetic	each

► Style N5A

Type 5A, super thin oblique tips.

Length: 113mm



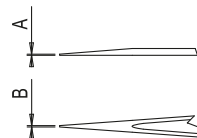
NEW STYLE

Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-N5A-PO	0.08	0.13	Polished	Inox 02	6/pk

► Style NAA

Type AA, strong tips.

Length: 123mm



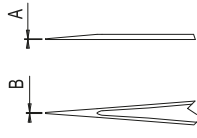
NEW STYLE

Cat. #	A mm	B mm	Finish	Alloy	Unit
0304-NAA-CO	0.2	0.4	Epoxy Coated	Antimagnetic	6/pk

► Style NGG

Type GG, strong tips.

Length: 128mm

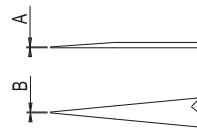


Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-NGG-PO	0.12	0.2	Polished	Inox 02	6/pk
0304-NGG-PO	0.12	0.2	Polished	Antimagnetic	each

► Style NPP

Type PP, strong tips.

Length: 133mm



NEW STYLE

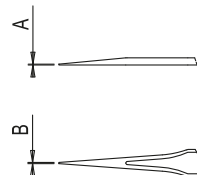
Cat. #	A mm	B mm	Finish	Alloy	Unit
0304-NPP-PO	0.14	0.24	Polished	Antimagnetic	6/pk

► Mini Tweezers, Dumont

► Style M5

Type 5 mini, super thin tips.

Length: 83mm



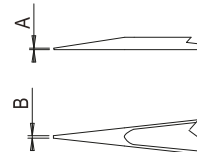
Cat. #	A mm	B mm	Finish	Alloy	Unit
0302-M5S-PS	0.06	0.1	Matt	Inox 02	each

► G. ESD Tweezers, Dumont

► Style 00 SA ESD

Geneva pattern, strong tips, thick body.

Length: 115mm

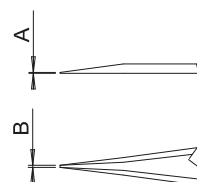


Cat. #	A mm	B mm	Finish	Alloy	Unit
0304-00SAESD-CO	0.25	0.45	Epoxy Coated	Antimagnetic	each

► Style 2 SA ESD

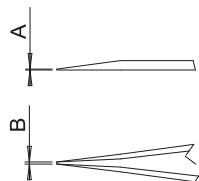
Strong tips.

Length: 120mm



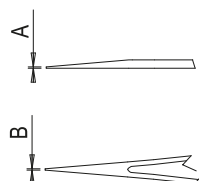
Cat. #	A mm	B mm	Finish	Alloy	Unit
0304-2SAESD-CO	0.14	0.34	Epoxy Coated	Antimagnetic	each

- **Style 2A SA ESD**
Flat rounded tips.
Length: 120mm



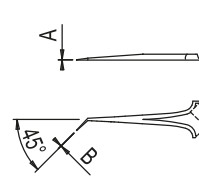
Cat. #	A mm	B mm	Finish	Alloy	Unit
0304-2ASAESD-CO	0.2	1.5	Epoxy Coated	Antimagnetic	each

- **Style 3A SA ESD**
Thin tips.
Length: 120mm



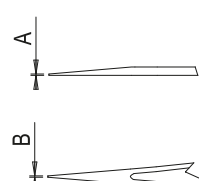
Cat. #	A mm	B mm	Finish	Alloy	Unit
0304-3SAESD-CO	0.1	0.17	Epoxy Coated	Antimagnetic	each

- **Style 5/45 SA ESD**
Thin tips, bent 45 degrees.
Length: 109mm



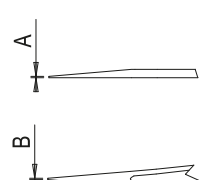
Cat. #	A mm	B mm	Finish	Alloy	Unit
0304-5/45SAESD-CO	0.06	0.1	Epoxy Coated	Antimagnetic	each

- **Style AA SA ESD**
Strong tips.
Length: 125mm



Cat. #	A mm	B mm	Finish	Alloy	Unit
0304-AASAESD-CO	0.2	0.4	Epoxy Coated	Antimagnetic	each

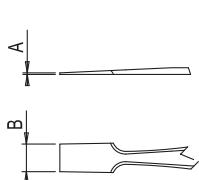
- **Style SS135 SA ESD**
Long narrow shanks, thin tips.
Length: 135mm



Cat. #	A mm	B mm	Finish	Alloy	Unit
0304-SSSAESD-CO	0.12	0.2	Epoxy Coated	Antimagnetic	each

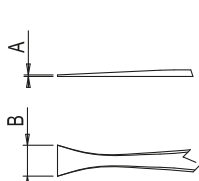
► H. Wafer Handling, Dumont

- **Style 34A**
Wafer handling tweezers.
Length: 120mm



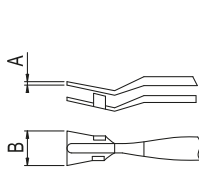
Cat. #	A mm	B mm	Finish	Alloy	Unit
0403-34A-PS	0.15	7	Matt	Dumoxel®	each

- **Style 35A**
Wafer handling tweezers, bent 30 degrees.
Length: 118mm



Cat. #	A mm	B mm	Finish	Alloy	Unit
0403-35A-PS	0.2	6	Matt	Dumoxel®	6/pk

- **Style 37S**
Wafer handling tweezers.
Length: 120mm



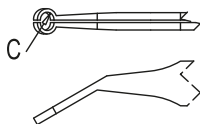
Cat. #	A mm	B mm	Finish	Alloy	Unit
0403-37S-PS	0.2	7	Matt	Dumoxel®	each

► I. Component Handling, Dumont

► Style 2E1/8

For components,
tips outside diameter
3.2 mm.

Length: 118mm



NEW STYLE

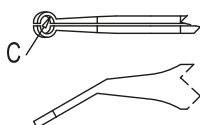
Cat. #	C mm	Finish	Alloy	Unit
0102-2E1/8-PO	3.2	Polished	Inox 02	6/pk
0102-2E1/8-PS	3.2	Matt	Inox 02	6/pk
0103-2E1/8-PO	3.2	Polished	Dumoxel®	6/pk
0103-2E1/8-PS	3.2	Matt	Dumoxel®	6/pk



► Style 2E1/8

For components,
tips 3.2mm

Length: 118mm



NEW STYLE

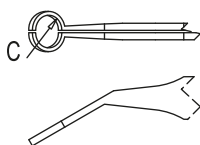
Cat. #	C mm	Finish	Alloy	Unit
0302-2E1/8-PO	3.2	Polished	Inox 02	6/pk
0304-2E1/8-PO	3.2	Polished	Antimagnetic	6/pk



► Style 2E1/4

For components,
tips outside diameter
6.4 mm.

Length: 118mm



NEW STYLE

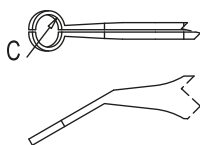
Cat. #	C mm	Finish	Alloy	Unit
0102-2E1/4-PS	6.4	Matt	Inox 02	6/pk
0103-2E1/4-PO	6.4	Polished	Dumoxel®	6/pk
0103-2E1/4-PS	6.4	Matt	Dumoxel®	6/pk



► Style 2E1/4

For components,
tips 6.4mm

Length: 118mm



NEW STYLE

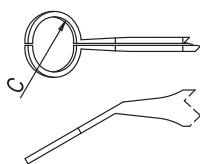
Cat. #	C mm	Finish	Alloy	Unit
0302-2E1/4-PO	6.4	Polished	Inox 02	6/pk
0304-2E1/4-PO	6.4	Polished	Antimagnetic	6/pk



► Style 2E1/2

For components,
tips outside diameter
12.7 mm.

Length: 118mm



NEW STYLE

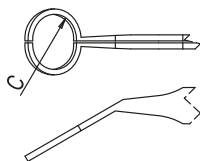
Cat. #	C mm	Finish	Alloy	Unit
0102-2E1/2-PO	12.7	Polished	Inox 02	6/pk
0103-2E1/2-PO	12.7	Polished	Dumoxel®	6/pk



► Style 2E1/2

For components,
tips 12.7mm

Length: 118mm



NEW STYLE

Cat. #	C mm	Finish	Alloy	Unit
0302-2E1/2-PO	12.7	Polished	Inox 02	6/pk
0304-2E1/2-PO	12.7	Polished	Antimagnetic	6/pk



► Dumont Tweezers Set in Wooden Case

Dumont tweezers in a fine wood display case.

Dumont Tweezers Set 1:

This set includes all of the fine tip Dumont tweezers made from Dumoxel steel (biological grade): specifically used in the field of microscopy for all delicate and precise work. The kit includes one each of a Dumont style 3C (72680-D), style 3 (72690-D), style 5 (72700-D), style 5/15 (72708-D) and style 7 (72800-D).

72890-01 Dumont Fine Tips Tweezers Set 1 5/set

Dumont Tweezers Set 2:

This set includes one each of : style #3C epoxy coated (72682-D), Style 5A (72720-D), style 5/45 (72703-D), style 5AC (72730-D) and style N5AC (72856-D).

72890-02 Dumont Fine Tips Tweezers Set 2 5/set



► DUMONT Tweezers Set

Made from lightweight plastic and padded with protective foam inside, this tweezers storage box offers you the safe place to store your delicate and valuable tweezers, but keeps them at your reach when you need them.

Set of 7 DUMONT Dumoxel/Biology quality tweezers, includes styles #3 (72690-D), #5 (72700-D), #5/45° (72703-D), #5/15° (72708-D), #5AC (72730-D), #N5 (72854-D) and #7 (72800-D), This set is ideal for ultramicrotomy work.

72891-01 DUMONT Box & Tweezers Set each

72891-Bx DUMONT Tweezers Box Only each

► Wooden Tweezers Holder Case

Made from solid wood, with brass double hinges and an elegant latch. Comes with a foam padded top and bottom to protect stored tweezers. The inside measures 5 3/4" x 4 1/8" (145 x 124 mm) and it holds 5 tweezers with a maximum length of 140mm.

72898-01 Wooden Tweezers Holder Case each

► Tweezer Boxes

Box for 3 Tweezers

Cat #	Finish	Material	Unit
BOX.W-003	White varnish with logo	Wood	each

Box for 5 Tweezers

Cat #	Finish	Material	Unit
BOX.W-005	White varnish with logo	Wood	each

Box for 7 Tweezers

Cat #	Finish	Material	Unit
BOX.W-007	White varnish with logo	Wood	each



EMS is Proud to represent **Rubis**

Innovations from Rubis with a clear focus on cutting-edge laboratory instruments

► High-Tech Tweezers for Laboratory Requirements

Evolution is what the Rubis development engineers call it when they harmonize ultra-modern technology and traditional Swiss precision engineering in their ground-breaking precision instruments. Continuous innovation in recent years has enabled the premium label//brand to ready its classic tweezers to meet new and exacting demands. With three new developments at once, the experts from South Switzerland are back on the pioneering track: exclusive high-tech surfaces offer substantial added utility and clear customer benefits.

Ultra-modern nanotechnology closes even the tiniest of pores on the surface of the Nano tweezers. The instrument itself, as all Rubis tweezers, is made from extremely high-grade surgical stainless steel. The Lotus effect, engineered by the nanotechnology, causes dirt, oil, water and other liquids to simply pearl off the steel. This keeps the tweezers perfectly clean, a beneficial feature particularly in a sensitive laboratory setting.

However, the need for hygiene is no longer limited to what the eye can see. Rubis has come up with a unique solution to meet just such exacting requirements in the form of the Ion tweezers. The innovative special coating of the Ion model releases silver ions, which act as an antimicrobial to reliably neutralise bacteria, germs and other pathogens. Unlike other methods, the use of ion technology does not give rise to any resistance. Consequently, it represents a risk-free method of guaranteeing hygiene, even at workstations where instruments are used by several different people.

The third innovation really does "get a grip" on things. The special soft coating of the new Grip tweezers not only provides a non-slip grip, it also improves the handling perceptibly. The easy-grip, soft-touch coating prevents hand fatigue, provides isolation and protects against the influence

of heat.

The latest innovation aims for a considerably longer service life. Durax™ tweezers with a tip as hard as 616HV Vickers-hardness are 6 x harder than the tip of a standard stainless steel tweezers. Even with intensive use Rubis Durax™ tweezers retain their original precision. The advanced material properties guarantee higher resistance against normal wear and tear.

The Nano, Ion, Grip and Durax™ tweezers are available exclusively from Rubis. Already operating globally in the watch-making and electronics industries and in the medicine and cosmetics sectors for the past 60 years, these innovations give Rubis a strong point of departure to enter the laboratory products market. "We are highly specialised, possess unique expertise and offer our customers a product programme tailor-made to suit their exacting requirements," explains Fides Baldesberger, proprietor of Rubis. "And this goes for the laboratory products segment now, too." To constantly guarantee the first-rate quality of the products, each hand-made precision instrument and all its details are meticulously checked under magnifier glasses before leaving the workshop. In typical Swiss style, of course: As Fides Baldesberger puts it, "Only tweezers that pass this test carry the Rubis quality label//brand".

The company

Rubis is a leading international manufacturer of hand-made precision instruments. The Swiss premium label//brand has been manufacturing and developing high-grade precision instruments in the tradition of Swiss precision engineering at its workshops in Stabio for more than 60 years. Besides boasting an extensive product portfolio, Rubis also makes tools to its customers' own specifications. Although Rubis tweezers were initially manufactured exclusively for the Swiss watch industry, the products are now employed across the globe in a wide range of applications in the electronics industry, in R&D labs, in medicine and in cosmetics. Rubis products are regularly honoured with international awards for the quality of their materials, finish and design. Elaborate handwork, ultra-modern technology, the best raw materials, functional precision and aesthetic form put Rubis in a class of its own.

► Hand Crafted Precision Tweezers

More than sixty years ago, the first precision tweezers were developed to place ruby stones into watch movements. Since then the brand Rubis has continued to represent precision tools made to authentic Swiss quality standards.

The quality of Rubis product is the result of applying a combination of the latest technology with speed and superior traditional workmanship. Each tweezers is finished by hand under a loupe, to guarantee perfect tips alignment and Swiss top quality. Ideal span, high stability, an ergonomically correct form and resilience of material - best surgical stainless steel, antacid and non-magnetic - accounts for effectiveness and precision.

State-of-the-art technologies and novel materials have been studied for the development of new, extraordinary and innovative products. Tweezers are a simple tool - yet demanding in their specifications. They require continuous engineering and development to keep pace with their applications for the newest and ever changing technologies.

Electron Microscopy Sciences is proud to offer the complete line of Rubis laboratory tweezers:

■ Standard SA Steel Tweezers
■ Rubis Reinforced Plastic Tweezers

■ Rubis Wafer Tweezers
■ Nano-Tweezers

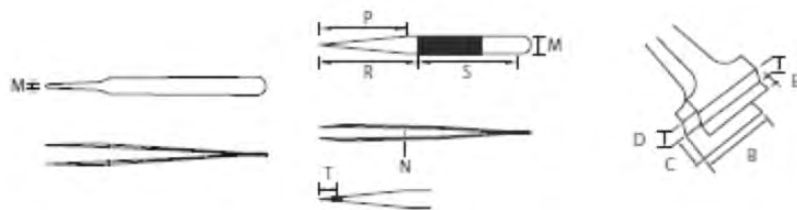
■ Ion Tweezers
■ Grip Tweezers
■ Durax

■ Axal

► **A. Axal™ Tweezers from Rubis**

EMS is happy to announce the Axal line of Tweezers from Rubis. These tweezers are a direct replacement for the discontinued Taxal line of Tweezers that we used to carry from Fontax prior to them going out of business.

The Axal™ line is made from High Cobalt Chromium-Molybdenum Alloy. With a high Vickers hardness, 100% antimagnetic and acid resistant, these tweezers supply long lasting durability and are practically wearproof.



► **Style SS**

135 mm (5 3/8") Long. M = 8 mm (1/8")
N = 1.5 mm (1/16") P = 82 mm (3 1/4")



78147-SS Axal™ SS Tweezer

each

► **Style OC 11**

110 mm (4 3/8") Long. M = 9 mm (1/8")
N = 1.5 mm (1/16") P = 47 mm (1 3/4")



78147-OC11 Axal™ Style OC11 Tweezer

each

► **Style 1**

120 mm (4 3/4") Long. M = 10 mm (1/8")
N = 1.5 mm (1/16") P = 50 mm (2")



78147-1 Axal™ Style 1 Tweezer

each

► **Style 4AB**

110 mm (4 3/8") Long. M = 10 mm (1/8")
N = 1.5 mm (1/16") P = 30 mm (1 1/8")



78147-4AB Axal™ Style 4AB Tweezer

each

► **Style 3**

120 mm (4 3/4") Long. M = 10 mm (1/8")
N = 1.5 mm (1/16") P = 50 mm (2")



78147-3 Axal™ Style 3 Tweezer

each

► **Style F**

120 mm (4 3/4") Long. M = 10 mm (1/8")
N = 1.5 mm (1/16") P = 33 mm (1 1/4")



78147-F Axal™ Style F Tweezer

each

► **Style 3C**

110 mm (4 3/8") Long. M = 9 mm (1/8")
N = 1.5 mm (1/16") P = 43 mm (1 3/8")



78147-3C Axal™ Style 3C Tweezer

each

► **Style 2A**

120 mm (4 3/4") Long. M = 10 mm (1/8")
N = 1.5 mm (1/16") P = 35 mm (1 3/8")
U = 2 mm (1/2")



78147-2A Axal™ Style 2A Tweezer

each

► **Style 0**

120 mm (4 3/4") Long. M = 10 mm (1/8")
N = 1.5 mm (1/16") P = 51 mm (2")



78147-0 Axal™ Style 0 Tweezer

each

► **Style 2**

115 mm (4 1/2") Long. M = 10 mm (1/8")
N = 1.5 mm (1/16") P = 34 mm (1 3/8")



78147-2 Axal™ Style 2 Tweezer

each

► Rubis Axal Tweezers (continued)

► Style 5

120 mm (4 3/4") Long. M = 10 mm (1/2")
N = 1.5 mm (1/16") P = 30 mm (1 1/16")

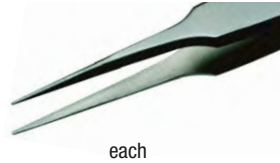
78147-5 Axal™ Style 5 Tweezer each



► Style 4

110 mm (4 1/2") Long. M = 10 mm (1/2")
N = 1.5 mm (1/16") P = 30 mm (1 1/16")

78147-4 Axal™ Style 4 Tweezer each



► Style 5A

115 mm (4 1/2") Long. M = 10 mm (1/2")
N = 1.5 mm (1/16") P = 34 mm (1 1/8")

78147-5A Axal™ Style 5 Tweezer each



► Style 7

120 mm (4 3/4") Long. M = 11 mm (1/2")
N = 1.5 mm (1/16") P = 34 mm (1 1/8")

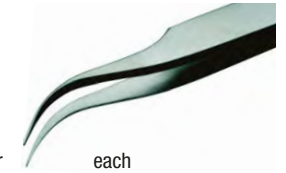
78147-7 Axal™ Style 7 Tweezer each



► Style 7A

115 mm (4 1/2") Long. M = 10 mm (1/2")
N = 1.5 mm (1/16") P = 34 mm (1 1/8")

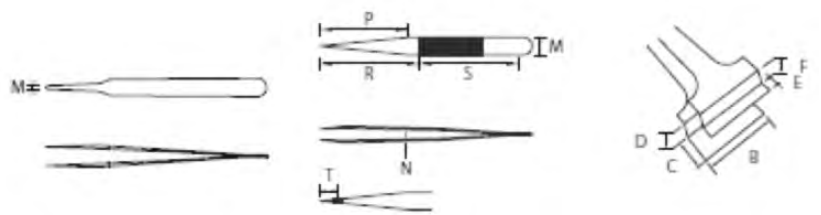
78147-7A Axal™ Style 7A Tweezer each



► B. Durax™ Tweezers from Rubis

The resistant tweezers.

With a 616HV Vickers-hardness, the tip of Rubis DURAX™ tweezers is six times harder than the tip of a standard steel tweezers. Even with intensive use, Rubis DURAX™ tweezers retain their original precision. The advanced material properties guarantee higher resistance against normal wear and tear, providing a considerably longer service life. Their specially-hardened chrome-magnesium steel is also used in the manufacture of surgical instruments.



► Style SS

135 mm (5 1/2") Long. M = 8 mm (1/2")
N = 1.5 mm (1/16") P = 82 mm (3 1/4")

78149-SS Durax™ SS Tweezer each



► Style 1

120 mm (4 3/4") Long. M = 10 mm (1/2")
N = 1.5 mm (1/16") P = 50 mm (2")

78149-1 Durax™ Style 1 Tweezer each



► Style 3

120 mm (4 3/4") Long. M = 10 mm (1/3")
N = 1.5 mm (1/16") P = 50 mm (2")

78149-3 Durax™ Style 3 Tweezer each



► Style 3C

110 mm (4 1/2") Long. M = 9 mm (1/2")
N = 1.5 mm (1/16") P = 43 mm (1 3/8")

78149-3C Durax™ Style 3C Tweezer each



► Style 0

120 mm (4 ¾") Long. M = 10 mm (⅜")
N = 1.5 mm (⅙") P = 51 mm (2")

78149-0 Durax™ Style 0 Tweezer each



► Style 0C11

110 mm (4 ½") Long. M = 9 mm (⅜")
N = 1.5 mm (⅙") P = 47 mm (1 ¾")

78149-0C11 Durax™ Style 0C11 Tweezer each



► Style F

120 mm (4 ¾") Long. M = 10 mm (⅜")
N = 1.5 mm (⅙") P = 33 mm (1 ¼")

78149-F Durax™ Style F Tweezer each



► Style 2A

120 mm (4 ¾") Long. M = 10 mm (⅜")
N = 1.5 mm (⅙") P = 35 mm (1 ⅜")
U = 2 mm (⅙")

78149-2A Durax™ Style 2A Tweezer each



► Style 2

115 mm (4 ½") Long. M = 10 mm (⅜")
N = 1.5 mm (⅙") P = 34 mm (1 ⅜")

78149-2 Durax™ Style 2 Tweezer each



► Style 5

120 mm (4 ¾") Long. M = 10 mm (⅜")
N = 1.5 mm (⅙") P = 30 mm (1 ⅜")

78149-5 Durax™ Style 5 Tweezer each



► Style 4

110 mm (4 ¼") Long. M = 10 mm (⅜")
N = 1.5 mm (⅙") P = 30 mm (1 ⅜")

78149-4 Durax™ Style 4 Tweezer each



► Style 5A

115 mm (4 ½") Long. M = 10 mm (⅜")
N = 1.5 mm (⅙") P = 34 mm (1 ⅜")

78149-5A Durax™ Style 5 Tweezer each



► Style 7

120 mm (4 ¾") Long. M = 11 mm (½")
N = 1.5 mm (⅙") P = 34 mm (1 ⅜")

78149-7 Durax™ Style 7 Tweezer each



► Style 7E

115 mm (4 ½") Long. M = 10 mm (⅜")
N = 1.5 mm (⅙") P = 34 mm (1 ⅜")

78149-7E Durax™ Style 7E Tweezer each



(Rubis continued)

► C. Standard SA Steel Tweezers – General

► Style 00B

Thick and flat, medium sharp and strong tips. Ideal for heavy-duty use. Serrated handle. Length 110mm (4½")

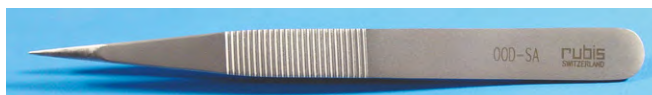
78130-01	Rubis #00B Tweezers	each
78130-12	Rubis #00B Tweezers	dozen



► Style 00D

Same as #00B above with serrated tips and handle. Length 120mm (4¾")

78131-01	Rubis #00D Tweezers	each
78131-12	Rubis #00D Tweezers	dozen



► Style #3L

Very sharp, well-groomed points with fine finish. Comes with a unique finger actuated locking device. Length 110mm (4½")

78135-01	Rubis #3L Tweezers	each
78135-12	Rubis #3L Tweezers	dozen



► Style #5

Super fine points. Length 110mm (4½")

78138-01	Rubis #5 Tweezers	each
78138-12	Rubis #5 Tweezers	dozen



► Style #5L

Same as #5 but comes with finger actuated locking device. Length 110mm (4½")

78139-01	Rubis #5L Tweezers	each
78139-12	Rubis #5L Tweezers	dozen



► Style #5B

Same as #5, but with 35 degree curved tips. Length 110mm (4½")

78140-01	Rubis #5B Tweezers	each
78140-12	Rubis #5B Tweezers	dozen



► Style #5C

Same as #5, but with round curved tips. Length 110mm (4½")

78141-01	Rubis #5C Tweezers	each
78141-12	Rubis #5C Tweezers	dozen



► Style H

Short and wide with fine tips. Length 90mm (3½")

78150-01	Rubis H Tweezers	each
78150-12	Rubis H Tweezers	dozen



(Rubis continued)

► Style Oc9

Short, flat and fine points. Length 90mm (3½")

78152-01	Rubis Oc9 Tweezers	each
78152-12	Rubis Oc9 Tweezers	dozen



► Style 3M

Pointed, thin and fine mini-tweezers. Length 70mm (2¾")

78154-01	Rubis 3M Tweezers	each
78154-12	Rubis 3M Tweezers	dozen



► D. Rubis Reinforced Plastic Tweezers

Rubis reinforced plastic tweezers with many unique features:

- Material: PBTP (Polybutylenterephthalate) with 20% fiber-glass.
- Good resistance to chemicals and acids.

- Highly isolating.
- Withstands temperatures up to 200°C.

► Style K2a

Flat tips. Length: 120mm (4¾")

78190-01	Rubis K2a Plastic Tweezers	each
78190-12	Rubis K2a Plastic Tweezers	dozen



► Style K6

Fine, strong hook tips. Length: 120mm (4¾")

78191-01	Rubis K6 Plastic Tweezers	each
78191-12	Rubis K6 Plastic Tweezers	dozen



► Style K7

Pointed, flat-contact-tips. Length: 120mm (4¾")

78192-01	Rubis K7 Plastic Tweezers	each
78192-12	Rubis K7 Plastic Tweezers	dozen



► Style K35a

Flat, strong tips. Length: 120mm (4¾")

78193-01	Rubis K35a Plastic Tweezers	each
78193-12	Rubis K35a Plastic Tweezers	dozen



► Style KR

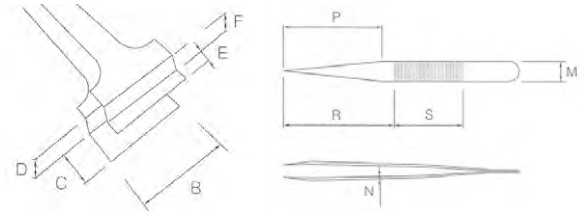
Flat and thin, flat-contact- tips. Length: 120mm (4¾")

78194-01	Rubis KR Plastic Tweezers	each
78194-12	Rubis KR Plastic Tweezers	dozen



► E. Rubis Wafer Tweezers

Made from SA steel with serrated handles. These tweezers are specially designed to handle different fragile and delicate materials of gallium or silicon wafers. They have a smooth polished non-glare surface with a satin finish. The tweezers have stopping pins turned up on lateral edges and graduated lower paddles prevent the wafer from slipping. The tweezers are also available in Peek material. Peek: An ESD Safe, $10^9\Omega \times \text{cm}$. Soft, conductive fiber, with heat resistance up to 250°C (short exposure 300°C). (Not compatible with nitric and sulfuric acids.)



► Style 2LB/4

No teeth. Length: 128mm (5"). B = 12.5mm ($\frac{1}{2}$ "), C = 8mm ($\frac{1}{8}$ "), D = 3mm ($\frac{1}{8}$ "), E = 2mm ($\frac{1}{2}$ "), F = 4mm ($\frac{1}{8}$ "), M = 9mm ($\frac{1}{8}$ "), N = 2mm ($\frac{1}{2}$ "), R = 48mm ($1\frac{3}{4}$ "), S = 42mm ($1\frac{3}{8}$ ")

78220-01 Wafer Tweezers, Style 2LB/4 each



► Style 39S-4

4 teeth, lower part perforated. Length: 128mm (5"). B = 12.5mm ($\frac{1}{2}$ "), C = 10mm ($\frac{1}{8}$ "), E = 2mm ($\frac{1}{2}$ "), F = 6mm ($\frac{1}{4}$ "), M = 9mm ($\frac{1}{8}$ "), N = 1.5mm ($\frac{1}{16}$ "), R = 48mm ($1\frac{3}{4}$ "), S = 4mm ($1\frac{1}{8}$ ")

78225-01 Wafer Tweezers, Style 39s each



► Style 41LB-2

2 teeth. Flat lower paddle. Length: 128mm (5"). B = 6mm ($\frac{1}{4}$ "), C = 7.0mm ($\frac{1}{4}$ "), E = 2mm ($\frac{1}{2}$ "), F = 3mm ($\frac{1}{8}$ "), M = 9mm ($\frac{1}{8}$ "), N = 1.5mm ($\frac{1}{16}$ "), R = 52mm (2"), S = 42mm ($1\frac{3}{8}$ ")

78226-01 Wafer Tweezers, Style 4 each



► Style 41LB-5

5 teeth. Flat lower paddle. Length: 132mm ($5\frac{1}{4}$ "), B = 16mm ($\frac{5}{8}$ "), C = 9mm ($\frac{1}{8}$ "), E = 2mm ($\frac{1}{2}$ "), F = 3mm ($\frac{1}{8}$ "), M = 11mm ($\frac{1}{2}$ "), N = 2mm ($\frac{1}{2}$ "), R = 52mm (2"), S = 42mm ($1\frac{3}{8}$ ")

78229-01 Wafer Tweezers, Style 41LB-5 each



► Style 42LB6

6 teeth. Step up lower paddle. Length: 130mm ($5\frac{1}{8}$ "), B = 19.5mm ($\frac{3}{4}$ "), C = 8mm ($\frac{1}{2}$ "), D = 3mm ($\frac{1}{8}$ "), E = 3mm ($\frac{1}{8}$ "), F = 4mm ($\frac{1}{8}$ "), M = 11mm ($\frac{1}{2}$ "), N = 2mm ($\frac{1}{2}$ "), R = 52mm (2"), S = 42mm ($1\frac{3}{8}$ ")

78237-01 Wafer Tweezers, Style 42LB 6 each



► Style 43LB-8-Peek

Clean-room compatible. Length: 138mm ($5\frac{1}{2}$ "). B = 27mm ($1\frac{1}{16}$ "), C = 21mm ($\frac{3}{4}$ "), D = 4mm ($\frac{1}{8}$ "), E = 6mm ($\frac{1}{4}$ "), F = 5mm ($\frac{1}{8}$ "), M = 11mm ($\frac{1}{2}$ "), N = 1.5mm ($\frac{1}{16}$ "), R = 61mm ($2\frac{1}{8}$ "), S = 35mm ($1\frac{1}{8}$ ")

78239-01 Wafer Tweezers, Style 43LB-8 Peek each



► Style 43LB-4-Peek

Clean-room compatible. Length: 138mm ($5\frac{1}{2}$ "). B = 13mm ($1\frac{1}{16}$ "), C = 21mm ($\frac{3}{4}$ "), D = 4mm ($\frac{1}{8}$ "), E = 6mm ($\frac{1}{4}$ "), F = 5mm ($\frac{1}{8}$ "), M = 11mm ($\frac{1}{2}$ "), N = 1.5mm ($\frac{1}{16}$ "), R = 61mm ($2\frac{1}{8}$ "), S = 35mm ($1\frac{1}{8}$ ")

78240-01 Wafer Tweezers, Style 43LB-4 Peek each



► Style 43LB-10

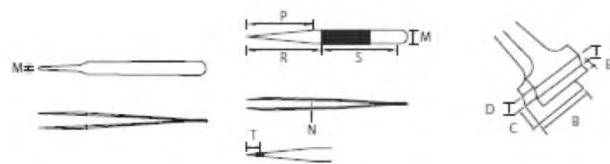
10 teeth. Flat lower paddle with opening controller. Length: 190mm ($7\frac{1}{2}$ "). B = 33.5mm (2"), C = 20mm ($\frac{3}{4}$ "), D = 7mm ($\frac{1}{4}$ "), E = 2mm ($\frac{1}{2}$ "), F = 3mm ($\frac{1}{8}$ "), M = 13mm ($\frac{1}{2}$ "), N = 2mm ($\frac{1}{2}$ "), R = 77mm (3"), S = 42mm ($1\frac{3}{8}$ ")

78241-01 Wafer Tweezers, Style 43LB-10 each



► F. Rubis Nano-Tweezers

Ultra-modern nanotechnology closes even the tiniest of pores on the surface and this innovation has resulted in the cleanest tweezers surface ever produced. Made from the finest stainless steel grade, the Lotus effect repels dirt, oil, water and other liquids. These tweezers are a perfect companion in the clean room or any sensitive laboratory areas where contaminant free tools is required.



► Style SS

135 mm (5 1/3") Long. M = 8 mm (1/3")
N = 1.5 mm (1/16") P = 82 mm (3 1/4")

78148-SS Nano-Tweezers, Style SS each



► Style 1

120 mm (4 3/4") Long. M = 10 mm (1/3")
N = 1.5 mm (1/16") P = 50 mm (2")

78148-1 Nano-Tweezers, Style 1 each



► Style 3

120 mm (4 3/4") Long. M = 10 mm (1/3")
N = 1.5 mm (1/16") P = 50 mm (2")

78148-3 Nano-Tweezers, Style 3 each



► Style 3C

110 mm (4 1/3") Long. M = 9 mm (1/3")
N = 1.5 mm (1/16") P = 43 mm (1 2/3")

78148-3C Nano-Tweezers, Style 3C each



► Style 0

120 mm (4 3/4") Long. M = 10 mm (1/3")
N = 1.5 mm (1/16") P = 51 mm (2")

78148-0 Nano-Tweezers, Style 0 each



► Style 00

115 mm (4 1/2") Long. M = 10 mm (1/3")
N = 2.5 mm (1/10") P = 46 mm (1 3/4")
U = 0.5 mm (1/20")

78148-00 Nano-Tweezers, Style 00 each



► Style 2A

120 mm (4 3/4") Long. M = 10 mm (1/3")
N = 1.5 mm (1/16") P = 35 mm (1 3/8")
U = 2 mm (1/12")

78148-2A Nano-Tweezers, Style 2A each



► Style 5

120 mm (4 3/4") Long. M = 10 mm (1/3")
N = 1.5 mm (1/16") P = 30 mm (1 1/16")

78148-5 Nano-Tweezers, Style 5 each



► Style 5A

115 mm (4 1/2") Long. M = 10 mm (1/3")
N = 1.5 mm (1/16") P = 34 mm (1 1/3")

78148-5A Nano-Tweezers, Style 5A each



► Style 7

120 mm (4 3/4") Long. M = 11 mm (1/2")
N = 1.5 mm (1/16") P = 34 mm (1 1/3")

78148-7 Nano-Tweezers, Style 7 each

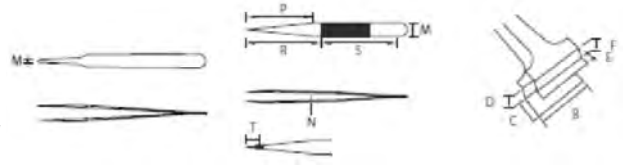


► G. Rubis Ion Tweezers

Antimicrobial Tweezers

This innovation has resulted in a special coating surface on the tweezers which releases silver ions. These ions act as an anti-bacterial agent which helps the user from contamination of any pathogens. Unlike other methods, the use of ion technology does not give rise to any resistance. Consequently, it represents a risk-free method of guaranteeing hygiene, even at workstations where instruments are used by several different people.

Made from finest stainless steel grade, these tweezers are perfect companions for your daily use in the laboratory. (We recommend that safety gloves still be used whenever handling any infectious materials)



► Style SS

135 mm (5 $\frac{3}{4}$ ") Long. M = 8 mm ($\frac{1}{2}$ ") N = 1.5 mm ($\frac{1}{16}$ ") P = 82 mm (3 $\frac{1}{4}$ ")

78146-SS Ion Tweezers, Style SS each

► Style 1

120 mm (4 $\frac{3}{4}$ ") Long. M = 10 mm ($\frac{1}{2}$ ") N = 1.5 mm ($\frac{1}{16}$ ") P = 50 mm (2")

78146-1 Ion Tweezers, Style 1 each

► Style 3

120 mm (4 $\frac{3}{4}$ ") Long. M = 10 mm ($\frac{1}{2}$ ") N = 1.5 mm ($\frac{1}{16}$ ") P = 50 mm (2")

78146-3 Ion Tweezers, Style 3 each

► Style 3C

110 mm (4 $\frac{1}{2}$ ") Long. M = 9 mm ($\frac{1}{2}$ ") N = 1.5 mm ($\frac{1}{16}$ ") P = 43 mm (1 $\frac{1}{2}$ ")

78146-3C Ion Tweezers, Style 3C each

► Style 0

120 mm (4 $\frac{3}{4}$ ") Long. M = 10 mm ($\frac{1}{2}$ ") N = 1.5 mm ($\frac{1}{16}$ ") P = 51 mm (2")

78146-0 Ion Tweezers, Style 0 each

► Style 00

115 mm (4 $\frac{1}{2}$ ") Long. M = 10 mm ($\frac{1}{2}$ ") N = 2.5 mm ($\frac{1}{16}$ ") P = 46 mm (1 $\frac{3}{4}$ ")
U = 0.5 mm (1/20")

78146-00 Ion Tweezers, Style 00 each

► Style 2A

120 mm (4 $\frac{3}{4}$ ") Long. M = 10 mm ($\frac{1}{2}$ ") N = 1.5 mm ($\frac{1}{16}$ ") P = 35 mm (1 $\frac{1}{2}$ ")

U = 2 mm ($\frac{1}{2}$ ")

78146-2A Ion Tweezers, Style 2A each

► Style 5

120 mm (4 $\frac{3}{4}$ ") Long. M = 10 mm ($\frac{1}{2}$ ") N = 1.5 mm ($\frac{1}{16}$ ") P = 30 mm (1 $\frac{1}{16}$ ")

78146-5 Ion Tweezers, Style 5 each

► Style 5A

115 mm (4 $\frac{1}{2}$ ") Long. M = 10 mm ($\frac{1}{2}$ ") N = 1.5 mm ($\frac{1}{16}$ ") P = 34 mm (1 $\frac{1}{8}$ ")

78146-5A Ion Tweezers, Style 5A each

► Style 7

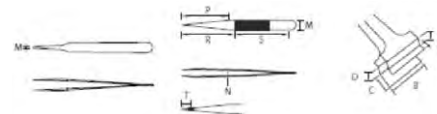
120 mm (4 $\frac{3}{4}$ ") Long. M = 11 mm ($\frac{1}{2}$ ") N = 1.5 mm ($\frac{1}{16}$ ") P = 34 mm (1 $\frac{1}{8}$ ")

78146-7 Ion Tweezers, Style 7 each



► H. Rubis Grip Tweezers

This special soft coating provides a non-slip grip and improves the handling of the tweezers. The soft-coating prevents hand fatigue, and protects the hand from heat and cold. Made from the finest stainless steel grade



► Style SS

135 mm (5 1/3") Long. M = 8 mm (1/3")

N = 1.5 mm (1/16") P = 82 mm (3 1/4")

78144-SS Grip Tweezers, Style SS each



► Style 1

120 mm (4 3/4") Long. M = 10 mm (1/3")

N = 1.5 mm (1/16") P = 50 mm (2")

78144-1 Grip Tweezers, Style 1 each



► Style 3

120 mm (4 3/4") Long. M = 10 mm (1/3")

N = 1.5 mm (1/16") P = 50 mm (2")

78144-3 Grip Tweezers, Style 3 each



► Style 3C

110 mm (4 1/3") Long. M = 9 mm (1/3")

N = 1.5 mm (1/16") P = 43 mm (1 2/3")

78144-3C Grip Tweezers, Style 3C each



► Style O

120 mm (4 3/4") Long. M = 10 mm (1/3")

N = 1.5 mm (1/16") P = 51 mm (2")

78144-O Grip Tweezers, Style O each



► Style 00

115 mm (4 1/2") Long. M = 10 mm (1/3")

N = 2.5 mm (1/10") P = 46 mm (1 3/4")

U = 0.5 mm (1/20")

78144-00 Grip Tweezers, Style 00 each



► Style 2A

120 mm (4 3/4") Long. M = 10 mm (1/3")

N = 1.5 mm (1/16") P = 35 mm (1 3/8")

U = 2 mm (1/12")

78144-2A Grip Tweezers, Style 2A each



► Style 5

120 mm (4 3/4") Long. M = 10 mm (1/3")

N = 1.5 mm (1/16") P = 30 mm (1 1/16")

78144-5 Grip Tweezers, Style 5 each



► Style 5A

115 mm (4 1/2") Long. M = 10 mm (1/3")

N = 1.5 mm (1/16") P = 34 mm (1 1/3")

78144-5A Grip Tweezers, Style 5A each



► Style 7

120 mm (4 3/4") Long. M = 11 mm (1/2")

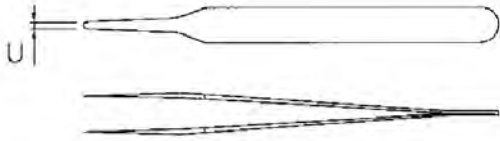
N = 1.5 mm (1/16") P = 34 mm (1 1/3")

78144-7 Grip Tweezers, Style 7 each



► I. Rubis Swiss Tweezer®; Precision

Made from austenitic, acid-proof stainless steel, 100% anti-magnetic (SA). Also resist to hydrogen fluoride (HF) and nitric acid. Melting point 1400°C



- These tweezers engineered for a NON-SLIP GRIP.
- Light weight –prevents hand fatigue.
- Sensuous touch and functional design.
- Ultra-fine precision tips.

► Model 1G, SA

120 mm (4¾") long. M=10 mm (½"), N = 1.5 mm (¼"), P= 50 mm (2")



78170-1G Rubis Tweezer Model 1G each

► Model 2AG, SA

120 mm (4¾") long. M=10 mm (½"), N = 1.5 mm (¼"), P= 50 mm (2"), U = 2 mm (¼")



78170-2AG Rubis Tweezer Model 2AG each

► Model 3G, SA

120 mm (4¾") long. M=10 mm (½"), N = 1.5 mm (¼"), P= 50 mm (2")



78170-3G Rubis Tweezer Model 3G each

► Model 3CG, SA

110mm (4½") long. M= 9 mm (⅜"), N = 1.5 mm (¼"), P= 43 mm (1½")



78170-3CG Rubis Tweezer Model 3CG each

► Model 4G, SA

110 mm (4½") long. M= 10 mm (⅜"), N = 1.5 mm (¼"), P= 30 mm (1¼")



78170-4G Rubis Tweezer Model 4G each

► Model 5G, SA

110 mm (4½") long. M= 9 mm (⅜"), N = 1.5 mm (¼"), P= 30 mm (1¼")



78170-5G Rubis Tweezer Model 5G each

► Model 5AG, SA

110 mm (4½") long. M= 9 mm (⅜"), N = 1.5 mm (¼"), P= 30 mm (1¼")



78170-5AG Rubis Tweezer Model 5AG each

► Model 5ARG, SA

115 mm (4½") long. M= 10 mm (⅜"), N = 1.5 mm (¼"), P= 34 mm (1⅓")



78170-5ARG Rubis Tweezer Model 5ARG each

► Model 7G, SA

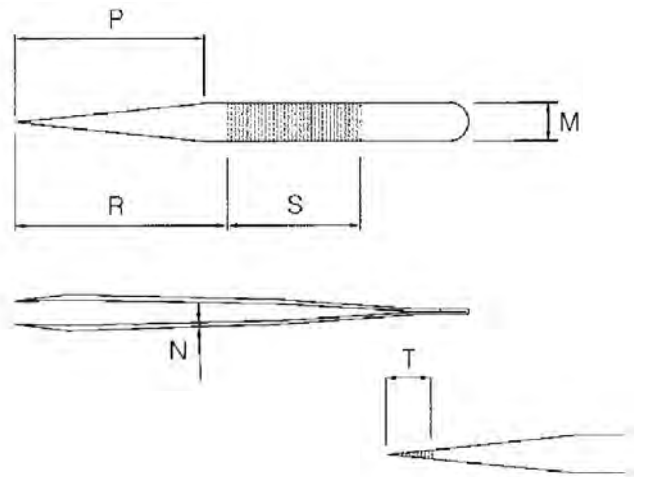
115 mm (4½") long. M= 10 mm (⅜"), N = 1.5 mm (¼"), P= 34 mm (1⅓")



78170-7G Rubis Tweezer Model 7G each

Made from austenitic, acid-proof stainless steel, 100% anti-magnetic (SA). Also resist to hydrogen fluoride (HF) and nitric acid. Melting point 1400°C

► J. Rubis Specialty Tweezers



- These tweezers are long and strong.
- Knurled Handle – non slip
- Serrated tips and with or without guide pin.

► Model 232, SA

158 mm (6¼") long. M= 9 mm (⅜"), N = 2 mm (¼"), P= 80 mm (3⅛"), R = 58 mm (2⅔"), S = 44 mm (1⅞"), T = 17 mm (⅝"), U = 1.7 mm (¼")



78174-232 Rubis Tweezers Model 232 each

► Model 524, SA

137 mm (5½") long. M= 10 mm (⅜"), N = 1.5 mm (⅙"), P= 60 mm (2⅓"), R = 52 mm (2"), S = 35 mm (1⅜"), T = 15 mm (⅝"), U = 1 mm (⅒")



78174-524 Rubis Tweezers Model 524 each

► Model 615, SA

155 mm (6") long. M= 8 mm (⅝"), N = 2 mm (½"), R = 57 mm (2¼"), S = 41 mm (1⅝"), T = 15 mm (⅝"), U = 1 mm (⅒")



78174-615 Rubis Tweezers Model 615 each

► Model 616, SA

162 mm (6⅜") long. M= 9 mm (⅜"), N = 2 mm (½"), R = 66 mm (2⅝"), S = 45 mm (1¾"), T = 15 mm (⅝"), U = 1 mm (⅒")



78174-616 Rubis Tweezers Model 616 each

► Model B00, SA

140 mm (5½") long. M= 9 mm (⅜"), N = 1.5 mm (⅙"), P= 60 mm (2⅓"), R = 52 mm (2"), S = 35 mm (1⅜"), T = 17 mm (⅝"), U = 2.5 mm (⅙")



78174-B00 Rubis Tweezers Model B00 each

► Model L/Black, SA

158 mm (6¼") long. M= 10 mm (⅜"), N = 1.5 mm (⅙"), P= 65 mm (2½"), R = 45 mm (3¼"), S = 35 mm (1⅜"), T = 13 mm (½"), U = 1 mm (⅒")



78174-LB Rubis Tweezers Model L/Black each

► Model 6151, SA

140 mm (5½") long, with plastic insulated handle. M= 11 mm (½"), N = 1.5 mm (⅙"), T = 15 mm (⅝"), U = 2 mm (½")



78174-6151 Rubis Tweezers Model 6151 each

► Plastic Wafer Tweezers and Pliers

Designed for low cost and ease of use with the highest quality of materials.



78310-41



78310-51



78310-51



78310-07



78311-4A



78314-P1



78314-P2

78310-04 Glass-filled Delrin for delicate, thin, and flat objects, 11.3cm long each

78310-41 Same as #78310-04 but made from linear polyethylene, acid resistant each

78310-05 Glass filled Delrin, useful for handling coverslips or glass slides 11.3 cm long each

78310-51 Same as #78310-05 but made from linear polyethylene, acid resistant each

78310-06 Glass-filled Delrin, good for glass slide, wafer handling, 11.3cm long each

78310-61 Same as #78310-06 but made from linear polyethylene, Acid resistant each

78310-07 Glass-filled Delrin with extra wide point, 11.3cm long each

78310-71 Same as #78310-07 but made from linear polyethylene, Acid resistant each

78311-4A Fluorocarbon, acid resistant, extra long with line up pin, 16.5cm each

78311-5A2 Linear polyethylene, acid resistant, 16.5cm long each

78314-P1 Glass-filled Delrin pliers. Serrated jaws, hold tubes securely, resistant to most solvents each

78314-P2 Glass-filled Nylon pliers, flat smooth jaws. Good for handling soft materials. Protected from damage. 15 cm long each

► Plastic Tweezers

Resist virtually any commercial solvents i.e. Nitric, Aqua-Regia, Acetic acid, Acetone, Alcohol, etc.

- Acid Resistant
- Gentle Positive Grip
- Non-Magnetic
- Non-Absorbent

Tips will not open when extra pressure is applied

Cat. No.	Description/Purpose	Qty.
78560-01	Semiconductors, Chips, Wafers Measurements: 4-9/16" x 7/16" body tapering down to .008" thick by 1/8" wide at Tweezer Tips.	each
78560-02	Made of Celcon static dissipative (ESD safe) Max. temp. 175°F. Measurements: 4-9/16" x 7/16" body tapering down to .008" thick by 1/8" wide at Tweezer Tips.	each
78560-03	Blue Styrene tweezers, designed for handling wax patterns Measurements: 115 mm long with 4 mm wide ribs	each
78560-04	Made of Ryton (PPS) when properly used, will withstand 425°F. Measurements: 4-9/16" x 7/16" body tapering down to .008" thick by 1/8" wide at Tweezer Tips.	each
78560-05	Angled tweezers, ideal for delicate wafers Measurements: 4-15/16" x 7/16" body tapering down to .004" by 3/16" wide at Tweezer Tips.	each
78560-08	Fluorocarbon (CTFE) for use in Chemical Processing of semiconductors. Withstands Hydrofluoric, other acid. Resists radiation Measurements: 4-1/2"x7/16" body tapering down to .011" by 3/32" wide at serrated Tips.	each

Cat. No.	Description/Purpose	Qty.
78560-09	For larger diameter wafers, etc. Measurements: 4-5/8" x 7/16" at body .007" thick by 9/32" wide at tips.	each
78560-10	Extra long tweezers feature unique alignment guide specially developed for wafers, ceramics & lenses Measurements: 6-3/8"x15/32" at body tapering down to .009" by 3/32" at Tweezer Tips.	each
78560-11	Wafers Measurements: 4-5/8" x 7/16" at body tapering down to .010 by 3/32" at Tweezer Tips	each
78560-12	Handling of precision micro-miniature parts in the instrumentation, watch-making, camera, electronic industries, etc. Measurements: 4-9/16" x 7/16" at body tapering down to a sharp point at Tweezer tips.	each
78560-13	Made of Celcon static dissipative (ESD safe). Max. temp is 175°F. Measurements: 4-9/16" x 7/16" at body tapering down to a sharp point at Tweezer tips.	each
78560-14	Narrow Tips, Glass-filled Delrin Measurements: 6mm, 11.3cm long	each
78560-15	Wide Tips, Glass-filled Delrin Measurements: 9mm, 11.3cm long	each
78560-16	Glass-filled Delrin Measurements: 11.3mm, 11.3cm long	each

► Plastic Tweezers (continued)

Cat. No.	Description/Purpose	Qty.
78560-17	Special 1cm wide flat points	



Measurements:
16-1/2cm long each

78560-18	Fluorocarbon (CTFE) for use in Chemical Processing of semiconductors. Withstands Hydrofluoric and other acid., Resists radiation. Extra long with line-up pin guide.	
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Measurements:
6-3/8"x15/32" body tapering down to .009" by 3/32" at Tweezer Tips each

78560-19	Maximum visibility (9/64" when closed). For handling of small parts in confined areas. assuring positive holding grip.	
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Measurements:
4-3/8"x7/16" body tapering down to fine angled points, flat inside each

78560-20	Standard Version	
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Measurements:
4-9/16" x 7/16" body tapering down to .009" by 3/32" at Tweezer Tips each

78560-06	Celcon static dissipative (ESD safe). Max. temp. 175°F. Useful in chemical processing of semiconductors.	
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Measurements:
4-9/16" x 7/16" body tapering down to .009" by 3/32" at Tweezer Tips each

78560-07	Ryton (PPS) Heat Resistant up to 425° F.	
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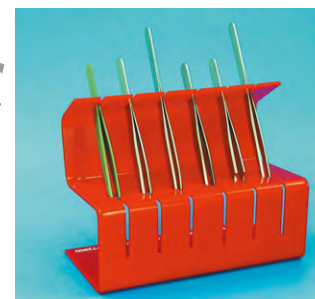


Measurements:
4-9/16" x 7/16" body tapering down to .009" by 3/32" at Tweezer Tips each

► Tweezer Holder

Holds 6 tweezers. Keeps tips protected in an easy to reach position.

EMS EXCLUSIVE



72900	Tweezer Holder	each
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► EMS Tweezer Protection Box

Made from soft silicone; grooved properly to tightly hold all types of tweezers in place. The tip of the tweezer is always well protected from any damage. The silicone pad is held in a plastic box with a hinged lid that keeps the tweezers free from dust. Holds 7 tweezers.



Overall measurements: 6"(L)x4 1/8"(W)x1 3/8"(H);
Inside measurements: 6"(L)x4"(W)x1 1/4"(H)

72902	Tweezer Protection Box	each
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► The Tweezer Repair Kit

This repair kit allows you to straighten, sharpen, and repair your tweezers that have been damaged or have become dull. Instructions are included with the kit



The kit includes: ■ 1 Sharpening stone ■ Ten O-rings
■ Instrument Oil, 50 ml ■ Chain nose pliers

Cat. #	Description	Qty.
72892-10	The Tweezer Repair Kit	kit

► Tweezers Protection Cap

These caps which are in the shape of the tweezer tip are made from Polyethylene and are used to protect the tweezers tips from damage.



72904-12	Tweezers Protection Cap	12/pk.
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► O-Ring for Tweezers

This Neoprene O-Ring is used as a simple clamping device for tweezers.



72903-12	Tweezers O-Ring	12/pk.
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► Dissecting Tools and Instruments

► The Meyco Diamond Dissecting Scalpel Blade

EMS
EXCLUSIVE



We are aware that in order to achieve the finest results in your work, you continually have to search for the highest quality instruments. The quality that will allow you to meet the high demands of your respected field. Here at **ELECTRON MICROSCOPY SCIENCES** we are dedicated to these needs. With this dedication in mind we have entered into an exclusive arrangement with our sister company, DIATOME Ltd., that enables us to offer you their experience in diamond instrument manufacturing.

For many years DIATOME has been the leading manufacturer-“The Innovators” in diamond instruments for a variety of applications including, but not limited to; ULTRAMICROTOMY, FIBER OPTICS, AND EYE SURGERY. DIATOME has now begun to manufacture for us diamond knives for microsurgery, dissection, and its related applications. The knives are of the same quality that DIATOME customers have become accustomed. Distinctive designs combined with DIATOME'S expertise in diamond technology and manufacturing assures you the best quality knife and being able to use it for many years.

► Freehand Diamond Knife

Characteristics and Specifications:

- Our ultra-sharp blade cuts with minimum pressure, without tearing or damaging the specimen and reduces the risk of specimen distortion.
- Our **UNIQUE PRESSURE MECHANISM** allows blade actuation with one hand
- The handle is made of titanium and is coated by high vacuum with titanium nitride to harden the surface.
- The knife is corrosion free and is completely resistant to saline solutions.
- It can be sterilized in an autoclave up to 200°C.
- Special tray for sterilization is available
- If your diamond is damaged or broken, we can sharpen it or replace it and guarantee that the repaired knife will be of the same standards of perfection as the original.

The following cutting forms are available:

1) Type M; angled; .50mm thickness

72024	Diamond Dissecting Knife, Type M	each
72024-R	Resharpener, Type M	each
72024-L	Replacement Blade, Type M	each

2) Type M-M; mini-angled; .20 thickness

For extremely fine work.

72025	Diamond Dissecting Knife, Type M-M	each
72025-R	Resharpener, Type M-M	each
72025-L	Replacement Blade, Type M-M	each

3) Type L; lancet; .50 thickness

72026	Diamond Dissecting Knife, Type L	each
72026-R	Resharpener, Type L	each
72026-L	Replacement Blade, Type L	each

4) Type M-L; mini-lancet; .20 thickness

For extremely fine work

72027	Diamond Dissecting Knife, Type M-L	each
72027-R	Resharpener, Type M-L	each
72027-L	Replacement Blade, Type M-L	each

5) Type DL; double-lancet; .50mm thickness

72028	Diamond Dissecting Knife, Type DL	each
72028-R	Resharpener, Type DL	each
72028-L	Replacement Blade, Type DL	each

6) Type M-DL; mini-double-lancet; .20 thickness

72029	Diamond Dissecting Knife, Type M-DL	each
72029-R	Resharpener, Type M-DL	each
72029-L	Replacement Blade, Type M-DL	each

7) Type DS; Tri-facet; .50mm thickness

72030	Diamond Dissecting Blade, Type DS	each
72030-R	Resharpener, Type DS	each
72030-L	Replacement Blade, Type DS	each

8) Type M-DS; mini-tri-facet; .20mm thickness

72031	Diamond Dissecting Blade, Type M-DS	each
72031-R	Resharpener, Type M-DS	each
72031-L	Replacement Blade, Type M-DS	each

9) Type R; round; .30mm thickness

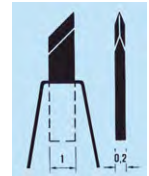
72032	Diamond Dissecting Blade, Type-R	each
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10) Type HR-S; half-round; .20mm thickness

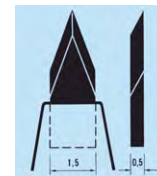
72033	Diamond Dissecting Blade, Type HR-S	each
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M / Angled



M-M / Mini Angled



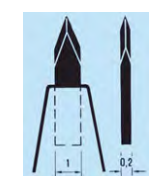
L / Lancet



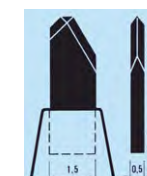
M-L / Mini Lancet



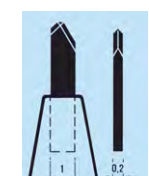
DL / Double-Lancet



M-DL / Mini Double Lancet



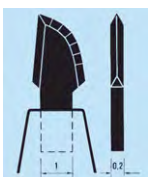
DS / Tri-Facet



M-DS / Mini-Tri-Facet



R / Round



HR-S / Half Round



Forceps



Scissors

► Lighted Forceps and Scissors: Illuminated and Ergonomic

- Increases the visibility of the specimen
- Minimizers Floaters
- Allows for accurate orientation of tissue and specimen
- Reduces embedding and prep time

See your samples and your embeddings in a whole new light! These lighted forceps ease identification and location of otherwise undetectable tissue fragments, while reducing embedding time. Increases the visibility of specimen allowing for more accurate work. Made of German stainless steel, are submersible and light longevity approx. 20,000 hours.

EMS #	Description	Qty	EMS #	Description	Qty
77905-01	Lighted Forceps, 13CM Smooth Fine Tip	Kit	77905-05	Lighted Forceps, 16CM Serrated Blunt Tip	Kit
77905-02	Lighted Forceps, 15CM Smooth Fine Tip	Kit	77905-06	Lighted Forceps, 20CM Serrated Blunt Tip	Kit
77905-03	Lighted Forceps, 18CM Smooth Fine Tip	Kit	77905-07	Lighted Mayo Scissor 17CM Blunt/Blunt Tip	Kit
77905-04	Lighted Forceps, 14CM, Smooth, Fine Tip, Ergonomic Embedding Forceps	Kit	77905-07	Lighted Surgical Scissor 17CM Blunt/Blunt Tip Kit	Kit

(Each kit includes: one instrument, power pack & battery charger)

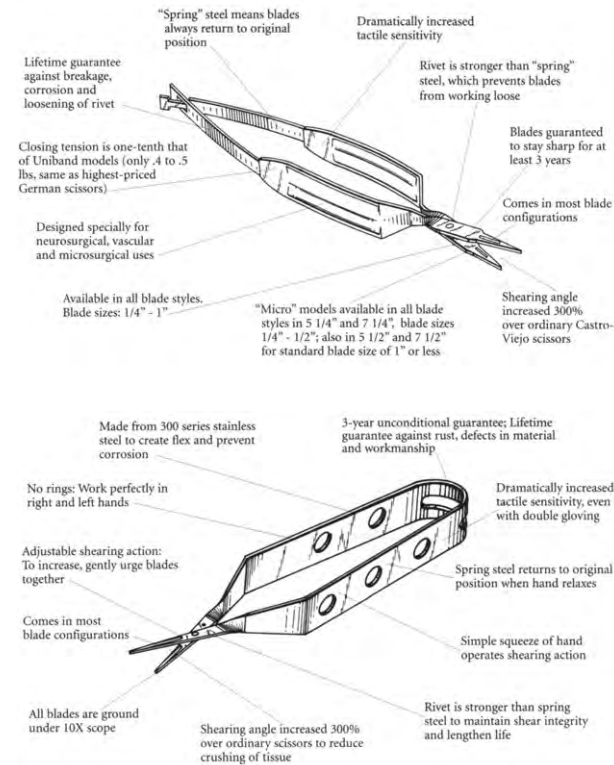
Introducing The Revolutionary New

➤ MicroPoint™ Surgical Scissors

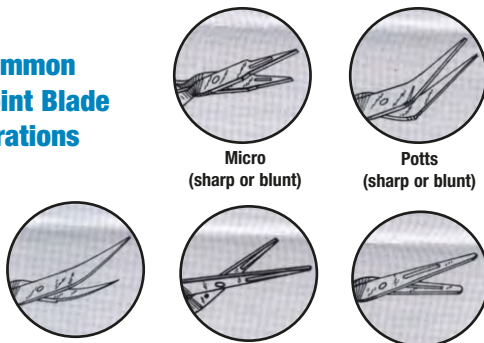
A new concept in scissor technology. MicroPoint™ scissors can be used for suture or tissue, and they are manufactured without rings, therefore eliminating the problems with right handed or left handed users. Scissors do not cut by cutting. They cut by shearing.

FEATURES:

- They have three times the shearing angle to reduce "tissue crushing."
- They last far longer than ordinary scissors.
- O.R. Castro-Viejo quality at a floor-grade price.
- They offer consistent cutting at the tip.
- The contact between the blades remains constant.
- The blades cannot work loose.
- Ambidextrous: perfect in right and left hands
- Easy to pickup and use, no clumsy rings.
- Adjustable shearing contact.
- Lifetime Guarantee: All MicroPoint™ Scissors are guaranteed for life against rust, breakage and rivet loosening.

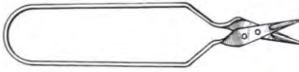


5 of the Most Common MicroPoint Blade Configurations



These scissors are available in two configurations: Uniband® and FeatherLite®

MicroPoint Unibands



Length: 5 inches
 Width: One Inch
 Height: 1/2 inch
 Blades: from 1/2 inches to 7/8 inches

MicroPoint FeatherLites



Micro model:
 Lengths of 5 1/4" and 7 1/4"
 Blades: 1/4" and 1/2"
 Standard:
 Lengths of 5 1/2" and 7 1/2"
 Blades: 3/8"



77926-5S



77927-7S



77910-10

➤ Style LA-1 and MPF-1 - All smooth Blades

Sharp/Sharp Straight. Blade 20 mm (3/4") L

77910-10	Uniband LA-1 Scissors 125mm (5") L	each
77926-5S	FeatherLite MPF-1 Scissors 140mm (5 1/2") L	each
77927-7S	FeatherLite MPF-17 Scissors 170mm (6 1/2") L	each



77910-1B

➤ Style LA-1B - All smooth Blades

Blunt/Blunt Straight blades. 13 mm cutting edge.

77910-1B	Uniband LA-1B Scissors 125mm (5") L	each
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77910-11



77926-5C



77927-7C

► **Style LA-1C and MPF-1C - All smooth Blades**

Sharp/Sharp Curved Blades. Blade 20 mm ($\frac{7}{8}$ ") L

77910-11	Uniband LA-1C Scissors 125mm (5") L	each
77926-5C	FeatherLite MPF-1C Scissors 140mm (5½") L	each
77927-7C	FeatherLite MPF-1C7 Scissors 170mm (6½") L	each



77910-15



77926-6S

► **Style LA-2 and MPF-2 – Smooth/Serrated Blades**

Sharp/Sharp Straight. Blade 20 mm ($\frac{7}{8}$ ") L

77910-15	Uniband LA-2 Scissors 125mm (5") L	each
77926-6S	FeatherLite MPF-2 Scissors 140mm (5½") L	each



77910-16

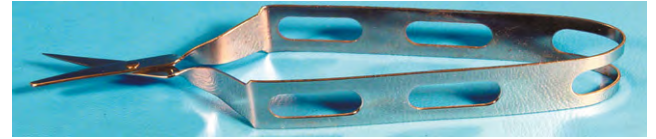


77926-6C

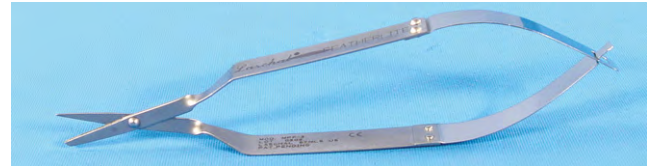
► **Style LA-2C and MPF-2C – Smooth/Serrated Blades**

Sharp/Sharp Curved. Blade 20 mm ($\frac{7}{8}$ ") L

77910-16	Uniband LA-2C Scissors 125mm (5") L	each
77926-6C	FeatherLite MPF-2C Scissors 140mm (5½") L	each



77910-20



77926-7S

► **Style LA-3 and MPF-3 – Smooth/Serrated Blades**

Sharp/Blunt Straight. Blade 20 mm ($\frac{7}{8}$ ") L

77910-20	Uniband LA-3 Scissors 125mm (5") L	each
77926-7S	FeatherLite MPF-3 Scissors 140mm (5½") L	each



77910-25



77926-8S

► **Style LA-4 and MPF-4 – Smooth/Smooth Micro Blades**

Sharp/Sharp Straight. Blade 12 mm ($\frac{1}{2}$ ") L

77910-25	Uniband LA-4 Scissors 125mm (5") L	each
77926-8S	FeatherLite MPF-4 Scissors 140mm (5½") L	each



77910-26



77926-8C

► **Style LA-4C and MPF-4C – Smooth/Smooth Blades**

Sharp/Sharp Curved. Blade 12 mm ($\frac{1}{2}$ ") L

77910-26	Uniband LA-4C Scissors 125mm (5") L	each
77926-8C	FeatherLite MPF-4C Scissors 140mm (5½") L	each



77910-40



77920-5S



77921-7S

► **Style LA-4XF and MPF-4XF – Smooth/Smooth Blades**

Needle Nose Blades with rounded tips. Straight. Blade 8 mm (5/16") L

77910-40	Uniband LA-4XF, 125mm (5") L	each
77920-5S	FeatherLite MPF-4XF, 125mm (5")L	each
77921-7S	FeatherLite MPF-4XF7, 165mm (6 1/2")L	each



77910-41



77920-5C



77921-7C

► **Style LA-4CXF and MPF-4CXF – Smooth/Smooth Blades**

Needle Nose Blades with rounded tips. Curved. Blade 8 mm (5/16") L

77910-41	Uniband LA-4CXF, 125mm (5") L	each
77920-5C	FeatherLite MPF-4CXF, 125mm (5")L	each
77921-7C	FeatherLite MPF-4CXF7, 165mm (6 1/2")L	each



77910-30

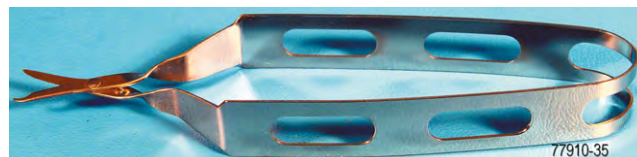


77910-31

► **Style LA-5 and MPF-5 – Smooth/Smooth Blades**

Needle Nose Blades with rounded tips. Straight Blade 15 mm (5/8") L

77910-30	Uniband LA-5, 127mm (5") L	each
77910-31	FeatherLite MPF-5, 140mm (5 1/2")L	each



77910-35

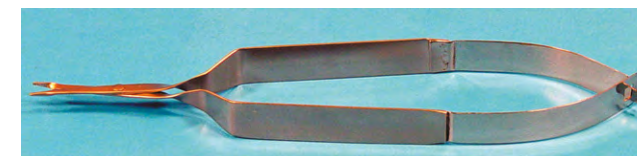


77910-36

► **Style LA-6 and MPF-6 – Smooth/Serrated Blades**

One blade is straight, the other hooked. Blade 12mm (1/2") L

77910-35	Uniband LA-6 Scissors 120mm (4 3/4") L	each
77910-36	FeatherLite MPF-6 Scissors 125mm (5 1/4")L	each



77915-BS

► **Style LA-BS – Small Bandage Scissors, 5" Long**

Curved with 7mm cutting edge

77915-BS	Model LA-BS, Bandage Cutter	each
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► MicroPoint™ MICRO SCISSORS



77900-S

► Style DS-1, 5" Straight Vannas Scissors

► Style DC-1, 5" Curved Vannas Scissors

5mm and smooth blades. Length 125mm (5")

77900-S	FeatherLite Vannas Scissors, Straight	each
77900-C	FeatherLite Vannas Scissors, Curved	each



77901

► Style DS-G –Stork Style

10 mm long and smooth blades. Length: 125 mm (5")

77901	FeatherLite Stork Style Scissors, Universal	each
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77902

Style DS-GM –Micro Stork Style

5 mm long and smooth blades. Length: 125 mm (5")

77902	FeatherLite Micro Stork Style Scissors	each
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► Spring Scissors - Micro Scissors



► VANNAS Scissors: Straight, Delicate

Extra fine tips. 3" (75mm) long. Available in a 3mm and a 5mm cutting edge.

72932-01	3mm Cutting Edge, Straight	each
72933-01	5mm Cutting Edge, Straight	each



► VANNAS Scissors: Curved, Delicate

Extra fine tips. 3" (75mm) long. Available in a 3mm and a 5mm cutting edge.

72932-02	3mm Cutting Edge, Curved	each
72933-02	5mm Cutting Edge, Curved	each



► VANNAS Scissors: Angled Forward, Delicate

Extra fine tips. 3" (75mm) long. Available in a 3mm and a 5mm cutting edge.

72932-03	3mm Cutting Edge, Angled Forward	each
72933-03	5mm Cutting Edge, Angled Forward	each



► VANNAS Scissors: Angled on Side, Delicate

Extra fine tips. 3" (75mm) long. Available in a 3mm and a 5mm cutting edge.

72932-04	3mm Cutting Edge, Angled on Side	each
72933-04	5mm Cutting Edge, Angled on Side	each

► Style PCF Series Forceps



77890-S

► Castro-Viejo Needle Holder, Straight– PCF-TCL

5 mm serrated jaws. Comes with a mechanism lock. Length 135mm (5¼")

77890-S	PCF-TCL Castro-Viejo Needle Holder	each
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77890-C

► Castro-Viejo Needle Holder, Curved– PCF-TCC

5 mm serrated jaws. Length 135mm (5¼")

77890-C	PCF-TCC Castro-Viejo Needle Holder	each
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77890-C

► Castro-Viejo Micro Needle Holder - PCF-FX (5½"L)

Straight Tips: 1.03mm wide x 4mm long

77890-FX	PCF-FX Needle Holder	each
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77892-S

► **Castro-Viejo Micro Scissors, Straight**

Model 51-12, 5mm long, straight blades. Very delicate. Length: 130mm (5")

77892-S Model 51-12 Castro-Scissors Straight each



77892-C

► **Castro-Viejo Micro Scissors, Curved**

Model 51-22, 5mm long, curved blades. Very delicate. Length: 130mm (5")

77892-C Model 51-22 Castro-Scissors Curved each



77892-A

► **Castro-Viejo Micro Scissors, Angled**

Model 51-12-30P, 5mm long, angled blades. Very delicate. Length: 130mm (5")

77892-A Model 51-12-30P Castro-Scissors Straight each



77898-S

► **Tissue Forceps 1x2 Teeth, Straight – PCF-FX-1x2**

12 mm jaws with 1x2 teeth. Very fine finish. Length 140 mm (5½")

77898-S PCF-FX-1x2 Tissue Forceps, 1x2 Straight each



77898-C

► **Tissue Forceps 1x2 Teeth, Curved – PCF-FX-1x2C**

12 mm jaws with 1x2 teeth. Very fine finish. Length 140 mm (5½")

77898-C PCF-FX-1x2C Tissue Forceps, 1x2 Curved each



77894-S

► **Half Lunar Jaws Forceps W/ Diamond Dust – PCF-F**

8 mm jaws with fine diamond dust inside jaws to reinforce gripping capability. When the jaws are fully open the diameter is 8mm and when closed it is 2mm. Length 135 mm (5¼")

77894-S PCF-Haft Lunar W/Diamond Dust each



77893-LM2.5



77893-7LM2.5

► **LASNER-DaMAN Forceps**

Uncompromised slip resistant with automatic tissue manipulation.

Up until now, you were faced with two choices in tissue forceps: rat toothed forceps that hold by penetrating a small zone of tissue, or serrated forceps that grasp by inadvertently crushing a broader area. Somehow, both can lead to microvascular damage. Pressure controlled Lasner-DaMan Tissue Forceps virtually eliminates the penetration or crushing of fragile tissue while providing uncompromised slip resistance.

- Ergonomic Featherlite™ spring handle relieves excess pressure and mechanical stress for ideal compression in either hand.
- Patented twisted I-beam design with three point fixation that provides unparalleled stability.
- Micro cross-cut carbide jaws provide an extraordinary grip on tissue and suture needles.
- Adjustable auto-lock feature permits auto-retention of tissue.

77893-LM2.5 PCF Lasner-LaMan Tissue Forceps 5" each

77893-7LM2.5 PCF Lasner-LaMan Tissue Forceps, 7" each

► Micro Forceps

Micro Forceps/Tweezers are designed specifically for applications in the field of microscopic science.



► 1. Micro Forceps MF-1, Straight, Smooth or Serrated Jaws.

Features extra delicate tips for general precision work. 100mm (4.0") in length, tips 0.5mm wide.

62085-1S	Micro Forceps MF-1, Smooth Jaws	each
62086-1S	Micro Forceps MF-1, Serrated Jaws	each



► 2. Micro Forceps MF-2, Slightly Curved. Smooth or Serrated Jaws

Especially designed for precise handling in areas of limited access. Very delicate. 100mm (4.0") in length; 0.5mm width in tips.

62085-2S	Micro Forceps MF-2, Smooth Jaws	each
62086-2S	Micro Forceps MF-2, Serrated Jaws	each



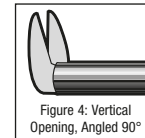
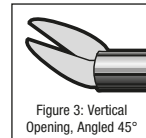
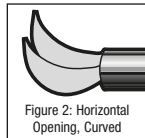
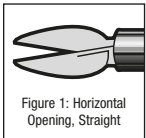
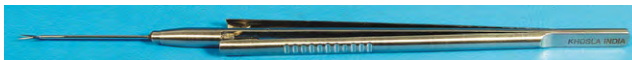
► 3. Micro Forceps MF-3, Fully Curved. Smooth or Serrated Jaws

Design for optimum visibility in precision microscopic work. Very delicate. 100mm (4.0") in length; 0.5mm width in tips

62085-3S	Micro Forceps MF-3, Smooth Jaws	each
62086-3S	Micro Forceps MF-3, Serrated Jaws	each

► Micro Dissecting Instruments

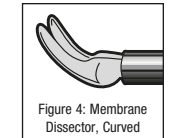
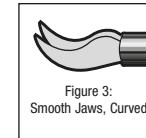
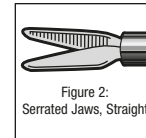
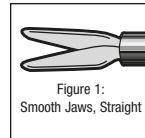
Made from all stainless steel construction.



► Micro Dissecting Scissors

20 gauge stainless steel, with a 3 mm cutting edge.

Fig.	Cat.#	Description	Pack
1	77930-01	Horizontal Opening, Straight	each
2	77930-02	Horizontal Opening, Curved	each
3	77930-03	Vertical Opening, Angled 45°	each
4	77930-04	Vertical Opening, Angled 90°	each



► Micro Dissecting Forceps

20 gauge stainless steel, with 3 mm tips.

Fig.	Cat. #	Description	Pack
1	77932-01	Smooth Jaws, Straight	each
2	77932-02	Serrated Jaws, Straight	each
3	77932-03	Smooth Jaws, Curved	each
4	77932-04	Membrane Dissector, Curved	each



► Micro Dissecting Knives

GRAEFE Dissecting Knife

4¾" long, double edge blade

Cat. #	Description	Pack
77934-01	Blade 25 mm (l) x 1.5 mm (w)	each
77934-02	Blade 27 mm (l) x 1.7 mm (w)	each
77934-03	Blade 30 mm (l) x 2.0 mm (w)	each
77934-05	Blade 35 mm (l) x 2.5 mm (w)	each

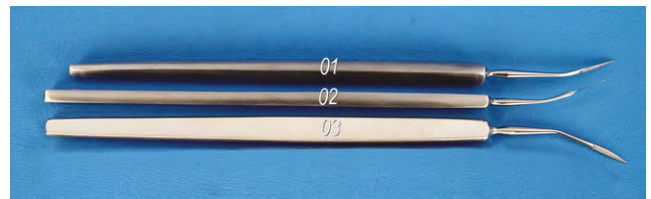


77935-01

BARRAQUER Dissecting Knife

5" long, single cutting edge, retractable blade

Cat. #	Description	Pack
77935-01	Blade 30 mm (l) x 2.00 mm (w)	each



KUHNT Dissecting Knife

5" long

Fig.	Cat.#	Description	Pack
1	77936-01	KUHNT Dissecting Knife	each
2	77936-02	KUHNT Dissecting Knife	each
3	77936-03	KUHNT Dissecting Knife	each

► Micro Dissecting Instruments (continued)

ZIEGLER Dissecting Knife

4 1/4" long, single edge

Cat. #	Description	Pack
77937-01	ZIEGLER Knife, 1.5 mm Blade	each
77937-02	ZIEGLER Knife, 2.6 mm Blade	each
77937-03	ZIEGLER Knife, 3.7 mm Blade	each



GILL Dissecting Knife

5" long

Cat.#	Description	Pack
77938-01	GILL Round Edge Knife	each



77938-01

► Micro Dissecting Needles, Hooks and Currettes

BOWMAN Micro Dissecting Needle

Cat.#	Description	Pack
77950-01	Micro Needle, Straight	each
77950-02	Micro Needle, Curved	each



77950-01



77950-02

GRAEFE Micro Dissecting Hook

Cat.#	Description	Pack
77955-01	GRAEFE Micro Hook, Sharp	each
77955-02	GRAEFE Micro Hook, Blunt	each



77955-01



77955-02

RAININ Micro Dissecting Hook, Blunt

Cat.#	Description	Pack
77956-01	RAININ Micro Hook, Blunt	each



77956-01

Twist Hook

Cat.#	Description	Pack
77957-01	Twist Hook, Twist Left Only	each
77957-02	Twist Hook, Twist Right Only	each



BUCK Micro Dissecting Curette

6 1/2" long

Cat.#	Description	Pack
77965-0	Straight, Sharp, Size "0"	each
77965-1	Angled, Sharp, Size "1"	each
77965-2	Straight, Blunt, Size "2"	each
77965-3	Angled, Blunt, Size "3"	each



77965-0



77965-1



77965-2



77965-3

► Hand Held Cauteries

The cautery comes with fully changeable tungsten carbide tips and batteries. Dual power: 1 "AA" battery for lower power and 2 "AA" batteries for higher power.

Fully autoclavable. Stainless steel construction. Available in three versions:



► Low Temperature Cautery

Generates 300 to 350°C

Cat.#	Description	Pack
72976-10	Low Heat Cautery Set	each
72976-12	Replacement Tip, Straight	each

► Medium Temperature Cautery

Generates 500 to 520°C. Set includes cautery handle and tips.

Cat.#	Description	Pack
72976-20	Medium Heat Cautery Handle	each
72976-21	Medium Heat Cautery Set	each

► High Temperature Cautery

Generates up to 1000°C. Set includes cautery handle and tips.

Cat.#	Description	Pack
72976-30	High Heat Cautery Handle	each
72976-31	High Heat Cautery Set	each

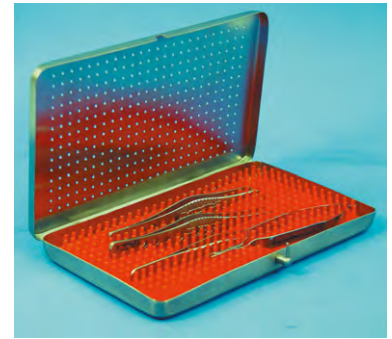
► Replacement Tip for Medium and High Temperature Cauteries

Both medium and high temperature models take the same replacement tips.

Cat.#	Description	Pack
72976-50	Pointed Straight Tip	each
72976-51	Pointed Angle Tip	each
72976-52	Loop Tip	each
72976-53	Needle Tip	each
72976-54	Ball Tip	each

► Stainless Steel Instrument Sterilizing Tray

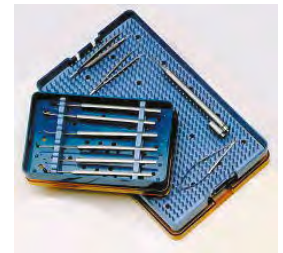
A perforated tray that comes complete with a silicone mat and a unique locking feature.



Cat.#	Description	Pack
66112-01	Tray 8½" x 5" x ¾"	each
66112-02	Tray 8" x 9¾" x ¾"	each
66112-03	Tray 16" x 9½" x ¾"	each

► Sterilizing Tray – Plastic

- Trays are perforated.
- Made from high strength Utem® Plastic
- Autoclave, Steam, Dry Heat, Chemical Sterilization is possible.
- Has an extended Life Cycle.
- Trays are stackable.
- Economical and Flexible Design



Has flexible silicone mats which offer flexibility to layout the instruments for sterilization. A unique "grid" system exists in the base, tray and lid, making it easy to install the mat required, protecting yours instruments properly. The trays are stackable and they have integral feet in base and corner ridges on lids which allow for easier handling in the autoclave and for storage.

All bases have pebble-type surface to keep mats from sticking.

Ordering:

Cat.#	Tray Size inch (mm)	Description	Pack
66114-01	6 x 2.5 x 1.25 (151 x 64 x 32)	Tray with Silicone Mat & Lid	each
66114-02	7.5 x 4 x 1.5 (191 x 102 x 38)	Tray with Silicone Mat & Lid	each
66114-03	10 x 6 x 1.5 (254 x 152.4 x 38)	Tray with Silicone Mat & Lid	each
66114-05	10 x 6 x 1.5 (254 x 152.4 x 38)	Deep Base/Insert Tray/ 2 Mats/Lid	each

► Sterilization Tray

A unique tray that allows you to place up to three diamond knives at one time in the autoclave. Protects the knives from any movement or damage.



72034	Sterilization Tray	each
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Tissue Matrices

See Specimen Prep. Section, pages 303 >>>>

Razor Blades

See Specimen Prep. Section, pages 296-298 >>>>

Jewelers Saw and Blades

See Specimen Prep. Section, page 302 >>>>

Scalpels and Handles See Specimen Prep. Section, pages 298-300 >>>>



62112-12

62112-08

> **Retrieving Tweezers**

A unique plastic coating on the tips of the tweezers insulate them and provide resistance to heat and chemicals. Ideal when cleaning with ultrasonics.

62112-06	Retrieving Tweezers, 6" Long	each
62112-08	Retrieving Tweezers, 8" Long	each
62112-10	Retrieving Tweezers, 10" Long	each
62112-12	Retrieving Tweezers, 12" Long	each



> **Lab Set Forceps**

Made from stainless steel. The set consists of 6 heavy duty forceps that are mandatory in the lab.

72957-06	Lab Set Forceps	6/Set
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> **Plastic Forceps, with Guide Pin**

5" (12.7cm) long, molded, strong, durable, autoclavable up to 275°F (135°C), serrated tip.

72970	Plastic Forceps	6/pk
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> **Plastic Forceps, with Jaw Grips**

All plastic. These forceps are excellent for handling hot, cold, corrosive or contaminated objects. Made from blue polypropylene with interlocking teeth. A catch locks tips tightly for use as a clamp. Scissor type handles with double action hinges makes this forcep a useful cryo tool, and great for handling stubs.

72971	Plastic Forceps with Jaw Grips	6/pk
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> **Nickel-Plated Forceps with PTFE Coated Tips**

Straight, PTFE coated tips, corrosion-free. Offers a soft and good grip to handle delicate articles. Overall length 3 7/8" (98mm), medium points.

72973	Nickel-Plated, 38mm PTFE Tip	each
72975	Nickel-Plated, Full Length w/PTFE	each



> **Curved, PTFE Coated Forceps**

Full length PTFE coated, 98mm long, serrated, curved tips. No conductivity.

72976	Curved, PTFE-Coated Forceps	each
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> **Cover-Glass Forceps, PTFE Coated**

Full length 4 1/2" (114mm) PTFE coated, straight, flat tip forceps. It offers a good grip and easy handling of cover glass and glass slides.

72977	Cover Glass w/PTFE Forceps	each
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> **Three Prong Holder**

This device is actuated by one thumb. Its three prong claw is handy in the picking up of small items up to 2 1/4" in diameter.

72905	Three Prong Holder, 4 3/4" long	each
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78266-04



78266-05



78266-06

► Handling Forceps

With broad and strong tips. Serrated jaws. These forceps offer firm gripping action.

78266-06	Nickel-Plated Steel, Round Tips Slide Locking, 6" (152mm) Long	each
78266-04	Non-Magnetic Stainless Steel, Pointed Tips, 4½" (114mm) Long	each
78266-05	Nickel-Plated Steel, Round Tips	each



► Stainless Steel Forceps, with PTFE Tips

4" (100mm) overall length, 1½" (38mm) PTFE tips; corrosion resistant. Curved shape with a strong fork. Individually blister packed. Ideal for handling balance weights.

72978	Stainless Steel w/PTFE Tips Forceps	each
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► Curved Forceps

6" (152mm), Stainless Steel, Medium fine tips, curved smooth points.

72910	Curved Forceps	each
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► Micro-Adson Forceps

4¾" (121mm) long. Stainless steel with fine serrated jaws.

72912	Micro-Adson Forceps with 2:1 Teeth	each
72913	Micro-Adson Forceps w/o Teeth	each

► Forceps Jar

Made from stainless steel with wide base and polished finished.



Cat. #	Description	Qty
63313-03	Forceps Jar, 3" Dia x 3" High	each
63313-04	Forceps Jar, 4" Dia x 4" High	each
63313-05	Forceps Jar, 3" Dia x 4" High	each
63313-06	Forceps Jar, 4" Dia x 5" High	each
63313-07	Forceps Jar, 4" Dia x 8" High	each

► Curved Forceps



6" (152mm), Stainless Steel, Medium fine tips, curved smooth points.

72910	Curved Forceps	each
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► Curved Forceps



EMS Brand, Swiss made forceps from low carbon austenitic steel, corrosion resistance, high quality, curved tips, available with different length and tips style

■ Curved Forceps with medium tips

Cat. #	Description	Qty
72910-6	6" (152mm L) Medium, Non-serrated Tips	each
72910-6S	6" (152mm L) Medium, Serrated Tips	each
72910-7	7" (180mm L) Medium, Non-serrated Tips	each
72910-7S	7" (180mm L) Medium, Serrated Tips	each

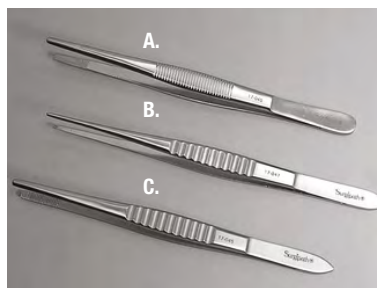
► Curved Forceps with Fine Tips



Cat. #	Description	Qty
72911-6	6" (152mm L) Fine, Non-serrated Tips	each
72911-6S	6" (152mm L) Fine, Serrated Tips	each
72911-7	7" (180mm L) Fine, Non-serrated Tips	each
72911-7S	7" (180mm L) Fine, Serrated Tips	each

► **Thumb Dressing Forceps**

These conventional forceps are very popular and are available in a variety of length, tip, and handle styles.

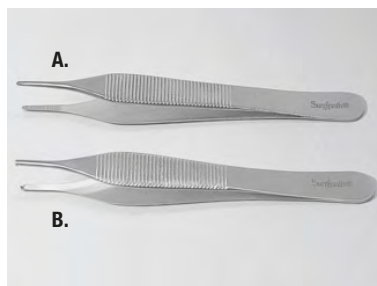


- Made of premium grade, hardened stainless steel
- Feature a protective coating for extra durability and protection from rust and corrosion
- Satin-matt finish reduces eye-fatiguing glare

Cat No.	Description	Qty.
77937-21	4" (102 mm) Serrated Tips, Fine Grip	each
77937-22	5" (127 mm) Serrated Tips, Fine Grip	each
77937-23	A. 5-1/2" (140 mm) Serrated Tips, Fine Grip	each
77937-24	B. 6" (152 mm) 2 mm Smooth Tips, Broad Grip	each
77937-25	7" (178 mm) 2 mm Smooth Tips, Broad Grip	each
77937-26	6" (152 mm) Serrated Tips, Fine Grip	each
77937-27	C. 6" (152 mm) Serrated Tips, Broad Grip	each
77937-28	7" (178 mm) Serrated Tips, Broad Grip	each
77937-29	8" (203 mm) Serrated Tips, Broad Grip	each
77937-30	12" (305 mm) Serrated Tips, Fine Grip	each

► **Adson Forceps**

Available in 4 styles. All feature a paddle-style, fine-grooved handle.



- Made of premium grade, hardened stainless steel
- Feature a protective coating for extra durability and protection from rust and corrosion
- Satin-matt finish reduces eye-fatiguing glare

Cat No.	Description	Qty.
77937-35	A. 4-3/4" (121 mm) Adson Tissue Forceps, Serrated	each
77937-36	6" (152 mm) Adson Tissue Forceps, Serrated	each
77937-37	7" (178 mm) Adson Tissue Forceps, Serrated	each
77937-38	B. 4-3/4" (121 mm) Adson Tissue Forceps, 1 x 2 Teeth	each

► **7" (178 mm) Ergonomic Paddle Handle Forceps**

Available with either smooth, serrated, needle tips, or with 1 x 2 teeth.



178mm versions are for those preferring a longer forcep and a wider variety of tip choices.

Curved styles are well suited for retrieving specimens from the inside perimeter of transport jars and tissue separation in the water bath.

- Made of premium grade, hardened stainless steel
- Feature a protective coating for extra durability and protection from rust and corrosion
- Satin-matt finish reduces eye-fatiguing glare

Cat No.	Description	Qty.
77937-44	7" (178 mm) Ergonomic Forceps, Paddle Handle, 3 mm Smooth Tips	each
77937-45	7" (178 mm) Ergonomic Forceps, Paddle Handle, 3 mm Serrated Tips	each
77937-46	7" (178 mm) Ergonomic Forceps, Paddle Handle, 3 mm 1 x 2 Teeth	each
77937-47	7" (178 mm) Ergonomic Forceps, Paddle Handle, 1.5 mm Smooth Tips	each
77937-48	7" (178 mm) Ergonomic Forceps, Paddle Handle, 1.5 mm Serrated Tips	each
77937-49	7" (178 mm) Ergonomic Forceps, Paddle Handle, Needle Tip	each
77937-54	7" (178 mm) Ergonomic Forceps, Paddle Handle, 1.5 mm Curved 30° Serrated Tip	each
77937-55	7" (178 mm) Ergonomic Forceps, Handle, 1.5 mm Curved 30° Smooth Tips	each

► **5-1/2" (140 mm) Ergonomic Forceps**

Available with smooth, serrated, or needle tips.



5 1/2" (14 cm) ergonomic versions for those who prefer a shorter forcep.

- Made of premium grade, hardened stainless steel
- Feature a protective coating for extra durability and protection from rust and corrosion
- Satin-matt finish reduces eye-fatiguing glare

Cat No.	Description	Qty.
77937-56	5-1/2" (140 mm) Ergonomic Forceps, 1.5 mm Smooth Tips, Straight	each
77937-57	5-1/2" (140 mm) Ergonomic Forceps, 1.5 mm Smooth Tips, Curved 30°	each
77937-58	5-1/2" (140 mm) Ergonomic Forceps, 1.5 mm Serrated Tips, Curved 30°	each
77937-59	5-1/2" (140 mm) Ergonomic Forceps, 1.5 mm Serrated Tips, Straight	each
77937-60	5-1/2" (140 mm) Ergonomic Forceps, 1.5 mm Serrated Tips, Needle Tip	each



► Specimen Forceps

Stainless steel forceps with serrated tips.

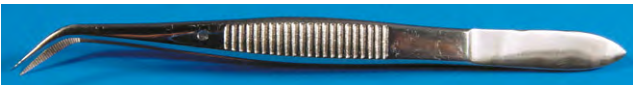
72914	Specimen Forceps, 4½" (114mm)L	each
72915	Specimen Forceps, 6" (152mm)L	each
72916	Specimen Forceps, 8" (203mm)L	each
72917	Specimen Forceps, 10"(254mm)L	each
72918	Specimen Forceps, 12"(305mm)L	each



► Tissue Forceps

Stainless Steel Forceps with 1x2 teeth.

72920	Tissue Forceps, 4½" (114mm)L	each
72921	Tissue Forceps, 5" (127mm)L	each
72922	Tissue Forceps, 6" (152mm)L	each
72923	Tissue Forceps, 8" (203mm)L	each



72991-4C



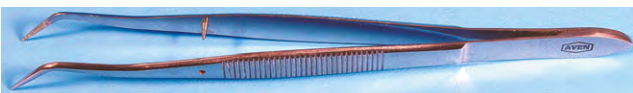
72991-4S



72992-6C



72995-6S



72993-6C

► Stainless Steel Forceps - Serrated Tips

Made from stainless steel, medium points, serrated tips and alignment pin, curved or straight tips. Available in 4" and 6" long. Only curved type A tips comes with locking device.

72991-4C	4" Forceps, Curved Tips	each
72991-4S	4" Forceps, Straight Tips	each
72992-6C	6" Forceps, Curved "A" Tips	each
72993-6C	6" Forceps, Curved "B" Tips	each
72995-6S	6" Forceps, Straight Tips	each



► Jaw Forceps

Stainless steel jaw forceps with a guide pin. Curved, serrated tips.

72925	Jaw Forceps, 8" (203mm)L	each
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► Dissecting Forceps

Stainless steel, straight fine point, serrated tips and a guide pin.

72927	Dissecting Forceps, 4½" (114mm)L	each
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► Graefe Fixation Forceps

Stainless steel, 4½" long, 4mm jaw. Without catch.

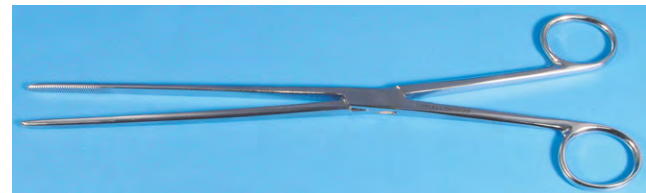
78262-04	Graefe Fixation Forceps	each
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► Russian Tissue Forceps

Stainless steel 6" (155mm) long. With special cupped pattern for superior grip. Cup area is 6.5mm wide, 9mm long.

78260-06	Russian Tissue Forceps, 6" Long	each
78260-08	Russian Tissue Forceps, 8" Long	each



► Specimen Gripper

Stainless steel, long, serrated fine tips, for easy removal of specimens from deep containers. Scissor type.

72928	Specimen Gripper, 10¼" (258mm)	each
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► Kelly Forceps

Stainless steel hemostatic forceps with box lock joint and serrated jaw.

72930	Kelly Forceps, 5½"(140mm)L, Straight	each
72931	Kelly Forceps, 5½"(140mm)L, Curved	each



72930



72931

► Dissecting Scissors; Iris Scissors

Stainless steel. Fine points. High quality. Length 4½" (114mm)

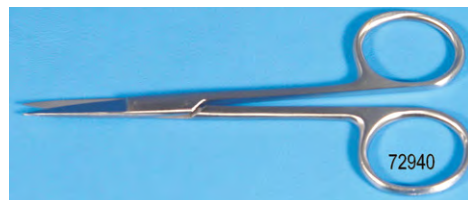
72938	Scissors, Angular w/two fine points	each
72939	Scissors, Angular w/one probe point, one fine point	each
72940	Scissors, Straight w/two fine points	each
72941	Scissors, Curved w/two fine points	each



72938



72939



72940



72941

► Rubis Micro Scissors

High quality scissors, manufactured from hardened, anti-acid, stainless, surgical steel (CA) Handcraft with precision sharpened blades that provide a perfect cut. The Rubis Twist® grip scissors offer ergonomically, comfort and control.

► Model 1C300, CA

110 mm (4¼") long, Sharp pointed micro scissors. N = 5.4 mm (¼")



78180-1C3 Rubis Micro Scissors, 1C300 each

► Model 1C200, CA

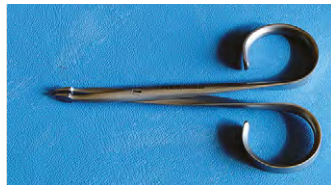
146 mm (5¾") long, Long legged scissors with rounded tips. N = 6.4 mm (¼")



78180-1C2 Rubis Micro Scissors, 1C200 each

► Model 1K603, CA

90 mm (3¼") long, N = 5.4 mm (¼"), U = 2.8mm (⅛"). Precision tweezers engineered into a scissors' movement, offers firm and good grip.



78180-1K6 Rubis Micro Tweezers, 1K603 each



► Rubis Micro Scissors Set

Strong, slightly curved easily cut through small bones and cartilages

SET INCLUDING:

- 1 each Rubis Colibri fine scissors, light duty
- 1 each Rubis Classic medium fine scissors, medium duty
- 1 each Rubis Sauro medium strong scissors, heavy duty

78180-03 Rubis Micro Scissors Set 3/set each

► Rubis Personal Care Set

This kit is offered you tools for the personal care. Swiss quality and workmanship give you a long lasting quality and service.



78182-00 Rubis Personal Care Set Set each



► Castro-Viejo Scissors

Short, delicate stainless steel scissors with a spring handle.

72933	CV Scissors 4"(102mm), Straight Tips	each
72934	CV Scissors, 4"(102mm), Angled Sideways	each
72935	CV Scissors, 4½"(114mm), Curved on Flat	each



72956

► Utility Sheer

Multi purpose shear with stainless steel blades and plastic handle. One blade is serrated that allows you to cut materials from wire to bone. Autoclavable to 120°C.

72956	Utility Sheer	each
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► Paper Cutting Scissors

Stainless steel sheer for cutting paper; black enameled handles.

72954	Paper Cutting Scissors, 8"(200mm)L	each
72955	Paper Cutting Scissors, 10"(250mm)L	each

Baby Metzenbaum Scissors

See *Histology Section*, page 499 >>>>

Doyen Scissors See *Histology Section*, page 499 >>>>



72960



72961



72962



72963

► Mayo Dissecting Scissors

Stainless Steel. Polished finish.

72960	Dissecting Scissors 5½" Straight	each
72961	Dissecting Scissors 5½" Curved	each
72962	Dissecting Scissors 6¼" Straight	each
72963	Dissecting Scissors 6¼" Curved	each



72952-10



72952-20

► Inoculating Loop/Needle

Nichrome wire. An 8" aluminum handle with a 3" nichrome wire, 25 gauge. Loop O.D. is 4mm; loop I.D. is 2.5 mm. Available with a loop or a needle.

72952-10	Inoculating Loop	12/pk
72952-20	Inoculating Needle	12/pk

Yasargil Bayonet Scissors See *Histology Section*, page 499 >>>>

Operating Scissors See *Histology Section*, page 499 >>>>

Dissecting T-Type Pins

Stainless steel, with T shapes head pin and pointed end.



Cat. #	Description	Qty
63307-60	Dissecting T-Type Pins,	6/pk

Mall Probe



6" long, Chrome plated with one blunt bent end and hexagonal shape handle

Cat. #	Description	Qty
63324-20	Mall Probe, 6" L,	each

Probe with Eye



Stainless steel, 5" long, 2mm diameter. Flat one end with eye.

Cat. #	Description	Qty
63324-30	Probe With Eye, 5" L	each
63324-32	Probe With Eye, 6" L	each
63324-33	Probe With Eye, 7" L	each
63324-34	Probe With Eye, 8" L	each

Huber Probe



63324-10

Chrome Plated. 6" long, one blunt bent end, and one chisel finish on the other end

Cat. #	Description	Qty
63324-10	Huber Probe 6" L	each

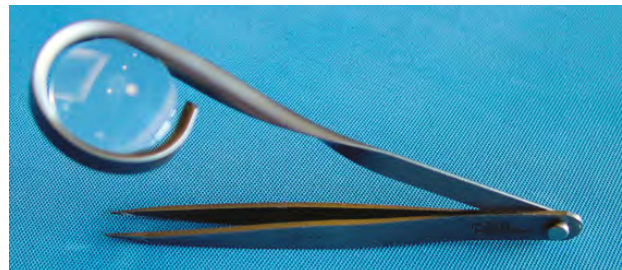
Combination Probe Set



Probe set include two-way handle and four probe heads. These probe heads (A, B, C, D) are easily screwed into the handle (H). This set is very convenient for field work or on the move.

All packed in a handy plastic zippered case. Handle is 6.5 inch long.

Cat. #	Description	Qty
63325-00	Combination Probe Set	each



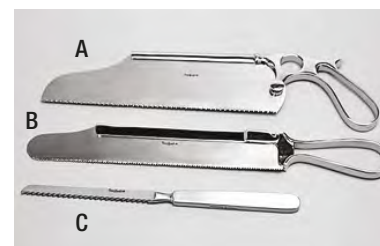
Tweezers with Magnifier

The combination of high precision tweezers with magnifier offers you easy handling of small parts and become handy where a microscope or magnifier isn't at hand. Tweezers is 90 mm long, 100 mm total length with 3 3/4X magnifier.

78183-01	Tweezers with Magnifier	each
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Saws

Three styles of manual bone saws are available. The broad bladed Satterlee Saw (A), the thinner rounded tip Charriere Saw (B), and the solid handle Langenbech Metacarpal Saw (C). Each saw has serrated teeth.



Cat No.	Description	Qty.
70566-30	B. Charriere Saw 10-1/2" (267 mm)	each
70566-31	A. Satterlee Saw 11-1/2" (292 mm)	each
70566-32	Satterlee Saw Replacement Blade	each
70566-33	C. Langenbech Metacarpal Saw 9" (229 mm)	each

Autopsy Instruments

EMS now offers these premium grade, hardened stainless steel autopsy instruments, featuring a protective coating for extra durability and protection from rust and corrosion. Satin-matt finish reduces eye-fatiguing glare.

A. Brain Knife

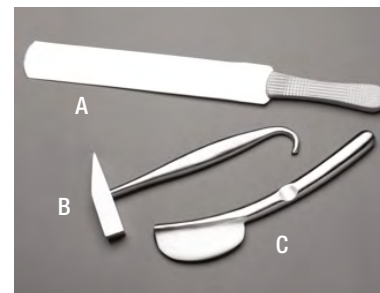
Double-sided edged knife for precision brain sectioning.

B. Skull Breaker

Fracturing hammer for brain access. Available with chisel bottom or hook bottom.

C. Rachitome

Curved rachitome. For specific skull fracturing.



Cat No.	Description	Qty.
70566-10	A. Brain Knife, 9-1/2" (241 mm) Blade	each
70566-11	B. Skull Breaker 5-1/2" (140 mm), Hook End	each
70566-12	B. Skull Breaker 5-1/2" (140 mm), Chisel End	each
70566-13	C. Rachitome 8-3/4" (222 mm)	each

► Dissecting Needles



72946



72947

1) Stainless steel with spear shaped head, 5" (127mm) long.

72946	Needle, Single cutting edge	each
72947	Needle, Double cutting edge	each



72948



72949

2) Wooden handle, needle tip.

72948	Straight needle, 5 3/4" (146mm) long	12/pk
72949	Curved needle, 5 1/2" (140mm) long	12/pk

For our complete line of Inoculating Loops and supplies, See Histology section, pages 502-503 >>>>



► Dissecting Kit, 8 pieces, Stainless Steel

Kit including:

- 1 4 1/2" Dissecting forceps with curved and serrated tips
- 1 Curved dissecting needle
- 1 Glass pipette with rubber bulb
- 1 4 1/2" Dissecting forceps straight and serrated tips
- 1 Dissecting scalpel, 6" long, 1 1/2" cutting edge.
- 1 4 1/2" Dissecting scissors, sharp, straight points
- 1 Plastic ruler 6", 1/16" div., millimeter and centimeter.

72950	Dissecting Kit	each
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► Large Dissecting Kit

Kit including:

- 12 Scalpel Blades #11 with #3 Handle
- 6" (15mm) Clear Ruler
- 6" long Light Small Probe, Blunt
- 5 1/2" Kelly Hemostat, Straight
- 6 1/4" Kelly Hemostat, Straight
- 4 1/2" Iris Scissors
- 5 1/2" Dissecting Scissors
- Suture Hook
- Set of Dissecting Needle, one Straight and one Bent
- 4 1/2" Straight Fine Point Serrated Jaws Forceps
- 5 1/2" Straight Blunt tip Serrated Jaws Forceps
- 2 mm Diameter Stainless Steel Punch
- Large Wood Handle Spatula

72951-15	Large Dissecting Kit	Set
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For our complete selection of dissecting kits, see page 295 >>>>

Bone Saws; See Histology Section, page 506 >>>>

► Needle and Knife Interchangeable Handle

Made from stainless steel, pin-vise type Handle, which accepts either dissecting needles or a knife.

Handle: 92 mm (3 5/8") L x 6 mm (1/4") diameter

Needle: available with straight or bent, 60 mm (2 1/2") long

Knife: spear type with single or double edge, 75 mm (3") long

72953-HD	Handle	each
72953-10	Needle, Straight	36/pk
72953-11	Needle, Bent	36/pk
72953-20	Spear Shape Knife, Single Edge	36/pk
72953-21	Spear Shape Knife, Double Edge	36/pk



► Needle File Handle

Blue anodized aluminum handles are well knurled with an excellent grip. The length of the handle is 4" and features a steel easy-release chuck, which simply presses into the barrel and remains secure. Handle will last a lifetime Made in the USA.



Cat. #	Description	Tool length	Handle Dia.	Pack
62213-01	Small Handle	4"	3/8"	each
62213-02	Medium Handle	5 1/2" - 6 1/4"	1/2"	each

► Riffler File Set

A set of 10 double-ended rifflers with square handles for use in tight places and for filing odd shapes. Overall length: 7". Available in medium cut only.



62116	Riffler File Set	10/set
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► Swiss Pattern Needle Files

A 12-piece file set which contains the most popular shapes in a handy plastic pouch. Files come with knurled handles. Excellent quality. Available in cut #2 only. Length 5 1/2".



62115	Swiss Pattern Needle Files	12/set
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► Micrometer

Metric and English scale micrometers with friction stop; comes in a padded plastic case. Model A: Calibrated to read 0 to 25mm, in 0.01mm divisions. Model B: Calibrated to read 0 to 1", in 0.001" divisions.

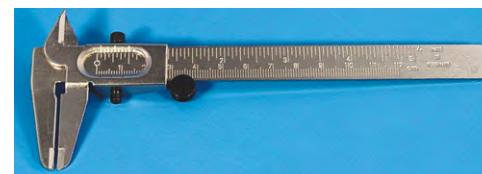
62060	Model A Micrometer	each
62061	Model B Micrometer	each



► Vernier Caliper

Double scale vernier caliper. Nickel Plated Scale. Inch Scale: Reading from 0 to 5" in 1/64" divisions Metric Scale: Reading from 0 to 120mm in 1mm divisions. Readable on the vernier scale to 1/256" and/or to 0.1mm. Has a roller adjustment and it is packed in a plastic case.

62064	Vernier Caliper	each
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► Digimatic Calipers – 6" Long

Provides a digital readout to 0.0005" / 0.01mm for error-free reading and can measure steps. Function: zero setting, data hold, low battery alarm and data output. Provided with a data saving output port for connection with the SPC system. Powered by a single SR-44 battery. Battery life: approximately two years under normal use.

Specifications: An all metal head with a plastic housing. Range: 0 – 6" / 0 - 150mm; LCD resolution: 0.0005" / 0.0; Accuracy: ±0.001

62062-10	Without SPC Output; with Thumb Roller	each
62062-20	Absolute Function Type with SPC Output	each



► Instant Read-out Precision Digital Caliper

This caliper is made from stainless steel and measures inside and outside in inches and millimeters. Read-out from 0 to 6 inches with 0.001" resolution, or 0 to 150 mm with 0.01mm resolution. Includes a zero set button, depth measuring rod and a fine adjustment thumb wheel. A protective carrying case and battery are included.

62065-40	Instant Readout Digital Caliper	each
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► Vernier Calipers; Dial Type Metric/English Scales

These precision vernier calipers are molded in corrosion resistant fiberglass-filled super-polyamide nylon alloy. They are excellent tools due to their easy reading scale (black numbers on white background) and dials (light weight, fine adjustment thumb roller). Its parallel jaws are 1.57" (40mm) deep, and its reading scale does not create a parallax. Its inside-outside jaws and round metal rod depth gauge add to its value. Overall length: 8 3/4" (213mm).

B Dial type, 0.1mm dial, 1.3" (33mm) diameter, maximum reading 150mm, 10mm bar scale.

62065-B	Vernier Caliper, B Dial Type	each
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Sapphire Burnishing/Deburring Tool - 62160-00

▶ Sapphire Burnishing/Deburring Tool

This tool will out-perform any stone for the fine burnishing of soft or hard materials such as; miniature pivots, shafts, and pins that are made from hard steel, carbide and even ceramic.

This precisely ground sapphire blade is 1.5mm x 2.3mm, 14mm long (0.06x0.09x.56"). It is permanently mounted in a hexagonal gold anodized aluminum handle. Total length is 120mm (4.75").

62160-00 Sapphire Burnishing/Deburring Tool each

For Diamond Scribes, see page 838-839, as well as Materials Science section, pages 388-389. >>>>



Hardened Steel Deburring Tool Set - 62161-SD

▶ Hardened Steel Deburring Tool Set

Made from hardened steel, this tool has three razor sharp cutting edges ranging from a very sharp point to one that is approximately 10mm in length. These nickel plated triangular tools are mounted in red and black plastic handles. Tool length is 30mm by 2.1mm across (1.2"x.08"). The overall length of the tool is 154mm (5.7"). 2 tools/set.

62161-SD Hardened Steel Deburring Tool Set each

▶ Arkansas Sharpening Stones

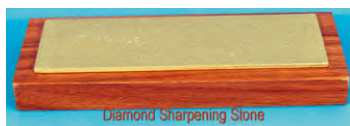
These stones are natural with close density oil-tones, and excellent qualities that make them the stone unequalled for sharpening tools such as gravers, knives, etc. Comes in a cedar wood box and they are available in two types: translucent (extra fine); and hard (fine).



62082-00 - Arkansas Sharpening Stone

Catalog #	Description	
62082-00	Arkansas Sharpening Stone, Translucent, Size 4" x 2"x½" (102 x 51 x12.7mm)	each
62082-10	Arkansas Sharpening Stone, Hard (Fine), Size 6" x 2"x½" (152 x 51 x12.7mm)	each

▶ Diamond Sharpening Stone



Diamond Sharpening Stone

This patented process of heat treatment which bonds the highest quality industrial grade diamond particles in a stainless alloy to a precision matched metal substrate, has been imitated, but has never come close to being duplicated. Our stone which is set on a walnut pedestal with a cover is available in 3 grades: F- fine grit (600); M - medium grit (270), and C - coarse grit (180). Stone size is 2"x6" (51mmx152mm)

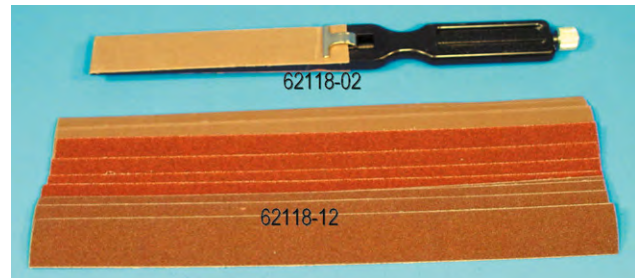
62082-50	Diamond Stone, Fine Grit	each
62082-51	Diamond Stone, Medium Grit	each
62082-52	Diamond Stone, Coarse Grit	each

▶ Diamond Stone

This diamond stone has millions of cutting edges to sharpen most any tool. Many times faster than dry or oil stones. May be used as a file or a stone. It cuts in all directions. Available in all purpose fine grit.



62120 Diamond Stone each



62118-02

62118-12

▶ Filing/Polishing Stick and Strips

A plastic handle, 10½" (267mm) long, holds strips of emery paper or cloth 11"x1" (279x25.4mm). Strips can easily be replaced. Comes complete with 2 strips/set, grit 120 and 240.

62118-02 Filing and Polishing Stick And Strips set
62118-12 Emery Refills in 12 Assorted Grits 12/pk



Flat Emery Sticks

▶ Flat Emery Sticks

Emery paper which is glued to a wooden handle. 11" long x ¾" wide (279x19.1mm). Very useful for filing excess resin of sample block tips. Grit size ranges from number 4/0 (finest) to 4 (coarsest).

62119-04	4/0 Grit	12/pk
62119-03	3/0 Grit	12/pk
62119-02	2/0 Grit	12/pk
62119-01	1/0 Grit	12/pk
62119-10	1 Grit	12/pk
62119-20	2 Grit	12/pk
62119-30	3 Grit	12/pk
62119-40	4 Grit	12/pk

▶ Emery Paper

Come in sheets, size 9"x13¾" (22x34cm) in varying grit sizes. Grit 4/0 is the finest and 3 is the coarsest.

Emery Papers
62117-

Cat.#	Grit	Mesh	Pack
62117-04	4/0	800	10/pk
62117-03	3/0	600	10/pk
62117-02	2/0	500	10/pk
62117-01	1/0	400	10/pk
62117-10	1	280	10/pk
62117-20	2	240	10/pk
62117-30	3	180	10/pk

► Pro-Craft® Flexible Shaft Machine

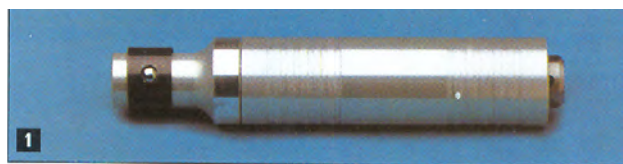
1. A versatile hang-up flexible shaft machine. Available either 1/10 or 1/8 HP, ball bearing motor, variable speed 0 – 18,000 RPM. Complete kit comes with a Hand Piece (#62137-02), 39" (1 m) Flexible Shaft (#2132-10), and a Bracket for hanging. Lifetime warranty on motor under normal use.



Cat.#	Description	Volt	Pack
62130-10	1/8 HP Flex-Shaft Machine Set	110	each
62130-20	1/8 HP Flex-Shaft Machine Set	220	each
62131-10	1/10 HP Flex-Shaft Machine Set	110	each
62131-20	1/10 HP Flex-Shaft Machine Set	220	each
62132-10	Replacement Flex Shaft	-----	each
62132-20	Replacement Sheath	-----	each

2. Motor only comes with Shaft and Sheath

Cat.#	Description	Volt	Pack
62133-10	1/8 HP Flex-Shaft Motor	110	each
62133-20	1/8 HP Flex-Shaft Motor	220	each
62134-10	1/10 HP Flex-Shaft Motor	110	each
62134-20	1/10 HP Flex-Shaft Motor	220	each



► Hand Pieces

The most popular hand pieces for all-around use. The chuck takes accessory shanks from 0 to 1/32" (0 to 4mm). Includes chuck key.

Cat.#	Description	Pack
62137-01	#1 Hand Piece	each
62137-02	#2 Hand Piece	each

► Electronic Foot Speed Controls

Solid state. Plastic housing. For use with all flex-shaft models, except full torque models.

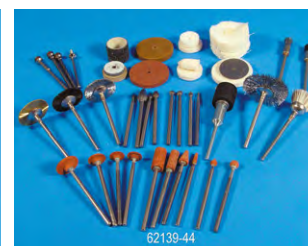
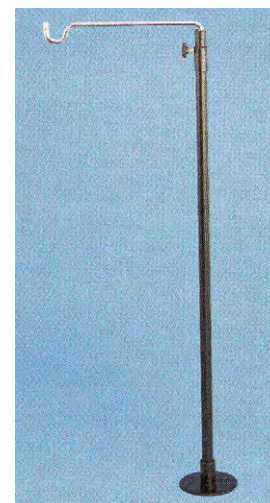


Cat.#	Description	Volt	Pack
62138-10	Standard Foot Speed Control	110	each
62138-11	Standard Foot Speed Control	220	each

► Adjustable Flex Shaft Holder

Attaches to the bench and adjusts from 26" to 41" (66cm to 104cm). Swivels for easy flex shaft use.

62138-30	Adjustable Flex Shaft Holder	each
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► Flex Shaft Accessory Kits

Mounted accessories are on 3/32" (2.35mm) arbors.

62139-26	26 Piece Assortment Set	set
62139-13	13 Piece Brush and Buff Set	set



► Unmounted Cut-Off Wheels

Made from rubber-bonded aluminum oxide grains. Excellent for cut-off work with less heat build-up. Mount on mandrels. 100/box. Excellent for use with Flex Shaft Machines.



Cat.#	Diameter		Thickness		Pack
	(in)	(mm)	(in)	(mm)	
62142-01	3/8	22.2	.010	.22	each
62142-02	3/8	22.2	.030	.76	each
62142-03	1	25.4	.030	.76	each
62142-04	1	25.4	.015	.38	each
62142-05	1 1/4	31.8	.033	.84	each
62142-06	1 1/4	31.8	.062	1.57	each
62142-07	1 1/2	38.1	.025	.64	each
62142-08	1 1/2	38.1	.040	1.02	each

► Abrasive Wheels - Finishing and Polishing Wheels

► 1. Pumice Wheels - 72 Assortment Wheels

For cleaning, polishing and finishing. Made from natural rubber with graded pumice grain distributed to assure uniform results. Kit includes 12 discs each of six styles and 3 mandrels with $\frac{1}{8}$ " (3.18mm) shanks.



62143-72 Pumice 72 Wheels Assortment 72/bx

► 2. Aluminum Oxide - Brightboy™ Assortment Wheels

The resilient rubber binder cushions the aluminum oxide abrasive and bridges the gap between grinding and polishing. 57 piece kit contains wheels cylinders, points, mandrels and chuck.



62144-57 Aluminum Oxide Abrasive Wheel 57/bx

► 3. Sanding Discs

Yellow abrasive with press on/flip-off center hole feature. Aluminum oxide grit in three grades, mounted on a thin backing, provides outstanding results in sanding and smoothing operations.

Individual Discs: Sold 100 discs in a tube.

Cat.#			Diameter	
Coarse Grit	Medium Grit	Fine Grit	(in)	(mm)
62145-10	62145-20	62145-30	$\frac{3}{4}$	19.1
62145-11	62145-21	62145-31	$\frac{1}{2}$	22.2

Assortment Disc: Contains 25 fine, 25 coarse, and 50 medium, $\frac{7}{8}$ " (2.2mm) sanding discs, plus one mandrel, in a plastic compartment box.

62145-00 Assortment Sanding Discs 100/bx

Press-On/Flip-Off Mandrel

Made from high quality steel with $\frac{3}{32}$ " (2.35mm) shank

62145-01 Sanding Disc's Mandrel each

► 4. Abrasive Band and Arbors

Abrasive bands

Glue bonded, silicon carbide for fast cutting. All are $\frac{1}{2}$ " (12.7mm) long. Available grit ranges: Coarse (60), Medium (80), and Fine (120).



Band Diameter

Cat.#	(in)	(mm)	Grit	Pack
62150-10	$\frac{1}{4}$	6.4	Fine	100/bx
62150-11	$\frac{1}{4}$	6.4	Medium	100/bx
62150-12	$\frac{1}{4}$	6.4	Coarse	100/bx
62150-20	$\frac{3}{8}$	9.5	Fine	100/bx
62150-21	$\frac{3}{8}$	9.5	Medium	100/bx
62150-22	$\frac{3}{8}$	9.5	Coarse	100/bx
62150-30	$\frac{1}{2}$	12.7	Fine	100/bx
62150-31	$\frac{1}{2}$	12.7	Medium	100/bx
62150-32	$\frac{1}{2}$	12.7	Coarse	100/bx

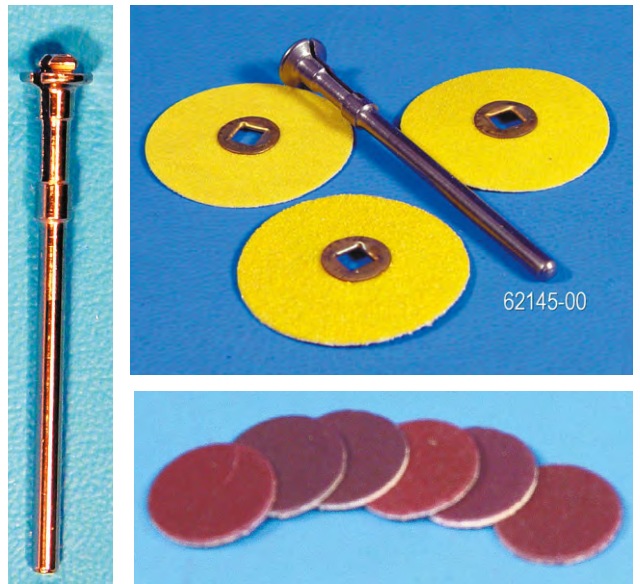
Abrasive Band Arbors

Rubber heads on $\frac{3}{32}$ " (2.35mm) shank.



Band Diameter

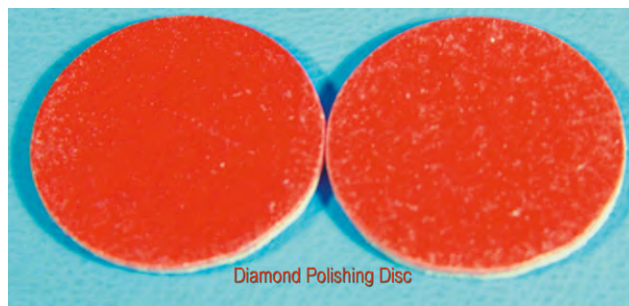
Cat.#	(in)	(mm)	Pack
62151-10	$\frac{1}{4}$	6.4	each
62151-11	$\frac{3}{8}$	9.5	each
62151-12	$\frac{1}{2}$	12.7	each



► 5. Diamond Finishing Discs

Offers extremely aggressive grinding action, yet leaves an exceptionally smooth finish. Discs have pressure sensitive adhesive backing for a secure fit on holder (Cat. #62146-01). $\frac{3}{4}$ " (19.1mm) diameter.

Cat.#	Grit	Color	Mesh	Pack
62146-10	Extra Coarse	Purple	220	6/pk
62146-15	Coarse	Brown	325	6/pk
62146-20	Fine	Red	600	6/pk
62146-25	Extra Fine	Blue	1200	6/pk



► 6. Final Polish Discs

No need for polishing compounds. These discs are ideal for final polish a surface. Fits on holders #72146-01. 3.4: (19.1mm) diameter. Pressure sensitive backing.

62146-40	Final Polishing Disc	6/pk
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► 7. Disc Holder

Use with all diamond polishing discs and final discs. The surface is designed to hold disc securely and smoothly. With 1/8" (3.18mm) mandrel. Maximum 12,000 RPM.



62146-01	Disc Holder	each
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► 8. Diamond Points

All diamond points are mounted on 3/32" (2.35mm) shanks. Suitable for Flex Shaft machines. Exceptionally long lasting. Use at 10,000 RPM.

Cat.#	Tip Size (mm)	I.S.O. Size	Description
62155-13	1.3	013	(1) Small Round
62155-83	8.3	083	(2) Inverted Wide Cone
62155-35	3.5	035	(3) Flat & Cylinder
62155-23	2.3	023	(4) Inverted Cone
62155-63	6.3	063	(5) Square Edge Wheel
62155-38	3.8	038	(6) Cone Square
62155-52	5.2	052	(7) Tapered Cone
62155-18	1.8	018	(8) Narrow Cone
62155-29	2.9	029	(9) Large Round
62155-24	2.4	024	(10) Cone
62155-73	7.3	073	(11) Tapered Wheel

► Small Bench Vises

New-improved vises which offer a choice of either clamping or screwing it onto the bench. An excellent tool and necessity for every lab.

62067-15	Bench Vise 1 1/2" Jaws	each
62067-20	Bench Vise 2" Jaws	each



► Mini Vise

This is the smallest vise ever. It comes complete with a clamp that allows for either table or bench-top attachment. Small 1" jaws. It weighs only 13 oz. The vise is made from cast iron with a heavy red enamel coating.

62066-00	Mini Vise, 1" Jaws	each
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► Portable Vacu-Vises

With a rubber suction base; you just flick off the Vacu-lever and the Vacu-vise firmly fastens to any clean, smooth surface. When you lift the Vacu-lever up, the Vacu-vise is released.

► Multi-Angle Swivel Vacu-vise

Can be tilted on any desired angle. Swivels 360°. 3" metal jaws and it is supplied with a slide-on rubber to hold delicate objects; opens up to 2 3/8"; 6 1/4" triangle base.

62068	Multi-Angle Vacu-Vise	each
62069	Slip-on Rubber Jaws	1 pr



► Double Clamp With Stand

Two adjustable arms with alligator jaws in a heavy base. A versatile tool which can be adjusted to any position and firmly hold small items of any shape.

62123-01	Double Clamp With Stand	each
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► Double Clamp with Magnifier

Same as (Cat# 62123-01,) but it has a 2 1/2" diameter magnifier attached.

62123-02	Double Clamp W/Stand & Magnifier	each
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62074- Precision Pin Vises

► Precision Pin Vises

These tool steel collets grip firmly when screw chucks are tightened. The chromium-plated handle is hollow which allows for the holding of long wires. The body is stepped, with the small portion knurled allowing for rotation between the fingers. The larger portion is smooth and it easily can be held firmly in lathes and drill presses.

Cat.#	Chuck Opening		Length	
	(in)	(mm)	(in)	(mm)
62074-01	0 to .040	0 to 1.02	3	76
62074-02	.025 to .062	0.6 to 1.60	3/4	83
62074-03	.050 to .125	1.3 to 3.20	3/4	98
62074-04	.115 to .188	2.9 to 4.80	4/4	108
62074-10	Set of all Four Precision Pin Vises		4/set	

► Hex Key Wrenches

Made from heat treated chrome nickel steel. Useful to have around the lab. Its sturdy handle, folds up just like a pocket knife. Can be used at any angle.



English Sizes

Cat.#	Hex Sizes, Inch			Handle Lgth.
62075-01	.050,	1/16,	3/64	3 3/8"
	3/32,	1/64,	1/8,	
	5/64,	3/32,	3/16	
62075-03	3/16,	1/32,	1/4	5 1/4"
	5/16,	3/8		

Metric Sizes

Cat.#	Hex Sizes, mm	Handle Lgth.
62076-01	1, 5, 2, 2.5, 3,	3 3/8"
62076-02	3, 4, 5, 6, 8, 10	5 1/4"

► Screwdriver Set

6-in-1 fold up screwdriver set that consists of 6 different screwdriver blades that folds up like a pocket knife and serves as a handle.

Blades are 1/8", 3/16" and 1/4" flat; T-15 Star Torx, #1 Phillips and Hole Punch awl.



62079 Screwdriver set set



► Phillips Screwdriver Set

A very handy set of Phillips screwdrivers which feature one of the smallest sizes available (1.20mm). A knurled body with hexagonal heads and tempered steel blades. All are 4 1/2" length. Sizes: 1.20mm, 1.50mm, 2.00mm, and 2.50mm

62077-00 Phillips Screwdriver Set each

Phillips Individual Screwdrivers:

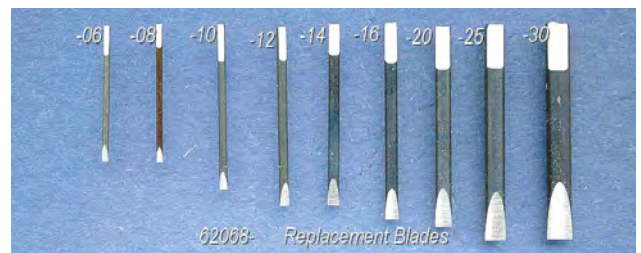
62077-12	Phillips Screwdriver Size 1.2mm	each
62077-15	Phillips Screwdriver Size 1.5mm	each
62077-20	Phillips Screwdriver Size 2.0mm	each
62077-25	Phillips Screwdriver Size 2.5mm	each

► Precision Screwdriver Set

Precision European quality screwdrivers in 9 sizes: .60; .80; 1.00; 1.20; 1.40; 1.60; 2.00; 2.50 and 3.00mm. With hexagonal swivel heads to prevent rolling and knurled handles for a firm grip. Color identifier bands allow for easy selection and set screws hold the blades securely. Set contains 19 extra blades and 2 extra set screws. The set comes with a handsome revolving stand.



62078-00 Screwdriver Set w/Revolving Stand Set



Replacement Screwdriver Blades For #62078-00:

62078-06	Replacement Blade 0.6mm	3/pk
62078-08	Replacement Blade 0.8mm	3/pk
62078-10	Replacement Blade 1.0mm	3/pk
62078-12	Replacement Blade 1.2mm	3/pk
62078-14	Replacement Blade 1.4mm	3/pk
62078-16	Replacement Blade 1.6mm	3/pk
62078-20	Replacement Blade 2.0mm	3/pk
62078-25	Replacement Blade 2.5mm	3/pk
62078-30	Replacement Blade 3.0mm	3/pk

► Heavy Duty Wire Bending Pliers

These extra heavy-duty pliers are used for bending any metal wire at a 'V' shaped angle, allowing for the formation of filaments in accordance to your specification.



62185 Wire Bending Pliers, 6½" (165mm) Long each

► Wire Looping Pliers

Stainless steel wire looping pliers, enables the user to bend wire easily. The round jaws in one and the box-jointed for durability. Jaws are finely polished, one being round and the other concave



62186-10 Wire Looping Pliers, 5½" (145mm) Long each

► Master Coiler Pliers

This 'Master Coiler' is the painless pliers. It is designed to make loops and coils without nicking precious wire. Master Coiler allows one to hold the wire with the flat jaw while rotating the round jaw to form the perfect loop. Comfort grips, non-rust, highly polished stainless steel jaws and standard step-jaw for consistent loops and coils.

62186-20 Master Coiler Pliers, 5½" (145mm) Long each

► Power Max Cutters

Ergonomic compound cutters that offer the finest in compound leverage construction at an affordable price. Leverage combined with induction-hardened, high-grade steel jaws allows for extra close, flush cutting. The handles are shaped to be ergonomically and comfortably.



62187-10 Power Max Cutters, 6½" (165mm) Long each

► De-Crimper Pliers

Made from stainless steel offers one tool for both sizes: 13mm and 20mm serum vial de-crimper. An inexpensive and easy way to remove the seal from the serum vial, simply secure the seal between the jaws, squeeze the handle and twist the seal. Plastic coated handle offers comfort and ease of use.



62180-01	De-Crimper for Sizes 8 & 13 mm	each
62180-02	De-Crimper for Sizes 8 & 30 mm	each
62180-03	De-Crimper for Sizes 11 & 20 mm	each
62180-04	De-Crimper for Sizes 13 & 20 mm	each

► Magic Wands

Magic Wands are made from PEEK, a high performance plastic, with excellent chemical resistance and withstands high temperatures (up to 300°C).



Magic wand is ideal for use for electronic high-tech areas to laboratories, from preparation of samples to applying adhesives, using it as a stirring rod, or evendosing samples etc.

63323-01	Fine tip and Flat strong tip, 6" (150mm)	each
63323-02	Curved tip and flat strong tip, 6" (150mm)	each
63323-03	Flat fine tip and flat sharp tip, 5" (130mm)	each



► General Utility Repair Kit

A 25 piece tool kit. This sleek, versatile and compact general utility kit contains 25 of the most common tools to handle general utility repairs in the lab, office or in the field. Your quality kit is housed in a convenient vinyl, zipper case that folds to a convenient size of 7¾"W x 14"L x 2¾"H (O.D.)

62081 General Utility Repair Tool Kit 25 Tools Set



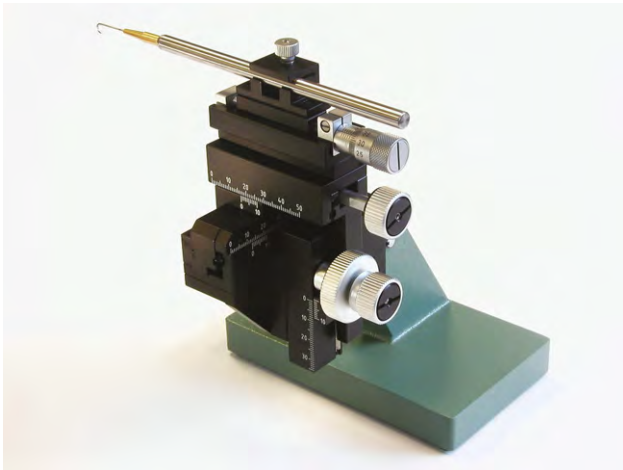
62080-20 - Deluxe Knife and Tool Set

► Deluxe Knife and Tool Set

A deluxe 28 piece set in a handsome wood case with molded storage trays. The set contains the following: a lightweight knife, medium weight knife, heavy-duty knife, awl, miter box, razor saw, sander, screwdriver and 20 assorted blades.

62080-20 Deluxe Knife and Tool Set set

► Professional Manual Micro Manipulator FX-117



This three axis micro-manipulator provides safe and efficient positioning of microtools.

All three vernier readings are graduated in 0.1mm increments. The X-axis, which holds the tool clamp with microtool, has an additional fine movement with 0.001mm graduations.

The FX117 employs rack and pinion drive, V-shaped guide ways and cross bearings, so movement is precise and repeatable. Contact parts are milled from hardened steel for optimum performance and long life. Design employs in-line control knobs clustered within a 8cm area in a single vertical plane resulting in quick and precise hand manipulation. The stand, the FX117-01 has a dovetail adapter and mounting post. The optional adapter FX115-03 (Microtool holder) can also be used.

Specifications:

Movements:	X axis fine	10mm travel	0.01mm graduations
	X axis	37mm travel	0.10mm graduations
	Y axis	20mm travel	0.10mm graduations
	Z axis	25mm travel	0.10mm graduations

Weight: 1.8 lbs (6.1 lbs with stand)

Dimensions: H 140mm (220mm with stand)
W 100mm (145mm with stand)
D 60mm (165mm with stand)

62100-15 Micro Manipulator FX-117 w/Stand each

► Stainless Steel Probes

These probes are scalpel sharp for fine probing. They are useful for many applications, such as micro positioning, solder probing, and band inspection.



62125-10	Stainless Steel Probes	4/set
62125-11	Stainless Steel Probes #1	each
62125-12	Stainless Steel Probes #2	each
62125-13	Stainless Steel Probes #3	each
62125-14	Stainless Steel Probes #4	each

► Micro Probe Handles and Interchangeable Micro Probe Tips

Micro probes are hand held microelectrodes that have been designed for the testing of the smallest micro circuits and micro miniature components.

Micro probes and handles are fully insulated and are made from black Delrin material.

Fitted to the handles are flexible electrical lead wires with standard banana plugs.

Available with red or black wire and plug termination.

Interchangeable micro probe tips are available in both a straight and bent configuration as well as in steel or tungsten with a standard 0.5mm (0.020") diameter.



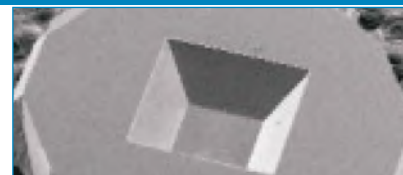
62150-1B	Single Probe Handle, Black Termination	each
62150-1R	Single Probe Handle, Red Termination	each
62151-SS	Micro Probe Tip, Steel, Straight	each
62151-SB	Micro Probe Tip, Steel, Bent	each
62151-ST	Micro Probe Tip, Tungsten, Straight	each
62151-BT	Micro Probe Tip, Tungsten, Bent	each

Check out our Most Revolutionary Products...

Introducing DuraSiN™, revolutionizing the way samples are prepared and analyzed in the transmission electron microscope.

DuraSiN™ Film and Mesh products are affordably-priced, durable, nonorganic, low scatter support grids for quantitative TEM and X-ray analysis. Unlike other support films and grids, DuraSiN™ Film and Mesh products can withstand harsh chemical and temperature environments.

For more information, see page 152-157. >>>>



SEM image of a DuraSiN™ Film (taken from the back side)



SEM image of a DuraSiN™ Mesh (taken from the back side)

► Mini-Tools; Micro-Tools

These tools are designed for anyone who is engaged in microscope work, miniature applications as well as specimen manipulation. Micro-Tools are the smallest known precision tools available for the laboratory and micro electronics industry. Micro-Tools are available in 32 different tip configurations with interchangeable handles. Micro-Tool consists of a threaded handle (MT1), and an interchangeable threaded base with tool tip. Tip material is hardened tool steel unless otherwise noted.

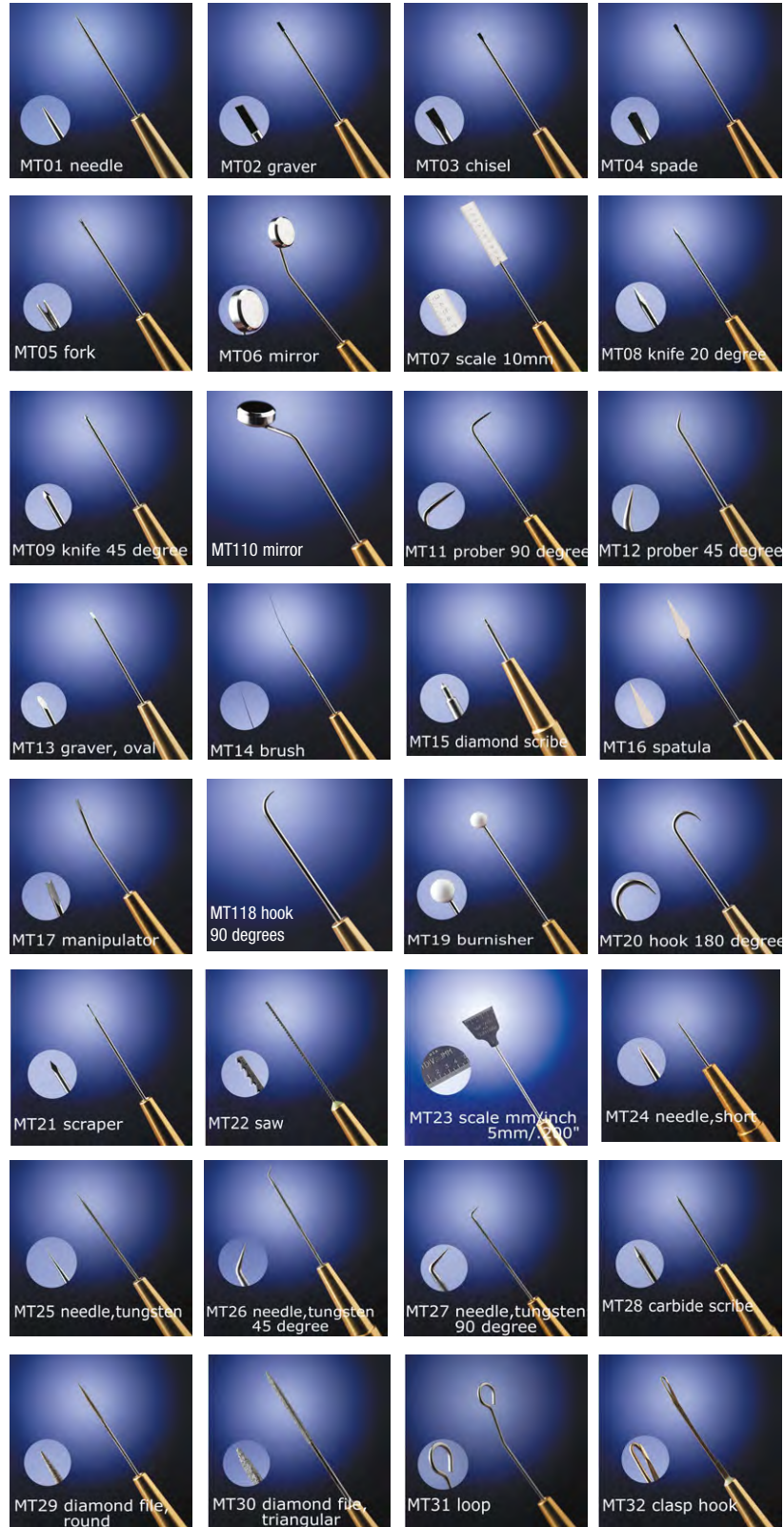
Ordering: Please specify Tip Size when ordering.

Cat.#	Description	Tip Availability			
		.025mm (.001")	.120mm (.005")	.25mm (.010")	.50mm (.020")
62091-01	Micro Needle	Yes	Yes	Yes	Yes
62091-02	Micro Graver	-	-	Yes	Yes
62091-03	Micro Chisel	Yes	Yes	Yes	Yes
62091-04	Micro Spade	Yes	Yes	Yes	Yes
62091-05	Micro Fork	-	-	Yes	Yes
62091-06	Micro Mirror	-	-	-	Yes
62091-07	Micro Scale	-	-	-	Yes
62091-08	Micro Knife 20°	Yes	Yes	Yes	Yes
62091-09	Micro Knife 45°	Yes	Yes	Yes	Yes
62091-10	Micro Mirror	-	-	-	Yes
62091-11	Micro Probe 90°	-	-	Yes	Yes
62091-12	Micro Probe 45°	-	-	Yes	Yes
62091-13	Micro Graver	Yes	Yes	Yes	Yes
62091-14	Micro Brush	-	-	-	Yes
62091-15	Micro Diamond	-	-	Yes	Yes
62091-16	Micro Spatula	-	-	-	Yes
62091-17	Micro Manipulator	-	-	-	Yes
62091-18	Micro Hook 90°	-	-	Yes	Yes
62091-19	Micro Burnisher	-	-	-	Yes
62091-20	Micro Hook 180°	-	-	-	Yes
62091-21	Micro Scraper	Yes	Yes	Yes	Yes
62091-22	Micro Saw	-	-	-	Yes
62091-23	Micro Scale	-	-	-	Yes
62091-24	Micro Needle	Yes	Yes	Yes	Yes
62091-25	Ultra Micro Needle	-	Yes	Yes	Yes
62091-26	Ultra Micro Needle	-	Yes	Yes	Yes
62091-27	Ultra Micro Needle	-	Yes	Yes	Yes
62091-28	Micro Carbide Scribe	Yes	Yes	Yes	Yes
62091-29	Micro Diamond File	-	-	Yes	Yes
62091-30	Micro Diamond File	-	-	-	Yes
62091-31	Micro Loop	-	-	-	Yes
62091-32	Micro Hook	-	-	-	Yes



62090-00 Micro-Tool Handle MT1 each

For a complete line-up of all of our Micro-Tools and Micro-Tool sets, see pages 384-387 >>>>



► Diamond Tip Scribers/Scribers

Sturdy scribers are in wide use throughout the laboratory. It leaves a permanent marking on virtually any surface, including metal, glass, or plastic. Each Scriber features a hexagonal aluminum pencil shaped body, mill finish, natural diamond tip and protective cap. Different styles are available to fit all of your needs.



► A. Straight Head:

Overall length 6", Shank Length 1/8", Handle 1/4" x 5 1/2", 60° tip finish.

70030	Straight Tip Scriber	each
70031	Straight Tip Scriber	6/lot



► B. Angled Head:

Overall Length 6 1/2", Shank 1/6" Dia. x 1/4" Long, Handle 1/8" x 6" Long, 75° tip finish.

70032	Angle Tip Scriber	each
70033	Angle Tip Scriber	6/lot



► C. Retractable Scriber:

This is a high quality chrome pen that features appearance as well as utility. The diamond is mounted in a stainless steel tip and refills are available. The tip is finished at a 60° angle.

70036	Retractable Scriber	each
70037	Retractable Scriber Refill	each

► High Precision Fine Diamond Scriber

This diamond scriber is the ultimate scribing instrument offering the most precision for the most delicate applications. It is available in straight or bent configurations.

APPLICATIONS INCLUDE:

- Fine scribing under the microscope - for silicon wafers and glass coverslips
- Precision scribing and repairing - for thin film circuits and microcircuits, etc.



These diamond mountings are 0.8mm diameter with a reduced shank size of 0.5mm or 0.25mm diameter, which holds the diamond stylus. The natural diamond has a 60° included angle and a 0.12mm tip radius. The integrated 6.35mm anodized hexagonal (non-rolling) aluminum handle has a positive finger grip in the form of grooves for easy control and non-slippage. Each diamond scriber is packaged in a protective plastic tube.

Cat. #	Configuration and Shank Size
62107-ST	Straight Mounting, 0.5mm diameter
62107-BT	Bent Mounting, 0.5mm diameter
62108-ST	Straight Mounting, 0.25mm diameter
62108-BT	Bent Mounting, 0.25mm diameter

► EMS Engraving Tool

Permanently be able to mark all of your important tools and samples. The Engraver comes with a Battery Pack and is operated on two "AA" Batteries

Our EMS Engraver Engraves Test Tubes, Bottles, Racks, Keys etc as well as anything made from glass, metal, stone as well as bone. Engravings are permanent and will not disappear in the presence of chemicals and solvents. The Engraver is 7" in Height (17.8cm)

We offer a Stand for the EMS Engraver that is made from polypropylene and it measures (3 1/2" x 3 3/8").

Cat. #	Description	Qty.
72096-01	EMS Engraver	Kit
72096-02	EMS Engraver Tool Stand	Kit



► The Glascribe® Pen

The Glascribe® Pen, with retractable tungsten carbide tip, lets you inscribe on glass, ceramics, and plastic. The pen has a pocket clip, so it is always handy when needed.

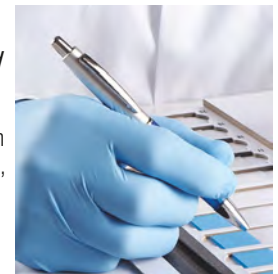


Cat. #	Description	Qty.
72151	Glascribe® Pen	each

► Tungsten Point Lab Pen

Permanently mark Glass Slides and all glass labware

These unique EMS pens have a sharp tungsten carbide tip which is able to etch glass, ceramic, and even plastic. The tip retracts for safe storage and it measures 9.8mm in diameter and the pen is 137mm long.



Cat. #	Description	Qty.
41148	Tungsten-Point Lab Pen	each

► Rotary Diamond Micro-Engraver Pen

An amazing tool that may be used to mark samples, engrave tools, indicate a sample area for finding in the SEM, deburring and so much more.

Easy to handle and control, this micro engraver is ideal for detailed engraving on almost any surface--wood, metal, ceramic, glass and more! The micro engraver features a contoured grip for comfort and control and a precision-ground stainless steel bit with a diamond point tip. This diamond-tipped ballpoint micro engraver is also as small as a pen, so it easily fits in your pocket or purse for easy transport.

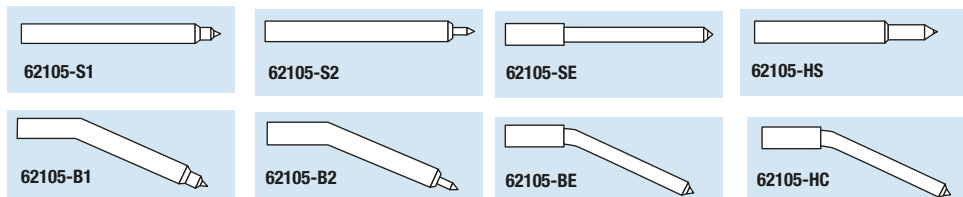
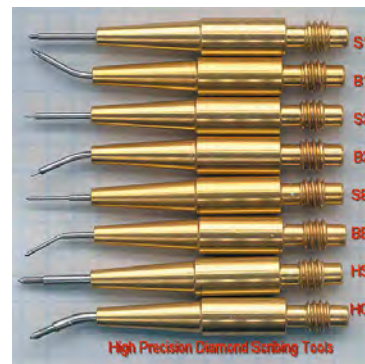
- Contoured grip for comfort and control
 - Pen-type design fits in a shirt pocket or purse and goes anywhere
 - Precision-ground stainless steel bit with diamond point tip
 - Requires two AAA batteries, included
- Measures: 6 1/4" Product Weight 1.86 lbs.

Cat. #	Description	Qty.
50465-15	Rotary Diamond Micro-Engraver Pen	each



► High Precision Diamond Scribing Tools

A newly designed diamond scribing tool set containing eight precision natural diamond scribes in various sizes and configurations. This set is perfect for precision work in microscopy. The set consists of eight diamond tips, 3 mm in diameter and are mounted in interchangeable tool cones and an MT-1 tool handle. The tool and handle are all housed in a hardwood instrument case. Individual scribes can be purchased separately.



62105-S1	Straight tip, .02" (.50mm) dia. by .06" (1.5mm) tip length	each
62105-B1	Bent tip, .02" (.50mm) dia. by .60" (1.5mm) tip length	each
62105-S2	Straight tip, .01" (.25mm) dia. by .06" (1.5mm) tip length	each
62105-B2	Bent tip, .01" (.25mm) dia. by .06" (1.5mm) tip length	each
62105-SE	Straight extended tip, .02" (.5mm) dia. by .2" (5.0mm) tip length. Good for tight areas	each
62105-BE	Bent extended tip, .02" (.5mm) dia. by .2" (5.0mm) tip length. Good for hard to reach areas	each
62105-HS	Straight, heavy duty tip, .03" (.8mm) dia. by .12" (3.1mm) tip length	each
62105-HC	Bent, heavy duty tip, .03" (.8mm) dia. by .12" (3.1mm) tip length	each
62090-00	MT-1 Tool Handle, 4.75" (112mm) long, gold anodized	each
62105-00	High Precision Diamond Scribing Tools, (8 tools & handle)	set

► Precision Pin Vise Handle and Diamond Stylus

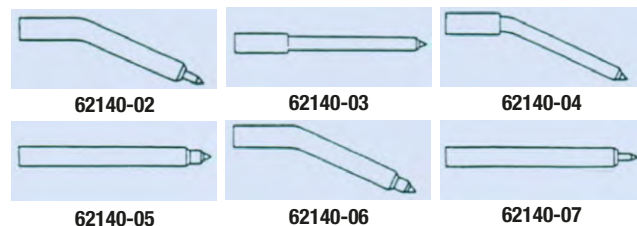
This high precision pin vise handle is machined from the finest material, non-rolling gold-anodized aluminum, which makes it lightweight and versatile. It comes complete with a precision drawbar for positive collets chuck clamping. It features an 8mm (0.31") hexagonal barrel dimension by 100mm (4") long (overall length is 115mm fully assembled) and it has a knurled finger-grip for positive precision control for handling and tool manipulation.

The vice is supplied with a standard collet chuck opening of 2mm (0.78") diameter and will hold a selection of our specially designed tools - and collets adapter 0.8mm (0.003") for diamond stylus chucking.



Cat. #	Description	
62140-00	Precision Pin Vise & Collets	each
62140-50	Diamond Stylus, 0.5mm	each
62140-25	Diamond Stylus, 0.25mm	each

Following are Diamond Scribing Tools, with a 0.80mm (0.003") diameter mounting shank, for use with above Precision Pin Vise and Collets:



Cat. #	Description and Configuration	
62140-02	Bent tip scriber, 0.010" (0.25mm) Diameter. 1.5mm tip length	each
62140-03	Straight extended tip scriber, 0.020" (0.50mm) diameter by 0.200" (5.0mm) tip length. This tool is a must for reaching into and in between high density components.	each
62140-04	Bent extender tip scriber, 0.020" (0.50mm) diameter by 0.200" (5mm) tip length. Use for tight places	each
62140-05	Straight tip scriber 0.020" (0.50mm) diameter by 0.60" (1.5mm) tip length.	each
62140-06	Bent tip scriber, 0.020" (0.50mm) diameter by 0.60" (1.5mm) tip length	each
62140-07	Straight tip scriber, 0.010" (0.25mm) by 0.60" (1.5mm) tip length	each
62140-60	Set of 6 Diamond Scribing Tools and Pin Vise	set

TOOLS FOR MICROSAMPLE MANIPULATION & MEASUREMENT

MicroTools for Crystallography

These patent-pending MicroTools™ have tips made from soft, flexible microfabricated polymer films. The curvature of the tips gives them rigidity, but they can still easily be flexed. Tools designed for use with samples from a few micrometers to millimeter in size. These tools will cause far less damage to fragile samples than metal tools, and they are optically and x-ray transparent.

Each tool is mounted on a 0.025"/0.64mm diameter non-magnetic stainless steel base. The base is fitted in a handle 0.7mm diameter, included in each kit. **General use:** for protein crystals, single cells and manipulating small samples.



► MicroTool™ Kit 1:

MicroTool Kit 1 contains 20 tools for sample manipulating and measurements.

MicroSpoon™: One each of Small, Medium, and Large sizes. Use to push, detach from surfaces, separate from a cluster, lift, and transfer. Push down to flatten tip and slide under your sample.

MicroChisel™: One each of Small, Medium and Large sizes. Use to push, detach from surfaces, separate from a cluster, lift and transfer. Push down to flatten tip and slide under your sample.

MicroLasso™: One each of Small and Large sizes. Use like a loop and lasso, pull and detach a sample from a surface.

MicroSieve™: One each of Small, Medium and Large sizes. Use to sieve samples out of solution, and to lift, transfer and soak.

MicroTip™: One 50µm diameter tip. Use to poke,

separate and lift samples. Use to reposition samples on a MicroMount or MicroMesh.

MicroGripper™:

One each of Small, Medium and Large sizes. Push down onto your sample to firmly capture it, or slide underneath your sample to delicately support it. Holds crystals rigidly without damaging them for room temperature x-ray measurements.

MicroRuler™: One 600µm wide ruler with 18µm graduation.

MicroSaw™: Two saws. Use in conjunction with a needle to cut and remove protein skins, gel, dense lipid phases and soft tissues from around your sample.



60100-01 MicroTool™ Kit 1, 20 Tools

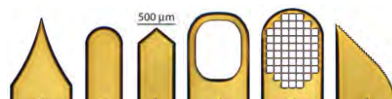
Kit

► MicroTool™ Kit 2

We separated out of the sample manipulator tools in Kit 1, modified and made them more durable. The tips of these tools are 15µm thick, so they generate more background x-ray scatter in x-ray beam than the tool in kit 1, however, they still far less background compared to other source of tools making)

MicroTip™: Two each 25 and 50 micrometer diameter tips. Use to poke, separate and lift samples. Also use to reposition sample on a MicroMount or MicroMesh. Shape is designed to minimize disturbance of surrounding liquid, while not scarifying tip rigidity.

MicroSpoon™: Two Small and one Large sizes. Use to push, detach from surfaces, separate from a cluster, lift and transfer. Push down to flatten tip and slide under your sample.



MicroLasso™: Two Small and Large sizes. Use like a loop and lasso, pull and detach a sample from a surface.

MicroChisel™: Two Small and one Large sizes. Use to push, detach from surfaces, separate from a cluster, lift and transfer. Push down to flatten tip and slide under your sample.

MicroSieve™: Two Small, two Medium and Large sizes. Use to sieve samples out of solution, and to lift, transfer and soak.

MicroSaw™: Two saws. Use in conjunction with a needle to cut and remove protein skins, gel, dense lipid phases and soft tissues from around your sample.

60100-02 MicroTool™ Kit 1, 20 Tools

Kit

► MicroTool™ Kit 3

Contain 20 tools for sample measurements. Two tools designs allow measurement of linear sample dimensions, and two allow measurement of both linear and angular dimensions. Use these tools to accurately measure small and fragile samples with minimal change of sample damage. Tool tips are 10µm thick and are both optically and x-ray transparent.

Horizontal MicroRuler™: Five 500µm wide horizontal rulers with 25µm graduations.

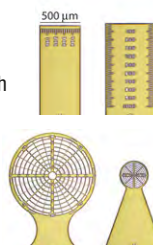
Vertical Microruler™: Five 1000µm long vertical rulers with 25µm graduations.

Small MicroProtractor™: Five 320µm diameter

tools for measuring angles and radial distances/dimensions, with 30° and 20µm graduations.

Large MicroProtractor™:

Five 1000µm diameter tools for measuring angles and radial distances/dimensions, with 15° and 50µm graduations. Use to measure facet angles on crystals, the major and minor axes of ellipsoidal samples, or to specify the polar coordinates of multiple samples on a single tool.



60100-03 MicroTool™ Kit 3, 20 Tools

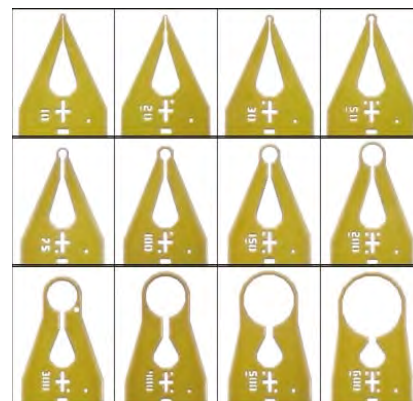
Kit

► MicroMounts™

MicroMounts™ are the highest performance tools for manipulating and mounting protein crystals, virus crystals, and small molecule/inorganic crystals, as well as all other small, fragile samples. They are ideal for both conventional and high-throughput X-ray crystallography applications.

MicroMounts™ consist of:

A thin (7.5µm thick) micro-fabricated polyimide film, attached to a solid non-magnetic stainless steel pin. Film is wrapped around the steel pin; provides excellent stiffness and convenient scoop-like action in retrieving and handling crystals.



Film Pattern:

Crystal Aperture sizes from 10 to 600µm, with minimal width around the aperture to minimize background scatter in all orientations.

Wicking Hole connected via drainage channel D to the crystal aperture. Hole size is compatible with size 15 or XF paper wicks. This 'fountain-pen'-like design, allows easier removal of excess liquid, without touching the crystals with the wick.

Alignment Cross located a fixed distance from the center of the crystal aperture. Allow easy automated alignment of the crystal aperture

Crystal Aperture Size Code around the alignment cross, allows automated recognition of Mount design, aperture, and crystal size, which determines boundaries of aperture (to be avoided), required alignment tolerance, and area of crystal available to be scanned for optimum diffraction. Initial beam size can then be automatically selected.

Aperture Size in µm can be read directly off the mount.

Orientation Mark allows the front and back of the mount to be automatically distinguished.

TOOLS FOR MICROSAMPLE MANIPULATION & MEASUREMENT

► MicroMounts™ (continued)

Pin:

Solid 316 non-magnetic stainless steel pins.

Pin is available in four standard lengths: 11 mm, 19 mm, 25 mm, and SPINE. The 11, 19, and 25 mm pin lengths, give pin base-to-crystal center distance compatible to those of nylon loops mounted on 10, 18 and 24 mm pins, respectively.

This solid pin will not suck up crystal and liquid. Pin is beveled at film end, allows good visibility of the crystals for wide range of pin orientation during crystal retrieval. Pin can be cut (with cutter pliers) to any desired length, or can be bent to place crystal in desired orientation. Pin is fitted to all standard bases

Features:

Easy manipulating and mounting of crystals from 700µm to less than 5µm.

- Rigid yet thin construction
- Convenient scoop-like design
- Gold hue – good mount crystal contrast
- Ideal for use at microfocus beamlines
- Complete optimization of cryoprotection and flash cooling
- Completely non-magnetic
- Low Thermal mass – rapid cooling
- Crystal aperture can be matched to crystal size and shape
- Easy removal of excess liquid
- Fully compatible with existing crystal mounting hardware

MicroMount™ Specifications

Pins

Length.....11, 19, 25 mm and SPINE lengths, marked in 2 mm intervals.
Diameter.....0.025" (0.64 mm) diameter
Material.....solid 316 non-magnetic stainless steel
Pin end.....beveled at 30° angle at each end

Crystal Holding Mount

Material.....polyimide
Crystal aperture sizes.....10, 20, 30, 50, 75, 100, 150, 200, 300, 400, 500 and 600µm
Thickness.....7.5, 10 and 12.5 µm
Distance from center of E to center of A.....870 µm
Distance from pin base to center of Crystal aperture.....12.1 mm (for 11 mm pins), 20.1 mm (for 19 mm pins), 26.1 mm (for 25 mm pins), 18.5 mm (for SPINE length pins)
Width of wicking hole.....250 µm (~ size 15 paper wicks)
Length tolerance.....0.5 mm for 11, 19, and 25 mm pins, 0.3 mm for SPINE pins

Ordering

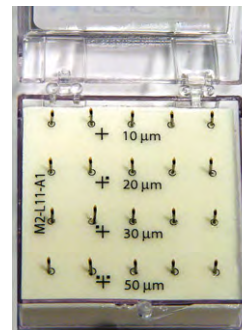
1/ Assortment boxes: We recommend initially ordering of any assortment apertures listed below, so you can match the amount aperture to the size of your crystal. Then you order the size you use the most. You can choose pin lengths from 11, 19, 25, or SPINE. These pin pins can be cut to a desired length (using cutter pliers) or bent to your orientation.

- Small (A1), includes: 10, 20, 30 and 40 µm apertures
- Medium (A2), includes: 75, 150, and 200 µm apertures
- Large (A3), includes: 300, 400, 500, and 600 µm apertures

2/ Individual MicroMount™

■ Each box contains 20 MicroMount™ with your choice of size and pin length.

In general, we recommend ordering our 19 mm or SPINE length pins. If you like copper post style goniometer bases and have been using 10 or 11 mm pins with them, consider our B3 copper post base, which accepts full 19 mm length pins.



Description	Catalog Number			
	Pin 11mm	Pin 19mm	Pin 25mm	SPINE
Assortment Box A1	60110-11	60110-19	60110-25	60110-S
Assortment Box A2	60111-11	60111-19	60111-25	60111-S
Assortment Box A3	60112-11	60112-19	60112-25	60112-S
20 each of 10µm Size	60115-11	60115-19	60115-25	60115-S
20 each of 20µm Size	60116-11	60116-19	60116-25	60116-S
20 each of 30µm Size	60117-11	60117-19	60117-25	60117-S
20 each of 50µm Size	60118-11	60118-19	60118-25	60118-S
20 each of 75µm Size	60119-11	60119-19	60119-25	60119-S
20 each of 100µm Size	60120-11	60120-19	60120-25	60120-S
20 each of 150µm Size	60121-11	60121-19	60121-25	60121-S
20 each of 200µm Size	60122-11	60122-19	60122-25	60122-S
20 each of 300µm Size	60123-11	60123-19	60123-25	60123-S
20 each of 400µm Size	60124-11	60124-19	60124-25	60124-S
20 each of 500µm Size	60125-11	60125-19	60125-25	60125-S
20 each of 600µm Size	60126-11	60126-19	60126-25	60126-S

► MicroRT™ Room Temperature Mounting System

MicroRT™ is the answer for high-throughput room temperature diffraction screening and data collection. Go from crystal in a drop to crystal in the x-ray beam at room temperature in 2 minutes with 99% change of success.

You are now no-longer dealing with inadequate low temperature diffraction quality; no-longer painfully dealing with glass capillary mounting methods; and even can't easily retrieve crystal for low-temperature data collection.

Room temperature measurements are essential to determine whether the cause is poor as –grown crystal quality, damage caused by ligand and/or cryoprotectant soaks, and/or damage caused by the flask cooling process itself.

Our patent-pending **MicroRT™** system makes collecting data at room temperature as easy as at low temperatures, and allows you to collect room and low temperature data from the same crystal.

How does it work:

First, we've replaced the standard 10µm wall glass capillaries with ultra-thin-wall transparent polyester tubing that produces 60% less background scatter. Second, we use a tubing diameter that's much larger than your crystal and MicroMount, and a base that holds both the MicroMount and capture the tubing.

To prepare the sample, just inject stabilizing liquid down into the tube toward its sealed end, using a gel-loading pipette-tip. Mount your crystal on MicroMount and insert MicroMount into the base. Thirdly, pull the tubing down over the crystal and



mount onto the base.

No more cutting, crushing and breaking. No more cracking and shattering crystals on sharp capillary edges. No more swishing crystals back and forth to position them. No more fiddling with wicks. No more wax. No more alignment problem, caused by capillary/liquid lensing.



Once you have collected your room temperature frames, just pop off the tubing, plunge the MicroMount in your choice of liquid cryogen, and you're ready to collect a low-temperature data set. Or else, soak your crystal in the next solution, pop the plastic tubing back on, and repeat until you're checked out each solution or step in your protocol.

The only disadvantage is that polyester is somewhat gas permeable. You will want to keep a good sized plug of liquid in the tube and to measure your crystals within a day of mounting to make sure they do not dehydrate. If you want to store the crystals for longer, you can replace the polyester tube with any 2mm ID glass or thick wall plastic tubing.

TOOLS FOR MICROSAMPLE MANIPULATION & MEASUREMENT

FEATURES

- Ideal for both room-temperature structure determination and for diagnosing the cause of poor low-temperature diffraction
- Easy crystal mounting
- Easy collecting of both room and low-temperature data from a single crystal
- Significantly less background x-ray scatter
- Easier crystal visualization and alignment
- Accurate and reproducible crystal positioning
- Suitable for automated alignment and data collection
- One size tubing fits all.
- Tubing is reusable™.

MICRORT™ SPECIFICATIONS

Length	.....1.5" (38 mm) (compatible with 11 – 25 mm pin lengths)
Diameter	.....0.0800" ± 0.004" (2 ± 0.1mm)
Wall Thickness	.....0.001" (25 µm)
Material	.....poly(ethylene terephthalate)
Porosity	.....Water evaporation rate through wall @ 22°C.....roughly 80 µg per hour

NOTES: Heat seal at one end. Optically clear. Some small optical distortion is due to the small thickness variations around the circumference.

Ordering

Each bottle contains 20 1.5" (37mm) long clear polyester tubes, sealed at one end, an extra –keen razor blade for cutting the tubes to a desired length, and a tiny tube of grease for lubricating the base (see our Goniometer Bases on the next page to order MicroRT compatible bases)

60130-T1 MicroRT™ Tubing Kit kit

► Goniometer Bases

These patent pending designs Goniometer Bases are unlike other bases available on market. Goniometer Bases tightly capture the MicroRT™ tubing to allow seamless room-temperature and low-temperature data collection.



B1 B1A B2/B3 B3A/B3S B4

TECHNICAL FOR GONIOMETER BASES

Materials	.....416 magnetic stainless steel (B1, B2), .....copper (B2, B3) and brass (B4)
Base diameter at bottom	.....B1 – B3: inside: 9.70 mm; .....outside: 11.95 mm; B4:3 mm
Dimension of Tubing capture region	.....diameter: 1.93 mm, length: 5 mm (4mm for B4)
Central hole diameter	.....0.81 mm
Central hole bottom-height above goniometer bead	.....B1, B3: 0.043" (1.1mm); B2: 0.358" (9.1mm)
Height of MicroMount aperture above goniometer head magnet	.....B1: 21 mm for 19mm pins; B2: 21mm for 11 mm pins; .....B3: 21mm for 19mm pins; 19.7mm for SPINE length pins

Ordering

We offer several different base styles that are compatible with our MicroRT™ tubing and with standard cryo-tools, cryo-vials, magnetic goniometer head mounts, and most automating hardware.

- Base B1 is available in two versions: B1 (with flat ledge) and B1A (without the ledge, for ALS-style grippers used at ALS, NSLS and CHESS)
- Base B2 is a copper post-style base that accepts 11/12 mm MicroMounts™. Available only with the flat ledge.
- Base B3 is available in three versions: B3 for 19 mm MicroMount™, with the flat ledge; B3A for 19 mm MicroMount™, without the ledge; and B3S for SPINE length MicroMount™, without ledge.
- B4 is a 3 mm diameter "brass pin" style base, with the smaller central hole to tightly hold MicroMount™ and an extension to capture MicroRT™ tubing.

Base B1 – B3 are available in package of 1, 3, 6, and 20.

Base 4 is available in package of 20 and 100.

NOTE: You must choose your Base when order these bases. Example: 60140-01, base B1 or base B2, or Base B3, or Base B1A, or Base B3A, or Base B3S. 60143-03, three bases, 1xB1 and 2xB3; or 1xB1, 1 xB2, and 1xB3; and so on...

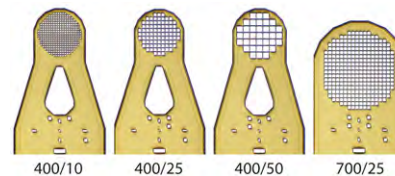
EMS #	Description	Qty
	MicroRT Compatibility	
60140-01	Type B1, B2 or B3 Base, Magnetic	1 Base
60141-03	Type B1, B2 or B3 Base, Magnetic	3 Bases
60142-06	Type B1, B2 or B3 Base, Magnetic	6 Bases
60143-20	Type B1, B2 or B3 Base, Magnetic	20 Bases
60145-20	Type B4	20 Bases
60145-100	Type B4	100 Bases

► MicroMesh™ Mounts

MicroMesh™ Mounts are the tool of choice for microcrystal crystallography and diffraction experiments, especially at micro-focus beam-lines. They have been use in de novo protein structure determination from crystals as small as 5µm. They are excellent for rods shaped crystals, and are superior to mount with elliptical apertures, because the mesh provides continuous, gentle support for rods of all sizes.

MicroMesh™ produce the smallest background scatter of any commercial mount. Their sieve-like action allows easy retrieval of sub 30µm crystals.

We offer five different sizes MicroMesh™. All are 10µm thick, with curved around tip, mounted on non-magnetic stainless steel pin as the same way as MicroMount™, producing scoop like action.



- Three of 400 µm diameter mesh area with 10, 25, and 50 µm openings

■ One of 700 µm diameter with mesh area with 25 µm openings. These four are available as single-size boxes, or in an assortment. Multiple small crystals can be retrieved and mounted together, spread out over the mesh. The diffraction properties of each crystals can be separately interrogated using a small (<100 µm) X-ray beam, so crystal heterogeneity and maximum diffraction quality yielded by a given drop's conditions can be quickly determined. This is useful in early crystallization trials when showers

TOOLS FOR MICROSAMPLE MANIPULATION & MEASUREMENT

of crystals and precipitate are obtained.

When a drop contains many crystals, two or more crystallographic forms may be present which can differ dramatically in the quality of their diffraction. The regular grid of each MicroMesh makes it easy to match a diffraction pattern with a crystal and habit. Minimal crystals can be used.

Excess liquid can be removed using size #15 liquid wicks. Mounts can be cleaned using Medium or Fine liquid wicks.

■ **The fifth MicroMesh™ Mount has an 80 µm diameter mesh area with 15µm openings.**

This small head is designed to fit entirely within the 80µm and larger X-ray beams typical of standard synchrotron beam-lines and of focused laboratory sources. Consequently, you do not have to see your tiny crystal to align it, just center the 80 µm head in the beam, and your crystal will be within it.

The smaller head also makes it easier to mount a single crystal, and produces less background scatter when the beam is aligned along the plane of the film.

Ordering

Each box contains 20 MicroMesh™ Mounts

Assortment box contain 5 each of 400/10, 400/25, 400/50, 700/25, and 800/15 MicroMesh mounts, each attached to nonmagnetic stainless steel pin. Pins are marked in 2 mm intervals, and can be cut to your desired length.

EMS #	Description
60150-xx	Assortment Box, 20 Micromesh Mount
60151-xx	20 - 400µm Diameter, 10µm openings
60152-xx	20 - 400µm Diameter, 25µm openings
60153-xx	20 - 400µm Diameter, 50µm openings
60154-xx	20 - 700µm Diameter, 25µm openings
60155-xx	20 - 80µm Diameter, 15µm openings

NOTE: to specify the pin length, substitute xx with the Pin Length: 11mm, 19 mm, 25 mm, or SP for SPINE). Example: 60150-11 for pin length 11 mm; 60153-SP for SPINE pin length.

► Liquid Wicks

These paper wicks offer a great deal of absorbency with its small tip that foam-tipped or cotton-tipped applicators can not substitute. These wicks are available sizes: 15, extra fine (XF), fine (F), and Medium (M).

Size 15 wicks fit the wicking aperture of MicroMounts, and are ideal for removing residual liquid from your crystal and mounts.

Size Medium (M) and Fine (F) wicks are ideal for cleaning MicroMount

The thick end of these wicks fit into standard 0.7mm mechanical pencil.

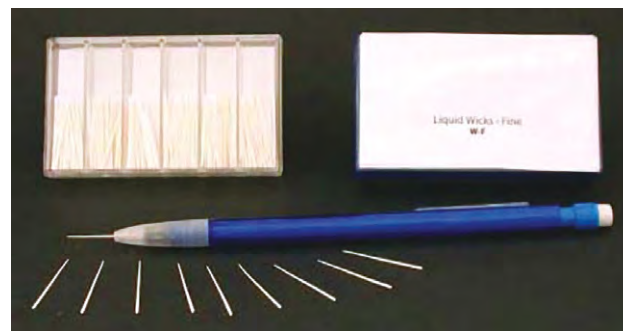
Ordering

Each box contains 300, 28mm long high quality, tapered paper wicks.

Order size 15 and Extra Fine (XF) for removing liquid formed around your crystal.

Order sizes Fine (F) and Medium (M) wicks for cleaning MicroMounts.

EMS #	Description	Qty
60160-15	Size 15 Liquid Wicks	300
60160-XF	Size Extra-Fine Liquid Wicks	300
60160-F	Size Fine Liquid Wicks	300
60160-M	Size Medium Liquid Wicks	300



► LV CryoOil™

Oils are widely used in crystallography – as cryoprotectants when samples are flash cooled, and as barriers to the dehydration, solvent evaporation, and oxidation, that may occur in air near and above room temperature. The ice ring seen in the diffraction pattern of flash cooled protein crystals arise primarily from crystallization of the aqueous solution surrounding the crystal, not of the internal solvent. Oils can displace and replace this surrounding solution with little risk of damage due to osmotic shock.

Substantial dehydration-induced damage can easily occur between removed from a drop and flash cooling. Dehydration can be minimized by first transferring to an oil drop (using MicroSieve™, in MicroTool kit 1 and MicroTool Kit 2) before mounting the oil coated crystal on a MicroMount or Micromesh.

However, surrounding oil scatters X-rays, reducing diffraction signal-to-noise, and contributes thermal mass that reduces crystal cooling rates and increases the need for penetrating cryoprotectants. These problems are especially acute for the smallest crystals. When mineral oil, Paratone Oil and other high viscosity oils are used, the volume of surrounding oil can exceed the crystal volume by a factor of 10 or more., and can contribute excess drag that increases sample motion in a cryostream. For larger rod or plate shaped crystals, the surrounding oil exerts stresses when it freezes that can cause crystal cracking and mosaic broadening.

LV CryoOil™ is the best solution to your oil needs. It has the lowest viscosity of any available perfluoropolyether oil (1/10 that of Paratone oil and compatible to that of vegetable oil) and very low surface tension (less than 1/3 that of water). Consequently, a dip in this oil followed by gentle tapping to shake off excess can yield protective oil films on your crystals of as little as 10 µm thick.

LV CryoOil™ has extremely low vapor pressure, excellent chemical inert and excellent thermal stability.

Ordering

LV CryoOil™ comes in each vial 1.5 ml, enough to protect hundreds of crystals.

60166 LV CryoOil™ 1.5 ml



Disposable Tools: Earth-Friendly Sampling Tools

Minimize environmental impact with 100% plant-based PLA (polylactic acid) resin sampling tools. Commonly used in water bottles and food packaging, PLA resin has a proven lower carbon footprint than traditional plastic resins. Users truly do make a difference when they choose Earth-Friendly Spoons and Sticks for their work.

PLA resin is derived from naturally occurring sugar in fast growing plants like field corn. The growth of these plants and the manufacture of PLA resin uses up to 50% less nonrenewable energy and results in up to 60% less greenhouse gases than equivalent petroleum-based plastic resins.

Making everyday products with less environmental impact can benefit everyone now and in the future.

As part of a species that plans to be here for a long time, we think that's important, and hope you do too!

FEATURES:

- Made with 100% PLA resin, a material made from annually renewable plant resources
- Lower environmental impact from cradle to grave
- Offer multiple disposal options including industrial composting for biodegradability, incineration, recycling and landfill
- Help companies meet sustainability goals
- Non-sterile FDA grade material safe for food, drug and cosmetic contact
- Comparable strength and durability to polystyrene, polypropylene and other plastic resin sampling tools



► Earth-Friendly Long Handle Sampling Spoons

Long-handled spoons are ideal for acquiring samples from bottles, jars and other confined areas and helping to avoid personal contact with sample materials. A flat edge on the rim of each bowl allows fast leveling to collect and measure small amounts with accuracy. Available in three bowl sizes, each spoon is 17.8cm (7") overall length. Non-sterile and translucent in color.

Cat. #	Description	Qty.
72131	Sample Spoon 1.23 ml (¼ Tsp)	10/Pack
72132	Sample Spoon 2.46ml (1/2 Tsp)	10/Pack
72133	Sample Spoon 4.93 ml (1 Tsp)	10/Pack



► Earth-Friendly Wide Handle Sampling Spoons

Perfect for retrieving small, specific volume samples of powders or liquids. Wide handles let you grip firmly and provide just enough stiffness to easily sample packed powders and other firm materials. Their unique flat bottom shape allows convenient dual use as weighing boats to save time and assure accuracy. Non-sterile and translucent in color.

Cat. #	Description	Qty.
72134	Wide Handle Sampling Spoons 1.25 ml	10/Pack
72136	Wide Handle Sampling Spoons 2.5 ml	10/Pack
72137	Wide Handle Sampling Spoons 5 ml	10/Pack
72138	Wide Handle Sampling Spoons 8 ml	10/Pack
72139	Wide Handle Sampling Spoons 20 ml	10/Pack



► Earth-Friendly Sticks

Whether you are mixing samples, handling capsules, scraping containers, or positioning solid samples under examination, these Sticks are ready to assist! Non-sterile and translucent in color. The sticks measure 14.6 x 1.9 x 0.15cm (5¾ x 3/4 x 1/16")

Cat. #	Description	Qty.
72143-10	Earth Friendly Sticks	100/Pack
72144-11	Earth Friendly Sticks	500/Pack



72988



72989

► Vibrating Spatula

A toothed wheel is turned by a finger making the spatula blade vibrate. This action allows for accurate adding of material. Plastic handle, stainless steel blade with PTFE coating. Style 1 is 7" (19cm) long, large blade.

Style 2 is 8¼" (21cm) long, small blade.

72988	Vibrating Spatula 1	each
72989	Vibrating Spatula 2	each



72983

► Balance Spoon

Stainless steel with PTFE coating. One end has a square trough, which holds about 1cc. 26.7" long.

72983	Balance Spoon	2/pk
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► Lab Spoon

5/32" (4mm) diameter stainless steel rod, flattened at one end to give a 8x51mm blade. The other end has a 13x25mm spoon. The blade as well as the spoon is coated with PTFE. Overall length 9" (229mm).

72987	Lab Spoon	each
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► Ellipso-Spoon® Samplers

Its unique shape means no more material loss!!!!

This utensil's specially curved shape permits contact with all corners of bottles and containers; therefore, no loss of material occurs. Crystals, powders, granulated and solid substances, and even thick liquids are easily retrieved and never fall back into the container. The Ellipso-Spoon® Sampler has a spoon end and a spatula end and is made from polished stainless steel.

Cat.#	Description	Length	Pack
72984-15	15x15mm Spoon, 5mm Dia Handle	15cm	each
72984-21	15x15mm Spoon, 5mm Dia Handle	21cm	each
72984-30	28x65mm Spoon, 8mm Dia Handle	30cm	each



► Flexible Spatulas

This is a sword type spatula, made from stainless steel with a wooden handle. This spatula is very thin and has bendability toward the end and very stiff towards the handle. It offers flexibility when working with soft materials, such as embedding waxes. The overall length is 6¾"

63321	Flexible Spatulas	each
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► Mixing Spatulas

Made from polished stainless steel. They are ideal for applying wax to glass knives, colloidal adhesives to stubs, and for mixing embedding resins.



62127-10	Stainless Steel Spatula Set	4/set
62127-11	Stainless Steel Spatula #1	each
62127-12	Stainless Steel Spatula #2	each
62127-13	Stainless Steel Spatula #3	each
62127-14	Stainless Steel Spatula #4	each

For our complete line of Micro Tools and accessories, See Materials Science, pages 384-388 <<<<<

► Stainless Steel Spatulas

We offer a selection of stainless steel spatulas - a "must tool" when handling embedding wax.



63320-03	SS Spatula 3" Long x ⅞" Wide Blade	each
63320-04	SS Spatula 4" Long x 1½" Wide Blade	each
63320-05	SS Spatula 5" Long x 1¾" Wide Blade	each
63320-06	SS Spatula 6" Long x 7⁄8" Wide Blade	each
63320-08	SS Spatula 8" Long x 1⅞" Wide Blade	each
63320-10	SS Spatula 10" Long x 1⅞" Wide Blade	each
63320-12	SS Spatula 12" Long x 1½" Wide Blade	each



► Micro Spatula

PTFE coated nickel stainless steel wire with flat ends.

0.105" (2.7mm) dia.x8¼" (210mm) long. Tapered to ⅛" (3mm).

72980	Micro Spatula Tapered End	2/pk
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0.156" (4mm) dia.x7¼" (184mm) long.

72981	Micro Spatula	2/pk
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0.156" (4mm) dia.x7¼" (184mm) long, tapered to ⅛" (0.8mm).

72982	Micro Spatula Tapered End	2/pk
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► Micro Spoon and Spatulas



► Micro Spoon with Resin Coated Handle

A micro spoon and spatula made from nickel stainless steel and coated with a glazed finish resin on the handle. The wire is 0.103" (2.62 mm) in diameter. Overall length: 6½" (165 mm). The spoon end length: 1" (25 mm) x ¼" (6.35 mm) wide.

Cat.#	Description	Pack
62410-01	Micro Spoon with Resin Coated Handle	each
62412-01	Micro Spatula PTFE Coated End	each



► Micro Spoon Heyman Type A

A Heyman type micro spatula made from nickel stainless steel with a glazed finish. The wire diameter is 0.103" (2.62 mm). Overall length: 6¼" (159 mm). Flat end: 1¼" (31.35 mm) long. The spoon end: ½" (12.5 mm) long x ⅛" (3 mm) wide.

Cat.#	Description	Pack
62411-A	Micro Spoon Heyman Type A	each



► Micro Spoon Heyman Type B

A Heyman type micro spatula made from nickel stainless steel with a glazed finish. The wire diameter is 0.103" (2.63 mm). Overall length: 6¼" (159 mm). Sharpened bent end: 1½" (37.5 mm) long. V-Shaped formed other end: ½" long.

Cat.#	Description	Pack
62411-B	Micro Spoon Heyman Type B	each

► Heated Forceps/Tweezers System

This forceps warmer system is digitally controlled and allows for two pairs of forceps to be used simultaneously. The temperature of each pair of forceps can be set individually by an easy-to-read keypad. The unique design ensures that the arms of the forceps are always proportionately cooler than the tips, making them more comfortable to use.



The system consists of a low profile unit with an easy-to-read digital display and keypad and is powered by a multi-voltage power supply. The system and the forceps are supplied separately. The forceps are available in three sizes – 1 mm (red), 2 mm (yellow), and 4 mm (blue).

Specifications:

Dimensions:	125mm (W) x 200 mm (Depth) x 90 mm (H)
Temperature Range:	60 – 70°C
Power Supply/Rating:	100 – 240V, 50/60Hz
Weight:	750 g

Cat. #	Description	Tip Size	Length of Forceps
63202	Forceps/Tweezers System only	—	—
63202-01	Forceps/Tweezers	1 mm	150 mm
63202-02	Forceps/Tweezers	2 mm	150 mm
63202-04	Forceps/Tweezers	4 mm	150 mm



► Forceps Warmer

This forceps warmer is indestructible: An all metal, space saving unit. Three heated wells prevent wax build-up and allow for easy tissue orientation at the embedding centers.

63201-10	Forceps Warmer, 100-120 VAC, 50/60Hz, 0.5A; 5"W x 3½"D x 3" H	1
63201-20	Forceps Warmer, 220-240 VAC, 50/60Hz, 0.25A; 5"W x 3½"D x 3" H	1

► A Third Hand With Tweezers

These multi-positional self-closing tweezers allow both your hands to be free. It holds objects as if you had a third hand. Its heavy base prevents sliding. It is ideal for soldering.



62122-01	Third Hand With Tweezers	each
62122-04	Tweezers Only	each

► Demagnetizer

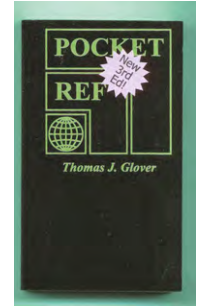
A Swiss made, powerful and compact demagnetizer unit. It demagnetizes tweezers and small tools within seconds. 110-120 VAC, 50/60 Hz. Measurement: 95x60x30 (3¾"x2½"x1½").



62083	Demagnetizer	each
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► Pocket Reference Book

Compiled by Thomas J. Glover, 2nd edition. Sequoia Publishing Inc. A book with thousands of hours of research and hard work. This book contains almost every information that one needs to know, right on the fingertip, without searching hour after hour. Book measures 5½" x 3¼" x ⅝" thick with 542 pages and a soft cover.

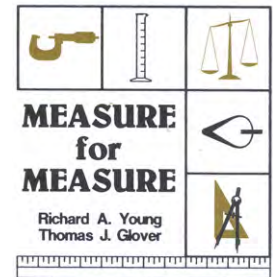


31210	Pocket Reference Book	each
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► Measure for Measure

At last, a GREAT Conversion Factor Handbook!

- THE conversion factor handbook - 864 pages worth.
- Contains over 39,000 conversions for over 5100 different Units.
- Comprehensive SI reference (the International Standard)
- Thousands of foreign and ancient conversion factors.
- Accurate to 8 significant figures.
- Value listed in both standard and scientific notation.
- Handy 4"x6" size with a durable Lexotone cover.
- Nothing else like it on the market today
- A MUST for everyone!



31200	Measure for Measure Book	each
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► Scientific Calculator, Solar

Highly efficient solar panel requires only 50 lux, works with any available light. Will never need batteries. 10 digit LCD + 2 digit exponent. 15 levels of parenthesis. 67 functions including all the preprogrammed functions of Large Display Scientific Calculator 830003 plus; binary, octal decimal, sexagesimal, and hexadecimal conversion, and standard deviation. Comes with a soft carrying pouch, instructions and a button cell battery.



Dim: 5¼" x 2¼" x ⅞" (133 x 70 x 11 mm).

Weight: 2 oz (57 g).

70090	Solar Scientific Calculator	each
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► Metric Converter

Automatically converts English to metric and metric to English for measurements of volume, area, length, temperature, or weight. Three programmable keys store any additional conversion factors that are desired. 8 digit LCD. Can function as a standard calculator. Comes with a compact hard folding case, full instructions and a button cell battery. Measurements: 4¼"x2½"x½". Weight: 2oz.



70092	Metric Converter	each
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► Checker®

Modern Substitute for Litmus Paper with Replaceable Electrode

The industry's latest electronic pH tester Checker® supplies you with fast and accurate readings on a large LCD. Unlike other pH testers, the Checker® electrode can be changed and any pH electrode of different shape or size can be used. Checker® is also suitable for checking electrodes in pipes and tanks and various laboratory applications. The Checker® pH testers now include standard gel-filled electrodes with built-in BNC or screw type connectors.

Features:

- Large and easy-to-read LCD.
- High accuracy with 0.01 pH resolution.
- Two point fast and accurate calibration.
- Usable with virtually any pH electrode.
- Battery life: 3,000 hours of continuous use.
- Wide range: 0.00 to 14.00 pH.
- Replaceable pH electrode.

Order your Checker® in accordance to your needs and the type of electrode which is most suitable for your application:

- Checker® 1: Stick model Checker®, with replaceable HI 1270 screw-type, combination pH electrode.
- Checker® 2: Stick model Checker®, with replaceable HI 1207 professional full-length gel-filled pH electrode and screw-type connector.



Specifications of both Checkers®

Range	.....0.00 to 14.00 pH
Resolution	.....0.01 pH
Accuracy (@20C/68F)	.....± 0.2 pH
Typical EMC Deviation:	.....± 0.1 pH
Calibration	.....Manual 2 points through trimmers
Battery Type / Life	.....2 x 1.4V / 3000 hours
Environment	.....0 to 50°C (32 to 122 F); RH 95%
Dimensions (Meter only)	.....66 x 50 x 25mm
Weight (Meter only)	.....70 g (2.5 oz)
Combination pH Electrode for Checker®	

Ordering:

70699-01	Checker® 1 Complete with HI1270	each
70699-02	Checker® 2 Complete with HI1207	each
70700-01	HI 1270 Replacement Electrode	each
70700-02	HI 1207 Replacement Electrode	each

Model #	Junction*	Shape**	Plug	Pressure Bar/PSI	Temp. Range °C	Body	Cell
HI 1270	D	SA	Screw	0.1/1.45	0/+50	Polypro	Viscolene
HI 1207	A	SC	Screw	1.5/21.75	0/+80	Utem	Gel

*D: Free Diffusion Layer

** SA: Sphere, 3.0mm Diameter; SC: Sphere, 7.5mm Diameter

► Piccolo Plus pH Meter

A new Improved 0.01 pH Accuracy, Replaceable probe & Temperature Read-out

Piccolo is a revolutionary pH-meter with a 4-in-1 "Electrode + Amplifier" design. Conventional pH meters are susceptible to the weak high impedance signal which makes the electrode, connector, cable and meter delicate and vulnerable to noise, humidity and dirty environments. Piccolo has overcome these problems with a pre-amplified electrode delivering a strong signal to the meter.

Piccolo has the same precision as a lab-grade meter with a resolution and accuracy of ±0.01 pH, at a fraction of the price.

Piccolo Plus comes complete with a 4-in-1 Ph electrode, pH 4 and pH 7 buffer solutions, a small calibration screwdriver in a rugged carrying case.

Specifications:

Range:	.....pH/°C 1.00 to 13.00 pH/0.0 to 70°C
Resolution:	.....pH/°C 0.01 pH/0.1°C
Accuracy:	.....pH/°C (@20°C/68°F) ±0.01 pH/ ±1°C
Typical EMS Deviation:	.....pH/°C ±0.2 pH/ ±1°C
Calibration:	.....Manual 2 points through trimmers
Battery Type/Life:	.....3x1.4V/100 hours approx. continuous use
Environment:	.....0 to 50°C (32 to 122°F); RH 95%
Dimensions:	.....265 x29x15mm (10.4x1.2x0.6")
Weight	.....400g (14.1 oz) with carrying case

Features:

- Easy to use: Battery operated and weighing only 100 grams.
- Replacement Electrode: The detachable electrode has sealed electrons to protect from humid and dusty environments.
- Automatic Temperature Compensation (ATC): A temperature sensor housed in the electrode provides ATC from 0 to 70°C (32 to 144°F)
- Temperature Read-out: A thermometer built inside a pH meter! Accurate temperature read-out directly on LCD.



70694	Piccolo Plus pH Meter Set	each
70695	Replacement pH Electrode HI 1295	each
70696	Calibration Kit, pH 7&10, 20ml	5 pcs each
70696-02	Calibration Kit, pH 4&7, 20ml	5 pcs each
70697	Buffer Solutions, pH 4.01 & 7.01 (2x230ml)	set
70698	Storage Solution, 230ml	each

► pH Indicator Papers - Test Papers

► 1. pH-Fix™ Universal Indicator Sticks



In contrast to conventional indicator papers, the indicator dyes of pH-Fix sticks are substantially bound to the cellulose fibers. As a result, the possibility of the color bleeding, even in strongly basic solutions, is avoided. Furthermore, there are the following advantages:

- Measurement of pH value is possible even in unbuffered or very weakly buffered solutions, since the sticks can be left in the solution until the final color change is completed.
- Test samples are not contaminated by the indicator dyes.
- Colors of the individual color fields cannot run into each other, thereby allowing for a more precise comparison with the color scale.
- Recently developed indicator dyes guarantee a sharp differentiation between the individual pH values and a clear and easy comparison to the color scale.
- Sample application - four different indicator papers 6x5 mm are sealed on to a plastic strip 6x85 mm. The strips are sufficiently long to avoid contact between the fingers and the test sample.

Cat.#	pH Range	pH Gradation	Pack
65510-10	0.0 - 14	1.0	100/bx
65510-15	0.0 - 6.0	0.5	100/bx
65510-18	2.0 - 9.0	0.5	100/bx
65510-20	4.5 - 10	0.5	100/bx
65510-25	7.0 - 14	0.5	100/bx
65510-30	0.3 - 2.3	0.3/0.4	100/bx
65510-35	1.7 - 3.8	0.3	100/bx
65510-40	3.6 - 6.1	0.3/0.5	100/bx
65510-45	5.1 - 7.2	0.3	100/bx
65510-50	6.0 - 7.7	0.3/0.4	100/bx
65510-55	7.5 - 9.5	0.2/0.4	100/bx
65510-60	7.9 - 9.8	0.2/0.4	100/bx

pH-Fix™ Indicator Sticks are packed in a box of 100 sticks 6x85 mm.

► 2. PEHANON® pH Indicator Strips



This is a series of pH indicator papers where the indicator and color scale are combined on a single strip. They permit a fast, convenient and accurate pH value determination since they eliminate the necessity to compare color against a separate scale. This presentation also permits the pH measurement of colored solutions and suspensions, since the color of the test solution acts on the comparison scale in the same manner as on the indicator field. The PEHANON® series covers the entire pH range from 0 to 12 with one universal paper and 13 narrow ranges which overlap to permit the user utmost selectivity for the range suited to each particular need.

The indicator zone (unprinted field) is in the center of the strip, the comparison fields above and below same. The strip is submerged in the solution for about three seconds so that all colors zone are wetted whereby the center field changes color according to the pH value of the solution and is then compared against the color field bearing the corresponding pH value imprint. An invisible hydrophobic barrier just above the top color field prevents capillary action of the test solution beyond that point and corrosive, toxic or otherwise noxious liquids do not come in contact with fingers which remain clean and dry.

Strips are packed in a plastic box, containing 200 strips.

Cat.#	pH Range	pH Gradation	Pack
65511-01	1.0 - 12.0	1.0	200/bx
65511-11	0.0 - 1.8	0.2/0.3	200/bx
65511-12	1.0 - 2.8	0.2/0.3	200/bx
65511-13	1.8 - 3.8	0.2/0.3	200/bx
65511-14	2.8 - 4.6	0.2/0.3	200/bx
65511-15	3.8 - 5.5	0.2/0.3	200/bx
65511-16	4.0 - 9.0	0.5	200/bx
65511-17	5.2 - 6.8	0.2/0.3	200/bx
65511-18	6.0 - 8.1	0.3	200/bx
65511-19	7.2 - 8.8	0.2/0.3	200/bx
65511-20	8.0 - 9.7	0.2/0.3	200/bx
65511-21	9.5 - 12.0	0.5	200/bx
65511-22	10.5 - 13.0	0.5	200/bx
65511-23	12.0 - 14.0	0.5	200/bx

► **Anemometer**

Perfect for use in fume hoods, environmental studies, or for air flow check. A highly accurate, hand-held unit, only 3 ozs. Allows you to select readout in knots, feet per minute, meters per second, or miles per hour. To insure maximum sensitivity and accuracy, the turbine is suspended on sapphire jewel bearings, and its rotation is sensed by an infrared light beam, which adds no friction. The resulting signal is processed electrically by an LSI (Large Scale Integrated) circuit. Powered by 3 "AAA" batteries included. Measurements: 4.5"x2.5"x1.5".



72082 Anemometer each

► **Humidity/Temp Monitor**

A dual monitor for temperature and humidity in one compact and large 3/4" digital display unit. Useful for desiccators, incubators, refrigerators, fume hoods, EM labs, stock rooms, clean rooms, chemical storage areas, warehouses, etc. Recalls min/max temperature and min/max humidity readings over any time period. Stand or wall mounted. Comes with two "AAA" batteries which last one full year. Temperature range 0/50°C and 32/122°F in 1°C or F resolution with an accuracy of +/-5%RH (at 59°F to 104°F). Dimensions: 3/4"x2 1/2"x1/2". Weight: 2.8 oz.



72085-01 Humidity/Temp Monitor each

Temperature Tester; Temp-Pen See page 851 >>>>

► **FreezGuard™ Alarm**

Alarm will Sound for Up to Three Days

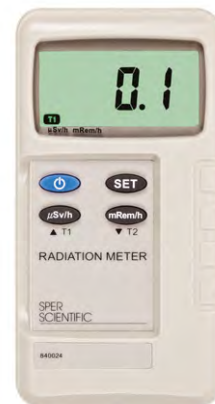
Prevent costly, time consuming sample loss with this practical battery operated system. The FreeGuard™ Alarm monitors freezers and coolers and detects any variance from temperatures between -20°C and 13°C (-5°F to 55°F), ±1°C, which are preset by the user. The resonant alarm will continue to sound for up to three days if the temperature falls out of the pre-set range. Should the temperature correct itself, an LED will indicate that a variance has occurred. The alarm can be reset manually. A beep will signal when the 9V battery (not included) is low. For added protection, and extra life, a second battery can be connected. The unit mounts with self-adhesive tape or screw. Unit comes with a 3 meter probe lead, and measures 86 W x 35 D x 26 mm H (3 5/16" x 1 1/2" x 5 1/16"). The weight without the battery is 144 g (5.1 oz).



72092-10 FreezGuard, Celsius Each
72092-20 FreezGuard, Fahrenheit Each

► **Digital Radiation Meter**

Small, light weight; sensitive enough to detect miniscule amounts of gamma, beta, or X-rays. Excellent for scanning lab work areas and clothing for trace of radioactivity after clean-up or as a personal monitor in areas of potential radiation exposure. Uses a Geiger Mueller tube detector calibrated in accordance with NIST and NRC Standards and regulations. The meter registers from 0.1 to 10 mR/h (mili Roentgen). Audible clicking will increase with the amount of background radiation. Beeping begins at 20mR/h increasing in frequency in proportion to the radiation level. Powered by a 9-volt battery (included). Measurements: 6 5/8"x3 1/4"x1 3/8". Weight 8.5 oz.



72084 Digital Radiation Meter each

► **eCount**

Precise Electronic Counter and Sharpie® Marker Combined in One



- Save** - Power off button helps save battery life
- Verify** - Each count verified with a beep or LED flash
- Accurate** - Count up and then count down to verify count accuracy
- Easy To Read** - Display up to 32 counts
- Memory** - Keep up to 32 different counts in memory
- Secure** - Disable counter and use the marker to write notes and totals

Cat.#	Description	Unit
70309-01	eCount	Each

► **Count Up - Count Down Timer**

Count up or down for 100 hours in intervals of 1 second. In the count down mode its unique feature tells you how much time has elapsed after the alarm sounds. Its memory allows for the repeat of a cycle just completed. Alarm clock mode. It comes complete with a built in stand, pocket clip, button cell battery, and magnet. Dimensions: 2 3/4"x2 3/4"x1/2". Weight: 1.8 oz. The timer is also available with a N.I.S.T. traceable certificate of compliance.



72603	Count Up-Count Down Timer	each
72603-02	Count Up-Count Down Timer, Certified	each

► Time Tracker: Regular and Mini

The Standard unit makes it easy to monitor your process from a distance! Designed like a traffic signal so the meaning of each light is intuitive. Green light means less than half done, yellow means more than half done, and red means finished. Program the time and select from six different audible alerts. Two-line LCD with 8 mm high characters, 10 characters across. Operates on 110 VAC adapter (included). The unit measures 112 x 118 x 230 mm.



BASIC FEATURES:

- Programmable time
- Six different audible alerts with LCD display
- LCD with 8mm high characters, 10 characters across

The Mini unit is based on the original but it is more economical and easy to use

- Total alarm ranges from 5 to 120 minutes in 5 minute increments
- Visual indicator features lighted dome. Green Light during countdown; yellow for the designated "warming" time; red when time has expired
- Volume control and audible warning alarm
- Requires 3 AAA batteries, not included

The unit measures 83 x 83 x 121mm

Cat. #	Description	Qty.
41150-10	Time Tracker	each
41150-20	Time Tracker Mini	each

► Talking Timer

A unique timer featuring a clear human voice that makes announcements which can be heard from any where within the lab. In the count-down mode, Talking Timer will announce the remaining time every hour. In the final hour, it will announce the time remaining every 10 minutes, every minute in the final 10 minutes, and every second in the final 10 seconds. A choice of 6 distinctive final alarm sounds make it easy to identify which Talking Timer has alarmed should you wish to use more than one. In the dark, in the clock mode, you can touch any button and the Talking Timer will announce the time. You also have the option of turning the voice off.

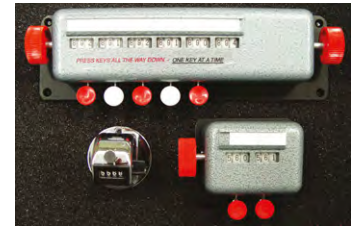


Other features include a large $\frac{3}{4}$ " display with icons to indicate various modes, such as voice off/on, count-down/count-up, etc. Recalls the previous count-down setting for immediate reuse and memorizes other frequently used setting for reuse at any time. Counts up or down to 24 hours. Has a built in stand for bench top use, clips to a pocket, or sticks to any metal surface with a magnetic back. Button cell batteries are included. Measures: $3\frac{3}{4}$ "x2 $\frac{1}{2}$ "x1". Weight 2.2oz. The timer also available with a N.I.S.T. traceable certificate of compliance.

72601-01	Talking Timer	each
72601-02	Talking Timer Certified	each

► Desk Tally Counter – Lab Counters

A. One Counting Unit – A chrome plated with counter with a flange (2 $\frac{1}{2}$ " dia.) for desktop mounting. The recording lever is on the right side and the reset knob on the top. The counter is ideal for serial sectioning work. Four digit place.



70310 One Counting Unit Tally Counter each

B. Two Counting Units - A Counter with two counting keys each with 0 to 999 range with a single reset knob it comes with removable tabs for top identification.

70310-02 Two Counting Unit Tally Counter each

C. Six Counting Units - A counter with five keys and one totalize unit (0 to 999), which records the total number of strokes made on other keys. At 100 increments, totalizing unit rings bell. When totalizing unit records 100, each figure corresponding to individual keys automatically displays percentage. Two reset knobs, removable tabs on top of counter provide area for identification of classification being counted.

70310-06 Six Counting Unit Tally Counter each

► Stop Watch; Large Display

Very accurate with a click stop control button. Large LCD display. Rugged ABS plastic case. It counts up to 60 minutes in 1/100th second resolution. It also has a split interval clock and calculator functions. Comes complete with a leatherette case. Measures: 3"x2 $\frac{1}{2}$ "x $\frac{1}{4}$ ". Weight: 2.6 oz.

72091 Stopwatch each



► 5 Channel Timer

4 independent channels each of which counts up or down for any interval from 1 second to 100 hours. Its extra large display indicates channels that are in use. Each one has a distinctive 1 minute alarm. Automatically begins to count up to indicate time elapsed after count down reaches zero. Its memory recalls last timer setting for reuse. Also has a clock mode. Comes complete with a stand, pocket clip, and magnet. Dimensions: 2 $\frac{1}{8}$ "x2 $\frac{1}{2}$ "x $\frac{3}{16}$ ". Weight: 2oz. The timer is also available with a N.I.S.T. traceable certificate of compliance.

72600 Timer, 5-Channel each

72600-02 Timer, 5-Channel, Certified each



Darkroom Timer, see Photography Section, page 740 >>>>

► Temperature Tester; Checktemp 2

Checktemp 2 is a high accuracy thermometer with a folding 110mm long probe. The probe has been specially designed to fold at different angles for measurements in difficult places. Checktemp 2 utilizes a hightech NTC thermistor sensor to measure the temperature. Unlike most other electronic thermometers, Checktemp 2 has a unique Calibration Check feature. Simply open the battery compartment and turn the Cal-Check switch on. The display will show a value between -0°C and +0.3°C. This means your meter is still within specifications of +/-0.3°C. Checktemp 2 is destined to make glass thermometers obsolete. Glass thermometers contain lead and the measurement media is either mercury or alcohol. These materials are undesirable in today's work place.

Specifications:

Range:	50.0 to 150°C	Environment:	0 to 50°C, RH 95%
Resolution:	0.1°C	Dimensions:	150x30x20mm (5.9x1.2x0.8")
Accuracy at 20°C:	+/-0.3°C (-20-90°C)	Weight:	60g (2.1 oz)
Typical EMC Deviation:	+/-0.3°C	All Checktemp 2 comes with 1.4V battery.	
Probe:	Folding, 110mm (4.33") x3mm (0.12" dia.)	Factory Calibration Certificates: Checktemp 2 can be calibrated against NIST standards.	
Battery Type/Life:	1x1.4V/3000 hours		
.....Approx. continuous use			

72086-02	Checktemp 2 Complete	each
72086-2C	Checktemp 2 Complete w/certificate	each



► Microwave Leakage Detector

Evaluate the RF emissions of mobile phone, radio and TV transmission towers, wireless camera, Wi-Fi and LAN detection and installation, microwave oven leakage and other environmental safety concerns. Radio Frequency (RF) is the range of electromagnetic frequencies above the audio range and below infrared light. Features maximum and minimum hold, an audible alarm, and a zero adjustment to eliminate background EMF. The display also indicates overload and low battery. Comes with a soft carrying case and standard 9V battery, which provides approximately 100 hours of use.

Dimensions: 5¼" x 2¼" x 1¼" (130 x 56 x 38mm). Weight: 6oz (170g).

Specifications

Display:	3½ digits, maximum reading 3999	Accuracy:	±2dB @ 2.45GHz ±50MHz
RF Power Density:	0.003~2.700 mW/cm²	Axis:	Single
RF Frequency:	50MHz ~ 3.5GHz	Alarm:	@ readings >1mW/cm²
Microwave Frequency:	2450MHz	Operating Temp:	41°F ~ 104°F (5°C ~ 40°C)
Resolution:	0.001mW/cm²	Operating RH:	<80% RH

72083-00	Microwave Leakage Detector	each
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► Smart Tweezers

Smart tweezers is a LCR meter in a set of tweezers. The Smart Tweezers feature a unique, patented mechanical and electronic design that integrates a highly accurate digital multimeter with built-in high precision SMD probes and a display.

FEATURES:

- Light weight – 10 times lighter than conventional tools
- Flexible user interface that allows the user to configure default settings
- Continuity/Open testing-beeper sounds when a resistance reading is below a threshold or to indicate an open circuit
- Measures DC voltage up to 8 volts
- Measures AC voltage via an oscilloscope-like picture
- Measures inductance, and resistance.
- Ergo design convenient control
- Tips are made from gold-plated, non-magnetic stainless steel.

Smart Tweezers are available in two versions: straight and curved tips

72907-01	Smart Tweezers, Straight Tips	each
72907-02	Smart Tweezers, Curved Tips	each



► Vacuum Pick-Up System

Handle delicate miniature objects without scratching, breaking or pinching. The system avoids contamination of parts and performs functions that tweezers does such as sorting, picking up, holding, carrying, and trans-ferring. As well it is an alter-native way for handling cover slips without the use of forceps.



Features:

- Picks up grids faster and easier than tweezers –
- Good suction (produces 14" Hg vacuum and an air flow of 125 cubic inches/minute); Can pick up aluminum stubs.
- Quiet operation.
- Can be used as a tool to pick up glass slides, cover slips, wafers, thin film samples, etc.
- Eliminates all tweezer damage to grids.

Double-insulated (115–120V, 60Hz, 2-wire). Light weight, completely assembled and ready for immediate operation as soon as the proper tip is selected and installed. Vacuum is created at the tip by placing the finger over the control hole on the anodized aluminum vacuum pen. To break the vacuum, just remove your finger from the hole. The vacuum generator measures 4½" (H) x 2¼" diameter (114 x 70mm), and it has an adjustable vacuum pressure control from 1" Hg to 15" Hg.

Vacuum Pick-up System complete set: Vacuum Generator, Aluminum Vacuum Pen, Five Vacuum Tips, Set of eight Rubber Vacuum Cups (size ranging: ⅜", ⅙", ½", ⅞", ⅜", ⅝", ¼" and ⅜"), an In-Line Filter, and 4 ft (122cm) of Vacuum Tubing.

Cat. #	Description	
71894	Vacuum Pick-Up System, 115V/60Hz	each
71895	Vacuum Pick-Up System, 220V/60Hz	each
71896	Vacuum Generator only, 115V/60Hz	each
71897	Vacuum Generator only, 220V/60Hz	each
71894-01	Vacuum Pick-Up Pen only	each
71904-02	In-line Vacuum Filter	each

Replacement Stainless Steel Probe Tips (1.5" Long) and Rubber Suction Cups:

Cat. #	Description	O.D.		I.D.	
		(in)	(mm)	(in)	(mm)
71898	15 gauge Probe Tip	.071	1.8	.052	1.3
71899	16 gauge Probe Tip	.065	1.7	.045	1.1
71900	21 gauge Probe Tip	.032	0.8	.020	0.5
71901	22 gauge Probe Tip	.028	0.7	.016	0.4
71902	23 gauge Probe Tip	.025	0.6	.013	0.3
71903	⅜" (14.27mm) Vacuum Suction Cup				each
71904	⅙" (11.12mm) Vacuum Suction Cup				each
71905	⅜" (9.53mm) Vacuum Suction Cup				each
71906	⅝" (7.94mm) Vacuum Suction Cup				each
71907	¼" (6.35mm) Vacuum Suction Cup				each
71908	⅜" (4.76mm) Vacuum Suction Cup				each
71909	Set of 8 Rubber Cups (⅜", ⅙", ½", ⅞", ⅜", ⅝", ¼", and ⅜")				8/set



► Pen Vac™

Pen-Vac™ is a new improved way to handle small, flat surface objects. Beside the electronics assembly industry, jewelers, model builders etc. Pen-Vac is ideal for EM work as well. It can be used to handle grids, pick up stubs, align membranes, work with glass slides, cover slips and much more. Holds up to one minute.

Features:

- Lifts up to 50 grams.
- Totally self-contained vacuum.
- Light-weight, less than one ounce.
- Fits in your pocket like a pen.
- Brushed aluminum body.
- Optional storage compartment for vacuum tips and cups.
- No power supply needed.
- Available in various sizes.
- Interchangeable vacuum probes.

Pen-Vac™ comes with:

- A variety of Vacuum Probes, complete with a vacuum cup attached and it is available with plastic or aluminum hubs. Straight and angled to suit your applications. The stainless steel needle portion of the probes are one-half inch long.
- Vacuum Cups come in a wide range of materials. We offer the Static Dissipative and the Conductive Cups that provide ESD protection for electrostatic discharge of sensitive components. Cups comes in three sizes: ⅜" (3.17mm); ¼" (6.35mm); and ⅝" (9.52mm).

Set consists of:

One Pen with 6 Probes and Cups. (6 Probes: 3 angled, ⅜", ¼", ⅝" and 3 straight ⅜", ¼", ⅝")

71914	Complete Pen-Vac System	set
71915	Same as 71914 with Deluxe Case	set

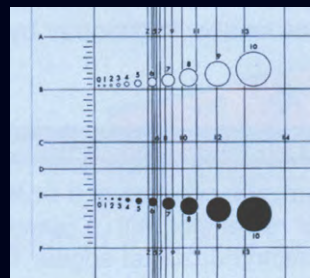
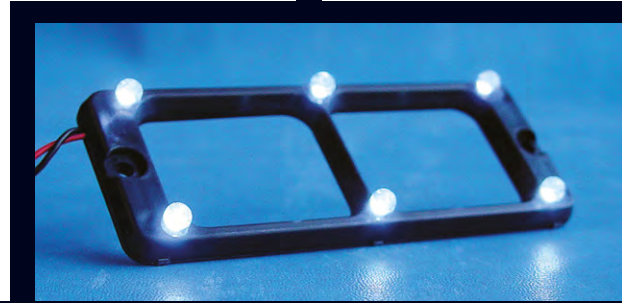
Probes and Cups:

71916	⅜" Straight and Bent, Small	2/pk
71917	¼" Straight and Bent, Medium	2/pk
71918	⅝" Straight and Bent, Large	2/pk

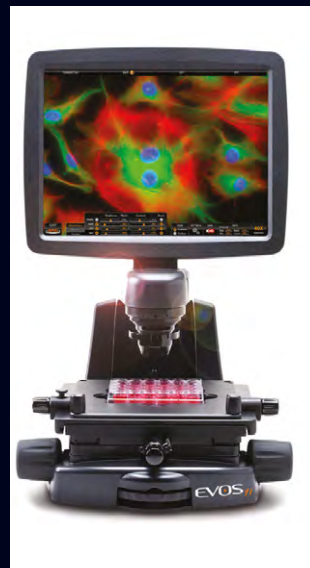
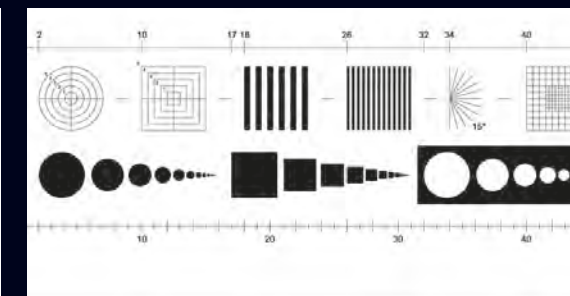
SECTION 21

Illuminators, Magnifiers, Microscopes, and Graticules

Compound Light Microscopes: Upright and Inverted
Digital Microscopes
Microscopes for Educational and Clinical Uses
Polarized and Metallurgical Light Microscopes
Stereo Microscopes
Digital Hand Held Microscope
Mobile Device Microscope
Fluorescence Adapters, Lights
Macroscope Portable Microscopes, Adjustable Ring Lights and Modular Illuminator
Head Band Magnifiers, Loupes, Pocket Microscope, and Stereo Viewers
Magnifiers including Lighted, Steinheil, and Parasite
Illuminated Magnifiers including Magnilite
Measuring Magnifiers, Scales, and Focusing Eyepieces
Microscope Graticles and Stage Micrometers
Standard Reticles
Eyepiece Graticules
Stage Graticules
Optical Resolution Charts, Ronchi Rulings and Grids
Counting Chambers



**Electron
Microscopy
Sciences**



Illuminators, Magnifiers, Microscopes, and Graticules

Electron Microscopy Sciences is proud to announce the introduction of the highest quality line of compound and stereo microscopes in the market place today. The microscopes incorporate advanced technology into a durable, cost effective solution. All of the microscopes have:

- A Modern frame with enhanced stability for image documentation
- An Ergonomic single hand stage/focus control to minimize fatigue
- A Robust stainless steel/brass focus mechanism endures high use
- Brilliant images resolved with superb optics
- Versatile performance — multiple techniques available, including polarization with First Order (Full Wave/Red) Retardation Plate, phase contrast, dark field and more

We are convinced that our Microscopes are the best in the marketplace and at the right price.

➤ Compound Light Microscopes: Upright and Inverted

➤ BC Series Upright Compound Microscopes

We listened to the needs of experienced researchers and designed the BC Series Upright Compound microscopes to perform in demanding environments. The BC Series incorporates advanced technology into a durable, cost effective solution.

KEY SPECIFICATIONS

- **Optical body** - Seidentopf design inclined 30°; 55 to 75 mm interpupillary adjustment, 360° rotation
- **Eye pieces** - 10X wide field; Focal Length 25mm, Field Number 22 mm.
- **Turret** - 4 position ball bearing, reversed, with positive click stops
- **Focusing** - 0.002mm markings, adjustable tension control & focus stop prohibits drift, protects specimen and objectives
- **Mechanical stage** - 8.25"(209mm) X 5.5"(140mm) with vernier scale; Range of motion 75x52mm; Low-positioned right hand coaxial control knobs for one hand focusing; slide holder
- **Condenser** - 1.25 N.A. 2 element Abbe with iris diaphragm and focusing
- **Kohler Illumination** - field diaphragm, 20W 6V Halogen with dimmer
- **Dimensions** - (WHD) (in/cm) 7.8 x 16.5 x 10.9 / 20.0 x 41.9 x 27.8 Gross Weight (lb/kg) 21/9.5



The microscope Includes: dust cover, immersion oil, two color filters, spare halogen lamp and fuse; phase centering telescope & green filter

Ordering Info

BC-211	Binocular, Planachromatt	each
BC-311	Trinocular Planachromatt	each
BC-221	Binocular, Planachromat, Phase contrastt	each
BC-321	Trinocular, Planachromat, Phase contrast	each
BC-2PL	Binocular, Planachromat, Polarized	each
BC-3PL	Trinocular, Planachromat, Polarized	each

Objective Magnification	Numerical Aperture (mm)	Field of View w/10X E.P. (mm)	Working Distance (mm)	
			Brightfield Achromatic	Phase Contrast Plan Achromatic
4X	0.1	4.5	17	NA
10X	0.25	1.8	8	8
20X	0.4	0.72	NA	0.5
40XRetractable	0.65	0.45	0.47	0.4
100XR(oil)	1.25	0.25	0.18	0.18
Binoc/ Trinoc/ Polarized	—	—	BC-211/BC-311 BC-2PL/BC-3PL	BC-221/BC-321 —

➤ Inverted Microscope — A New Level of Inverted Microscopy

EMS introduces a high optical standard on a versatile frame at budget conscious levels. The long working distance condenser (55 mm) and objectives (six supplied) provide brilliant resolved images in both phase contrast and brightfield techniques. The condenser swings out to accommodate roller bottles or other large cultivation vessels.

- Affordable - EMS delivers exacting performance for routine research without consuming your budget
- Versatile - trinocular body for image documentation; condenser design for observation of virtually all vessel types; mechanical stage with inserts for well plates and petri dishes; three objectives each for phase contrast and brightfield
- Durable - an all metal frame with an all metal focusing mechanism ensures this instrument will perform well beyond the industry leading 5 Year Warranty

KEY SPECIFICATIONS

- **Optical body** - Seidentopf design inclined 30°; 55 to 75 mm interpupillary adjustment, 360° rotation
- **Nosepiece** - quintuple, ball bearing
- **Eye pieces** - 10X, Focal Length 25mm, FN 20 mm.
- **Focus mechanism** - adjustable tension control to prohibit drift and adjustable up-stop to protect objective lenses; dial markings at 0.002mm increments
- **Condenser** - 1.25 N.A. 2 element Abbe with iris diaphragm and rack and pinion focusing; 55mm optical working distance, swing out or bright field
- **Kohler Illumination**, field diaphragm, 30 watt, 6 volt Halogen bulb with electronic dimmer
- **Mechanical stage:** (WxD) (in/cm) 8.25 x 8.875 / 20.95 x 22.54; Right-hand Coaxial dropdown X-Y Control Knobs; Four Inserts for: well plates (13 x 8 cm and 8 x 5 cm) petri dish (6.8 cm diam.) and slides (7.5 x 3.5 cm and 7.5 x 2.5 cm)
- **Dimensions:** (WHD) (in/cm) 7.7 x 18.4 x 13.8 / 19.5 x 46.8 x 35; Gross Weight: (lb/kg) 25/55



working distance is 125mm or 5"

Microscope Includes: phase centering telescope and phase annulus sliders, dust cover, color filters (blue green and frosted), spare halogen lamp and fuse.

Ordering Info

CP-2A1	Inverted, Trinocular, Mechanical Stage, 6 ea. Plan Objectives: 10X, 25X, 40XR, 3 Brightfield/Phase Contrast, 5 position turret, 30W Halogen	each
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Objective Magnification	Numerical Aperture (mm)	Field of View w/10X E.P. (mm)	Working Distance (mm)	
			Brightfield Achromatic	Phase Contrast Plan Achromatic
10X	0.25	1.8	8.1	---
25X	0.40	0.72	4.8	---
40XR	0.60	0.45	3.3	---
10X	0.25	1.8	---	8.1
25X	0.40	0.72	---	4.8
40XR	0.60	0.45	---	3.3

► Fluorescence Illumination for Live Cell Microscopes

The EMS Epi-fluorescence Inverted Microscope allows you to quickly locate fluorescent tagged items and save room in your budget. The BC Series Epi Inverted uses a single band filter cube and six objectives to deliver a brightly resolved image for identifying proteins and other specimens within a cell.

- Obtain sharp images through the bottom of a culture vessel because of the superior long working distance phase contrast objectives
- Examine large roller bottles or flasks with a swing out condenser - 7" (180mm) bright field working distance or 2" (55 mm) phase contrast working distance
- Custom filter sets available

KEY SPECIFICATIONS

- Optical Body - Seidentopf design inclined 30° with 55 to 75 mm interpupillary adjustment, 360° rotation
- Nosepiece - Quintuple ball bearing reversed
- Eye pieces - 10X; Focal Length 25mm, FN 20 mm.
- Focus mechanism has adjustable tension control to prohibit drift and adjustable up-stop to protect objective lenses; dial markings at 0.002mm increments
- Condenser - 1.25 N.A. 2 element Abbe with iris diaphragm and rack and pinion focusing
- Kohler Illumination, field diaphragm, 30 watt, 6 volt Halogen bulb with electronic dimmer
- Mercury Lamp and Electronic Power supply with elapsed time counter, Type: HBO 100W/2
- Fixed stage: (WxHxD) (in/cm) 8.25 x 0.59 x 8.875 / 20.95 x 1.5 x 22.54
- Optional Attachable Mechanical Stage: Right-hand Coaxial dropdown X-Y Control Knobs
- Dimensions: Trinocular: (WHD) 9 x 22.5 x 21.5 (16 on BC-2A1) / 22.86 x 57.15 x 54.61 (in/cm)
- Gross Weight: 60/27.27 (lb/kg)



Ordering Info

BC-2A1	Inverted with option for fluorescence, Trinocular, Mechanical Stage, 6 ea. Plan Objectives: 10X, 25X, 40XR, 3 Brightfield/Fluor and 3 Phase Contrast, 30W Halogen	each
BC-EPI	Fluorescent Attachment kit for Inverted Microscope	each
BC-364	Inverted Epi-fluorescence, Trinocular, Mechanical Stage, 6 ea. Plan Objectives: 10X, 25X, 40XR, 3 Brightfield/Fluor and 3 Phase Contrast, 30W Halogen	each

Compound Microscope Accessories

LB-15WH	15 Watt 6 Volt Halogen Bulb for transmitted or lower illumination	each
LB-15WHR	15 Watt 6 Volt Halogen Bulb with Reflector for reflected or upper illum.	each
LB-5WF	5W Fluorescent Bulb for transmitted or lower illumination	each
LB-20WH	20W 6 Volt Halogen Bulb for all Upright Compounds	each
LB-30WH	30W 6 Volt Halogen Bulb for Inverted Compounds	each
A9-10-100	Reticle, 10mm Scale with 100 divisions	each
A9-5-100	Reticle, 5mm Scale with 100 divisions	each
A9-100SQ	Reticle, Square Grid with 1mm divisions	each
A9-400SQ	Square Grid with 0.5 mm divisions	each
A9-STM	Reticle, Stage Micrometer, 1mm scale with 100 divisions	each
OP-050	50XR Oil Plan Achromatic, N.A. 0.65	each

Objective Magnification	Numerical Aperture (mm)	Field of View w/10X E.P. (mm)	Working Distance Brightfield Achromatic (mm)	Working Distance Phase Contrast Plan Achromatic (mm)
10X	0.25	1.8	8.1	---
25X	0.40	0.72	4.8	---
40XR	0.60	0.45	3.3	---
10X	0.25	1.8	---	8.1
25X	0.40	0.72	---	4.8
40XR	0.60	0.45	---	3.3

Model No. **BC-364**
 Model No. **BC-2A1** without Mercury Burner & Filters

Excitor Type	Peak Wave-length	Filter Type	Excitation Filter	Dichroic Mirror	Emission Filter
UV		DANSA	IF 330-400		425 W
VIOLET		SITS Primuline	IF 395-415		455 W
BLUE	445	FITC	IF 420-485	DM 510	520 W
GREEN	546	TRITC	IF 535-550	DM 580	580 W

Camera Systems

EMS offers three types of camera systems for documenting resolved microscopic images.

Each system is fully integrated with:

- software for image analysis
- optical adapters to obtain the image in the correct focal plane
- cables for connection to computers, monitors or projectors

All components are conveniently packaged under one part number for easy ordering

Description	Stereo	Upright Compound	Inverted Compound
Digital Still Camera, 15 megapixel or better resolution, with memory card, USB cable, battery charger, optical adapter for microscope and Jenco Image Software	57-C15	59-C15	5A-C15
Digital Video Camera, USB 2.0, 5 Megapixel resolution for color imaging, optical adapter and measuring software	57-5M	59-5M	5A-5M
Digital Video Camera, USB 2.0, 3 Megapixel resolution for color imaging, optical adapter and measurement software	57-3M	59-3M	5A-3M
Adapter for Digital Still Camera	CM-0334-S	CM-0334-B	CM-0334-V
Adapter for Digital Video Camera, C-Mount	CM-0303	CM-0304	CM-0306

Note: CCD cameras and cooled CCD cameras for fluorescence available upon request.

Now available from EMS...

EVOS®

Digital Microscopes

The ground-breaking design and revolutionary performance features of the EVOS® microscope line make high-quality imaging easier than ever before. Featuring LED illumination, integrated hardware/software, no bulbs, no alignment, no on-going costs or maintenance, EVOS® microscopes offer extraordinary comfort and ease of use. These instruments can be used in a hood or anywhere in the lab. The following three products are conveniently put together to offer the most common needs of most users. To top it off, you can also build a customized EVOS® microscope and order individual parts applicable to your unique needs!

change the way you work!



Small Footprint

Specially designed to fit nicely inside cell culture hoods and biosafety cabinets, EVOS makes delicate cell isolation and other sensitive procedures easier, safer, and more efficient. You can now work comfortably and effortlessly for extended periods of time inside controlled environments with precision and accuracy.

**See how it works...
Learn how to do it...**

We've added video content to our website to help you get to know our latest products even better!

Stop by and see what it's all about.



Patented LED Light Cubes

At the heart of EVOS is its unique patented LED light cube (US Patent 7,502,164) that outputs high intensity over a short light path (see light path at right) for maximally efficient fluorophore excitation.

- Precise digital illumination level controls
- Supports up to 4 fluorescence channels simultaneously
- 50,000+ hour lifetime
- Instant ON/OFF, no shutters
- Environmentally safe, non-hazardous, mercury-free LED bulbs
- 15X less power consumption than conventional fluorescence microscopes
- Easy installation and no maintenance



Applications and Software

EVOS microscopes are equipped with an integrated computer and imaging software that were designed and programmed for real-life imaging. Everything you need to acquire, manipulate, save, and transfer an image can be done right from the microscope in one place, with one instrument. A toolbar provides an ever-growing list of added features – time-lapse video, cell counting, image overlays, automated transfection images, scalebar, and the list continues to grow...

Time-Lapse

Set interval and duration of a time-lapse experiment

One channel per experiment, 10-seconds minimum acquisition interval

Stable, consistent LED illumination over the duration of the experiment

Pause during acquisition to review collected image sequence, adjust stage or illumination settings, etc.

Create AVI movie files that can be played on any computer with one click



Manual Cell-Counting

Count up to six cell types

Assign numbers for each cell type and place over each cell when counted

Numbers can be repositioned, deleted, hidden, and captured with each saved image

Place gridlines and results table with saved image

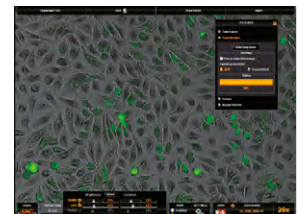


Transfection Analysis

Capture and overlay one transmitted light image and one fluorescent image with 1-click

Works with any one of the fluorescent light cubes installed on EVOS fi microscope

Allows users to adjust illumination intensity for both images prior to launching acquisition sequence



EVOS[®] fl

- » Fluorescence, brightfield, phase contrast
- » Patented LED fluorescence light cube technology
- » Supports up to 4 fluorescence channels at a time
- » 15-inch high-resolution LCD display
- » Monochrome and color camera options
- » Fits inside cell culture hoods and biosafety cabinets
- » Integrated computer and advanced imaging software/features

**Your science is hard.
Your microscope should be easy...**

Throw away the definition of “microscope”... and start over. Science needs tools that help set the pace, not hold it back. Isn't it time the equipment works for you – so you can get your data quickly and move on?

The ground-breaking design and revolutionary performance features of the EVOS fl microscope make high-quality fluorescence imaging easier than ever. Capture, overlay and save multi-channel fluorescence images in just seconds — in one place, with one instrument.

Technical Specifications EVOS fl

Optics	Infinity-corrected optical system; RMS-threaded objectives with 45 mm parfocal distance		
Objectives (available)	Magnification	N.A.	WD
	2X	0.06	5.1 mm
	4X Ph	0.13	16.9 mm
	10X FI	0.30	8.3 mm
	20X FI	0.45	7.1 mm
	40X FI	0.65	2.8 mm
Objective Turret	5-position; front-mounted manual control		
Light Cubes*	DAPI:	357 nm excitation	447 nm emission
	GFP:	470 nm excitation	525 nm emission
	RFP:	531 nm excitation	593 nm emission
	CFP:	442 nm excitation	510 nm emission
	YFP:	500 nm excitation	542 nm emission
	Texas Red:	585 nm excitation	624 nm emission
	Cy5:	628 nm excitation	692 nm emission
	Cy7:	731 nm excitation	825 nm emission
	QDots:	All available wavelengths	
Contrast Methods	Fluorescence and transmitted light (brightfield and phase contrast)		
Condenser	3-position turret for brightfield and phase contrast, slider with diffuser block and meniscus filters		
Condenser WD	60 mm		
Mechanical Glide Stage	X-Y axis fine-positioning controls; 69 mm (2.7-in) per rotation;		
	110 mm x 110 mm (4.3-in x 4.3-in) range of motion		
	Z-axis focusing controls, 480 µm/rotation		
	Interchangeable vessel holders available for most common shapes and sizes*		
LCD Display	15-inch color, 1024 x 768 pixels; adjustable tilt		
Camera	High-sensitivity monochrome, 1280 x 960, 3.75 µm/pixel; (Sony® ICX445 CCD) Also available with color camera (Sony® ICX285AQ CCD)		
Image Acquisition	Built-in computer; Intel® Atom processor 1.6 GHz; integrated software for image acquisition via mouse		
Captured Images	16-bit monochrome TIFF or PNG (12-bit dynamic range)		
	24-bit color TIFF or PNG; JPG, BMP		
Output Ports	3 USB and 1 DVI		
Power Supply	AC adapter; Input 100–240V, 50–60Hz; Output 5 VDC/4.15A		
Dimensions	Operating height: 57.8 cm (22.75-in)		
	Storage/transport height: 32.4 cm (12.75-in)		
	Depth: 47.0 cm (18.5-in) Width: 35.5 cm (14.0-in)		
Weight	15.3 kg (33.7 lbs)		



**High-quality
fluorescence imaging
has never been easier!**

EVOS[®] xl core

- » Brightfield and phase contrast
- » Designed for repeated-use in routine tissue culture/live cell applications
- » LED illumination for transmitted light
- » 12-inch high-resolution LCD display
- » Fits inside cell culture hoods and biosafety cabinets
- » Embedded operating system with basic imaging features for capture and save to USB flash drive
- » Affordable, unmatched price-to-performance value

Comfort without Compromise

The EVOS xl core makes cell culture microscopy remarkably easy. Uncomfortable eyepieces have been replaced with a high-resolution camera and display, but not only that... the LCD display is up high for easy viewing and the stage and controls are placed low so your hands can rest on the table.

Need To Save Images?

With the EVOS xl core microscope, images can be saved with the push of a button to a USB flash drive - no need to wrestle with computers, cables or external software.

Need To Move It Around?

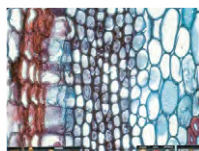
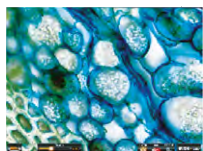
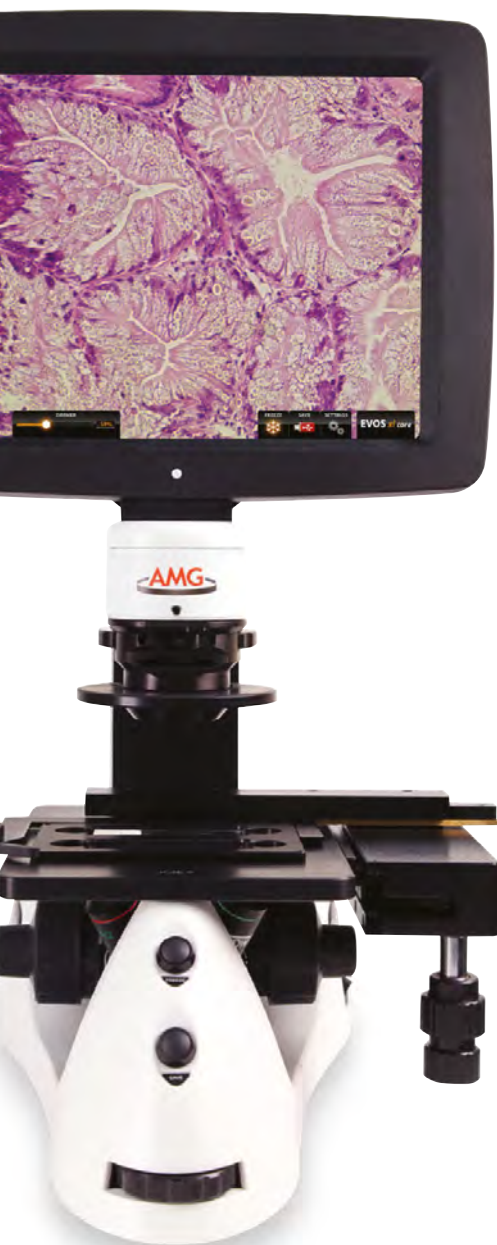
The all-in-one design is lightweight and boasts a small footprint. You can throw it in a hood or move it to an open space on the bench. Better yet, there is no alignment, no bulbs to change and the flip of one switch turns everything on.

EVOS xl core allows you to concentrate on what's important – your work. It's easy, affordable and powerful. Now, that's comfort without compromise!

- ALL-IN-ONE digital microscope workstation
- Eyepieces are replaced with a 12.1-inch high resolution display
- High performance phase contrast optics are integrated with a high-resolution digital camera
- Integrated imaging software runs everything via mouse or with fingertip controls
- Images can be saved to a USB flash drive

Technical Specifications EVOS xl core

Optics	Infinity-corrected optical system; RMS-threaded objectives with 45 mm parfocal distance		
Objectives (available)	Plan Achromat		
	Magnification	N.A.	WD
	2X	0.06	5.1 mm
	4X Ph	0.13	16.9 mm
	10X Ph	0.25	6.9 mm
	20X Ph	0.40	6.8 mm
	40X Ph	0.65	3.1 mm
Objective Turret	4-position; manual control		
Illumination	LED (50,000+ hour life); adjustable intensity		
Contrast Methods	Transmitted light (brightfield and phase contrast)		
Condenser	3-position turret for brightfield and phase contrast		
Condenser WD	60 mm		
Stage*	Fixed and mechanical stage (with X-Y axis controls and vessel holder framework) available *Mechanical stage also available for order separately		
LCD Display	12.1-inch color, 1024 x 768 pixels; adjustable tilt		
Camera	1/2-inch; 2048 x 1536 pixel; 3.1 MP COLOR		
Image Acquisition	Embedded operating system with software for image capture and save via mouse or front-mounted manual buttons onto USB flash drive		
Captured Images	24-bit color TIFF, JPG or BMP (2048 x 1536 pixel)		
Output Ports	2 USB 2.0		
Power Supply	AC adapter; Input 100–240V, 47–63Hz; 0.58A max; Output 12 VDC/2.0A 24W max		
Dimensions	Operating Height: 55.3 cm (21.8-in) Storage/Transport Height: 34.3 cm (13.5-in)		
	Depth: 40.6 cm (16.0-in) Width: 31.8 cm (12.5-in)		
Weight	• With fixed stage: 9.1 kg (20.1 lbs) • With mechanical stage: 10.0 kg (22.1 lbs)		



Effortless, affordable
cell-culture imaging

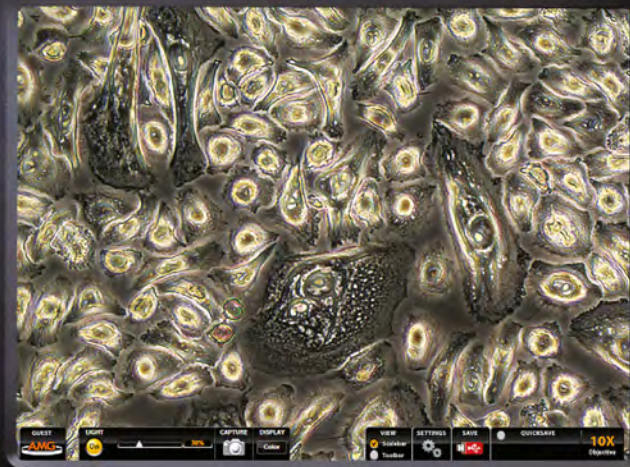
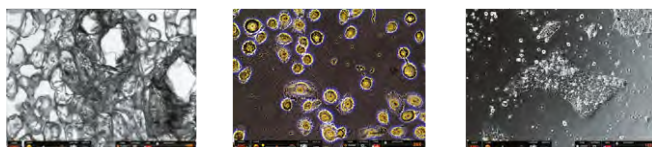
EVOS[®] xl

- » Brightfield and phase contrast
- » LED illumination for transmitted light
- » 15-inch high-resolution LCD display
- » Fits inside cell culture hoods and biosafety cabinets
- » Integrated computer and advanced imaging software and features
- » More optics selection than EVOS xl core
- » Optional arm rest (on either side of microscope) for cell isolation procedures

Quality. Flexibility. Design. Capability.

The EVOS xl digital inverted microscope combines advanced ergonomic design, an on-board microprocessor, LED illumination, fully integrated color camera, and a highly streamlined user interface to deliver unprecedented flexibility and ease-of-use.

EVOS xl is designed to make cell culture microscopy as comfortable, reliable and effective as possible. Our commitment to this design is visible in every feature – from the high-resolution 15-inch LCD display to the compact footprint and integrated computer and imaging system.



Technical Specifications EVOS xl

Optics	Infinity-corrected optical system; RMS-threaded objectives with 45 mm parfocal distance		
Objectives (available)	Magnification	N.A.	WD
	2X	0.06	5.1 mm
	4X Ph	0.13	16.9 mm
	10X Ph	0.25	6.9 mm
	20X Ph	0.40	6.8 mm
40X Ph	0.65	3.1 mm	
Objective Turret	5-position; front-mounted manual control		
Contrast Methods	Transmitted light (brightfield and phase contrast)		
Condenser	3-position turret for brightfield and phase contrast, slider with diffuser block and meniscus filters		
Condenser WD	60 mm		
Mechanical Glide Stage	X-Y axis fine-positioning controls; 69 mm (2.7-in) per rotation;		
	110 mm x 110 mm (4.3-in x 4.3-in) range of motion		
	Z-axis focusing controls; 480 µm/rotation		
	Interchangeable vessel holders available for most common shapes and sizes*		
LCD Display	15-inch color, 1024 x 768 pixels; adjustable tilt		
Camera	2048 x 1536, 3.2 µm/pixel; 3.1 MP COLOR		
Image Acquisition	Built-in computer; Intel® Atom processor 1.6 GHz; integrated software for image acquisition via mouse		
Captured Images	Color TIFF, PNG, JPG or BMP (2048 x 1536 pixels)		
Output Ports	3 USB and 1 DVI		
Power Supply	AC adapter; Input 100–240V, 50–60Hz;		
	Output 5 VDC/4.15A		
Dimensions	Operating height: 57.8 cm (22.75-in)		
	Storage/transport height: 32.4 cm (12.75-in)		
	Depth: 47.0 cm (18.5-in) Width: 35.5 cm (14.0-in)		
Weight	14.2 kg (31.4 lbs)		

Throw away the definition of “microscope” and start over..

EVOS® Digital Microscopes (continued)

Ordering Information

Pre-Configured Scopes We have put together the most popular scope configurations for your convenience...

EVOS[®] *xl*

Evos-XL includes the following:

- Digital Inverted Microscope
- On Board Computer
- Integrated Imaging Software
- LED Illumination
- 3.1 Megapixel Color Camera
- 15" High Definition display
- 4 Objectives (4x, 10x, 20x, 40x)



Cat. #	Description	Qty.
6500-XL	Evos-XL Base Microscope System Package	each

EVOS[®] *xl core*

Evos-XL/Core includes the following:

- Digital Inverted Microscope
- Embedded operating system
with integrated imaging software
- Mechanical Stage
- LED Illumination
- 3.1 mega pixel color camera
- 12.1" high definition display
- 4 Objectives (4x, 10x, 20x, 40x)



Cat. #	Description	Qty.
6500-XLCORE	Evos-XL/Core Base Microscope System Package	each

EVOS[®] *fl*

Evos-FL includes the following:

- Digital Inverted Fluorescence Microscope
- On Board computer and
integrated imaging software
- Brightfield and Phase contrast
- Adjustable intensity LED
- Objectives (Ph/Fluor, 4x, 10x, 20x, 40x)
- GFP, RFP, DAPI Light Cubes



Cat. #	Description	Qty.
6500-FL	Evos-FL Base Microscope System Package	each

Build-Your-Own Scope

Cat. #	Description	Qty.
AME-3300	EVOS xl — Includes on-board computer and integrated imaging software, LED illumination; 3.1 megapixel color camera; 15 in. high definition display; No objectives; No arm rest	each
AMEX-1000	EVOS core xl , no objectives	each
AMF-4300	EVOS fl Base — Includes on-board computer and integrated imaging software; Brightfield and phase contrast; Adjustable intensity LED; No objectives; No light cubes	each
AMEFC-4300-US	EVOS fl Base, US — Includes on-board computer and integrated imaging software; Color camera, two vessel holders; Brightfield and phase contrast; Adjustable intensity LED; No Objectives; No light cubes	each

Options and Accessories

Cat. #	Description	Qty.
AMEP-4712	Attachable Mechanical Stage; For use with EVOS xl core	each
AMEP-4618	Arm Rest Accessory Kit, attaches to either side of stage; For use with EVOS xl and EVOS fl (standard on EVOS cl)	each

Extended Warranties

Cat. #	Description	Qty.
AME-EXTW2-US	EVOS xl 2-Year Extended Warranty	each
AME-EXTW4-US	EVOS xl 4-Year Extended Warranty	each
AMF-EXTW2-US	EVOS fl 2-Year Extended Warranty	each
AMF-EXTW4-US	EVOS fl 4-Year Extended Warranty	each

EVOS® Digital Microscopes (continued)

Ordering Information (continued)

Cat. #	Description	Qty.
Objectives		
<i>For use with fl models</i>		
AMEP-4622	Magnification: 4x; Plan: LWD - FL; Imaging Medium: Air; NA: 0.13; WD: 19.7mm	each
AMEP-4623	Magnification: 10x; Plan: LWD - FL; Imaging Medium: Air; NA: 0.30; WD: 8.3mm	each
AMEP-4624	Magnification: 20x; Plan: LWD - FL; Imaging Medium: Air; NA: 0.45; WD: 7.1mm	each
AMEP-4625	Magnification: 40x; Plan: LWD - FL; Imaging Medium: Air; NA: 0.65; WD: 2.8mm	each
<i>For use with fl and xl models</i>		
AMEP-4626	Magnification: 60x; Plan: LWD - FL; Imaging Medium: Air; NA: 0.75; WD: 2.2mm	each
<i>For use with xl models</i>		
AMEP-4631	Magnification: 2x; Plan: LWD; Imaging Medium: Air; NA: 0.06; WD: 5.1mm	each
AMEP-4632	Magnification: 4x; Plan: LWD - PH; Imaging Medium: Air; NA: 0.13; WD: 16.9mm	each
AMEP-4681	Magnification: 10x; Plan: LWD - PH/FL; Imaging Medium: Air; NA: 0.25; WD: 9.2mm	each
AMEP-4682	Magnification: 20x; Plan: LWD - PH/FL; Imaging Medium: Air; NA: 0.40; WD: 3.1mm	each
AMEP-4683	Magnification: 40x; Plan: LWD - PH/FL; Imaging Medium: Air; NA: 0.65; WD: 1.6mm	each
AMPFOP-050	OBJ 50X PLAIN ACRO	each
AMPF-OP100	100X PLAN OIL 1.25NA100X PLAN	each
AMEP-4698	20X PLAN FL 0.50 NA CS CORRECT	each
<i>For use with fl and xl models</i>		
AMEP-4700	Magnification: 100x; Plan: LWD - FL; Imaging Medium: Oil; NA: 1.28; WD: 0.21mm	each
Fluorescent Light Cubes, for use with EVOS fl		
AMEP-4650	DAPI Fluorescent Light Cube	each
AMEP-4651	GFP Fluorescent Light Cube	each
AMEP-4652	RFP Fluorescent Light Cube	each
AMEP-4653	CFP Fluorescent Light Cube	each
AMEP-4654	YFP Fluorescent Light Cube	each
AMEP-4655	Texas Red Fluorescent Light Cube	each
AMEP-4656	CY5 Fluorescent Light Cube	each
AMEP-4667	CY7 Fluorescent Light Cube	each
AMEP-4668	BFP Fluorescent Light Cube	each

Cat. #	Description	Qty.
Vessel Holders		
AMEP-VH001	Slide Vessel Holder; Holds two 25mm x 75mm microscope slides, chamber slides	each
AMEP-VH002	35mm Petri Dish Vessel Holder; Holds four 35mm petri dishes	each
AMEP-VH003	60mm Petri Dish Vessel Holder; Holds two 60mm petri dishes	each
AMEP-VH004	100mm Petri Dish Vessel Holder; Holds one 100mm petri dish	each
AMEP-VH005	25cm T-Flasks Vessel Holder; Holds two 25cm ² flasks, rectangular or triangular	each
AMEP-VH006	75cm T-Flasks Vessel Holder; Holds one 75cm ² flask	each
AMEP-VH007	Hemocytometer Vessel Holder; Holds one standard hemocytometer; Use with C-Chip	each
AMEP-VH008	Vessel Holder - 1 BD T-75 FLK ; Holds one 75cm ² BD/Greiner T-75 flask	each
AMEP-VH009	Vessel Holder - Universal; Holds all vessel types (universal)	each
AMEP-VH010	Vessel Holder - 2 BD T-25 Flask; Holds one 25cm ² BD/Greiner T-25 flask	each
AMEP-VH011	Vessel Holder - 66mm Square Tray; Holds one 66mm square tray	each
AMEP-VH012	Slide Holder - SPL T-75 Flask; Holds one SPL T-75 Flask	each
AMEP-VH013	Vessel Holder - 4 PETRI 35 EU; Holds four 35mm petri dishes (EU)	each
AMEP-VH014	Vessel Holder - 2 PETRI 50 EU; Holds two 50mm petri dishes (EU)	each

► Compound Brightfield Microscopes

Clinics, Educators and Researchers Want These.



KEY SPECIFICATIONS

- Eye pieces - 10X wide field; Focal Length 25mm, FN 20 mm.
- Turret - 4 position ball bearing, reversed, with positive click stops
- Optical body - Seidentopf design inclined 30°; 360° rotation, 55-75mm interpupillary adjustment
- Mechanical stage – (in/cm) 5.25 / 13.5 x 5 / 12.5 with vernier scale; Range of motion 75x35mm; right hand coaxial control knobs; slide holder holds two slides; double plated for durability

- Focusing - 2µm markings, adjustable tension control prohibits drift, focus stop protects specimen and objectives
- Condenser - 1.25 N.A. 2 element Abbe with iris diaphragm and focusing
- Illumination - 20W 6V Halogen with dimmer
- Dimensions - (WHD) (in / cm) 7.5 x 15.4 x 12.4 / 19.2 x 39.2 x 31.6 Gross Weight (lb/kg) 13 / 5.9
- Microscope Includes: dust cover, immersion oil, two color filters, spare halogen lamp and fuse; on phase contrast: phase centering telescope & green filter

Designed for ease of use, this CP Series allows a novice to approach the microscope and quickly analyze their specimen. Void of complicated features, the CP Series offers pre-centered lenses and condensers, preventing operator confusion.

High eye point eye pieces, a rear facing turret for easy slide handling and a choice of lenses that provide large, flat fields of view offer brilliant images and outstanding resolution.

Built to take rough handling, the CP Series' frame, focusing and stage mechanisms are all metal construction because plastic wears over time. Spring loaded objectives protect against abuse but a focus stop control prohibits stage ramming accidents. Anti fungal protection and all glass light collectors ensure these microscopes will last.

Ordering Info

CP-101	Monocular Brightfield Achromatic	each
CP-102	Binocular Brightfield Achromatic	each
CP-103	Trinocular Brightfield Achromatic	each
CP-111	Monocular Brightfield Semi-Planachro	each
CP-112	Binocular Brightfield Semi-Planachro	each
CP-113	Brightfield Semi-Planachro	each
PHP-102	Binocular Phase Contrast Achromatic	each
PHP-103	Trinocular Phase Contrast Achromatic	each

Objective Magnification	Numerical Aperture (mm)	Field of View w/ 10X E.P. (mm)	Working Distance		
			Brightfield Achromatic (mm)	Brightfield Semi-Planachro (mm)	Phase Contrast Achromatic (mm)
4X	0.1	5	27	17	NA
10X	0.25	2	6.6	4.1	6.6
20X	0.4	1	NA	NA	0.8
40X Retractable	0.65	0.5	0.57	0.6	0.57
100XR(oil)	1.25	0.2	0.19	0.25	0.19
Models					
Monocular			CP-101	CP-111	NA
Binocular			CP-102	CP-112	PHP-102
Trinocular			CP-103	CP-113	PHP-103

► Education Microscopes

EMS keeps prices low, quality high.

These microscopes virtually eliminate down time and our optics deliver brilliant images.

Choose from the following options for the right equipment to meet your needs:

- **Illumination:** the popular rechargeable LED, or 20W halogen bulb or an incandescent bulb
- **Monocular or Binocular heads or Teaching heads.** Also, video systems are available to project images on a screen
- **Three objective system, Jenco CP135-M3, has 4X, 10X and 40X, or four objective system includes the 100X oil**

DIN Objective Magnification	Numerical Aperture (mm)	Field of View w/10X E.P. (mm)	Working Distance Brightfield DIN Achromatic (mm)
4x	0.1	4.5	27
10x	0.25	1.8	6.6
40x	0.65	0.45	0.57
100x Retractable (Oil)	1.25	0.18	0.19



CP135-M3
6" (150mm) x 14.5"
(37mm) x 8" (20mm)



CP135-B4
6" (150mm) x 14.5"
(37mm) x 8" (20mm)

Ordering Info

CP135-M3	Monocular, Education, 3 Achromat objectives	each
CP135-M4	Monocular, Education, 4 Achromat objectives	each
CP135-B4	Binocular, Education, 4 Achromat objectives	each
CP135-T4	Teaching	each

► Upright Compound Microscope with Dual View Body

Body: Dual Optical Body allows two people to observe simultaneously, inclined 45°, able to rotate a full 360° with 55mm to 75mm interpupillary adjustment. Left Eye diopter adjustment of -5 to +5

Nosepiece: Quadruple ball-bearing nosepiece with positive click stops and smooth operation

Eyepieces: 10X wide field, Focal Length 25mm, Field F 18mm

Stage: Size 140mm X 135mm, range of motion 75mm X 50mm Integrated mechanical stage with vernier, Low-position Coaxial Control Knobs Removable spring clip slide holder

Focus Mechanism: All stainless steel and brass gear train system Adjustable Tension Control to prohibit drift; Adjustable Up- Stop to protect slides, specimen and lenses Coaxial coarse and fine adjustments with dial markings at 0.002mm increments

Condenser: 1.25 N.A. 2 element Abbe Condenser with iris diaphragm Rack and Pinion focusing Illumination: 20 watt, 6-volt Halogen bulb with electronic dimmer 120-volt operation, Fuse: ½ Amp, located in the base

Finish: Bone colored, baked-on enamel paint with "stipple" finish

Dimension: (WHD) (in/cm) 7 x 19 x 8.5 / 17.8 x 48.25 x 21.5

Body Weight: 20 lb. / 9 Kg.

Microscope Includes: Mold protection throughout the Optical body, Mirror assembly (for use where electricity is not available) dust cover, immersion oil, two color filters, spare halogen lamp and spare fuse.

Ordering Info

CP-300DH Monocular Bright Field DIN Achromatic each



DIN Standard Objective	Magnification	Numerical Aperture	Working Distance	Field of View with 10X E.P.
Achromatic	4X	0.10	17mm	4.5mm
Achromatic	10X	0.25	8mm	1.8mm
Achromatic	40X	R 0.65	0.4mm	0.45mm
Achromatic	100X R (oil)	1.25	0.25mm	0.18mm

► Fluorescence Microscope

Fluorescence Observation Brilliant and Affordable



Incorporating system versatility with outstanding Infinity-corrected optics, the JC Series of microscopes offers an affordable Fluorescence module to meet this specialized need.

- **Filters** - two cubes with single band exciters easily slide into place and combine with the HBO illuminator to deliver intense, high contrast images
- **Optics** - Infinity-corrected planachromat lenses guaranty brilliant, color corrected, high contrast images
- **Robust** - all metal frame and focus mechanism endure high use while providing a stable platform minimizing vibration

- **Mechanical Stage** – Unique Locking Stage remains at focus even when pressed, saves time in changing specimens
- **Versatile performance** - multiple techniques available, including brightfield, polarization, phase contrast with slot built into condenser for slider and dark field

KEY SPECIFICATIONS:

- **Optical body** - Seidentopf design inclined 30°; 48 to 75mm interpupillary adjustment, 360° rotation
- **Eye pieces** - 10X wide field; High Eyepoint, Field Number 22 mm.
- **Turret** - 5 position ball bearing, reversed for unrestricted access, with click stops
- **Mechanical stage** - 6.25"(156mm) X 5.4"(138mm) with vernier scale; Range of motion 76x54mm; right hand coaxial
- **Focusing** - 0.001mm markings, adjustable tension control & focus stop prohibits drift, protects specimen and objectives
- **Condenser** - 1.25 N.A. 2 element Abbe with iris diaphragm, slot for phase slider, color coding corresponds to objectives
- **Kohler Illumination** - field diaphragm, 20W, 6V Halogen with dimmer
- **HBO Illumination** – Mercury vapor high pressure arc-discharge lamp, increases depth dimension by 4 in., 10cm.
- **Dimensions** - (WHD) (in/cm) 7.7 x 16.5 x 11.0 / 19.5 x 41.8 x 28.0 Gross Weight (lb/kg) 25/11.4
- **Microscope Includes:** dust cover, two color filters, spare halogen lamp and fuse

Filter Specifications:

Filter Cube	Excitation Peak Wavelength (nm)	Emission Peak Wavelength (nm)	Dichroic Peak Wavelength (nm)
Blue	460-490	520	500
Green	510-550	590	570
UV (optional)	330-385	420	400
V (optional)	400-410	455	455
100XR	1.25	0.22	0.17

Objective Specifications:

Objective Magnification	Numerical Aperture (mm)	Field of View w/ 10X E.P. (mm)	Working Distance Brightfield/∞ Planachro (mm)
4X	0.13	5.5	12.3
10X	0.3	2.2	5.03
40XR	0.7	0.55	0.72
40XRetractable	0.65	0.5	0.57
100XR	1.25	0.22	0.17

Ordering Info

JC-2EF	Binocular Fluorescence Microscope	each
JC-3EF	Trinocular Fluorescence Microscope	each
JC-UV	UV Model Microscope	each
JC-V	V Model Microscope	each

► Stereo Microscopes for Education

- Affordable - Portable
- Durable - Easy to use
- Five Year warranty

Dissection and observation of macro specimens is more enlightening with these Stereo microscope. The large stage allows ample room for sample manipulation but still fits in a storage cabinet. Their illuminated stands let you choose light from three directions - above, below or both, to help observe opaque or transparent samples. Solid, all metal focusing mechanisms will endure student use well beyond the five year warranty.

The ST-800 series two power stereo helps students down the road because they select magnification by turning a knob on the head, replicating a process on more sophisticated zoom models. Teachers like them because the eyepieces are locked and don't walk, the all metal frames are built to last and the low voltage bulbs last for hundreds of hours and are easy to replace. Even models with rechargeable illuminators are available.

The ZM-500 Series allows infinite magnification changes throughout the range, making available a world of discovery for the student.



ZM-500 Series

Model	Illumination	10X Eyepiece		Working Distance
		Magnification Range	Field Diameter	
ST-F801	Halogen/Fluorescent	10X / 20X	20.0 / 10.0	110
ST-F802	Halogen/Fluorescent	10X / 30X	20.0 / 6.6	110
ST-F803	Halogen/Fluorescent	10X / 40X	20.0 / 5.0	110
ST-F804	Halogen/Fluorescent	20X / 40X	10.0 / 5.0	110
ZM-F502	Halogen/Fluorescent	7.5X to 35X 4:1 ratio	26 - 5.7	90

Ordering Info – Microscopes

ST-F801	Binocular Two Power Stereo Microscope	each
ST-F802	Binocular Two Power Stereo Microscope	each
ST-F803	Binocular Two Power Stereo Microscope	each
ST-F804	Binocular Two Power Stereo Microscope	each
ZM-F502	Binocular Stereo Zoom Microscope	each
ZM-F503	Trinocular Stereo Zoom Microscope	each



ST-800 Series

Model	4:1 ratio Auxiliary Lens	10X Eyepiece		Working Distance (mm)
		Magnification Range	Field Diameter (mm)	
SM-0502	0.5X	3.75X - 17X	52 - 11.4	140
	1.0X (none)	7.5X - 35X	26 - 5.7	90
SM-0503	1.5X	11.25X - 52X	17 - 3.3	48
SM-0504	2X	15X - 70X	13 - 2.9	34

Additional Eye Pieces for the ZM-500, 15X & 20X, are available on request.

All models available with non-illuminated post stand

Ordering Info – Lenses & Eyepieces

SM-0502	0.5X Auxiliary Lens for ZM-F500	each
SM-0503	1.5X Auxiliary Lens for ZM-F500	each
SM-0504	2.0X Auxiliary Lens for ZM-F500	each
SEP-10X	10X Wide Field Eyepiece for ZM-F500	each
SEP-15X	15X Wide Field Eyepiece for ZM-F500	each
SEP-20X	20X Wide Field Eyepiece for ZM-F500	each

► Stereo Microscopes

► GL Series Stereo Microscopes – Superb Depth of Field and Contrast

Benefits Of All Of Our GL Series Stereo Zoom Optical Bodies:

- Save time - no need to refocus when zooming magnification, the GL Series is parfocal and its continuous zoom is available with detentes at 0.5X increments for precise measurements
- Accommodate all users - wide interpupillary adjustment (45 - 75mm) and diopters built in to the eyepieces allow virtually all individuals to work in comfort
- Minimize fatigue - side mounted zoom controls and low positioned focus control with tension adjustment reduce stress and let the user rest in a natural position
- Save Money for years to come - high contrast, flat images are now cost effective and EMS/Jenco's 5 year limited warranty protects your investment

The remarkably clear, non-distorted 3D image resolved by the GL Series optics is a result of advanced technologies in optical design. The GL Series Greenough design produces lifelike images in a large field of view and presents upright or erect images with astounding depth perception. A long (100mm) working distance facilitates observation.

Choose from 3 Zoom Ranges

	GL6 Series	GL7 Series
Zoom Ratio	6.5:1	7:1
Zoom Range	1.0X - 6.5X	0.65X - 4.5X

Versatility is a real advantage of the GL Series

With over thirty (30) combinations of stands and optical bodies from which to choose, the GL Series has a model to satisfy your application.

GL7 Optical Body - brilliance, clarity, parfocality, flatness and depth of field characterize this hard working model. Its wide magnification range, (7:1 or 0.65X to 4.5X) zooms in on your specimen without distortion, delivering a resolved image true to character. The detents at 0.5X allow exactly repeatable magnifications for documentation.

GL6 Optical Body - designed for those demanding applications where you are challenged with new and different specimens requiring absolute clarity at all powers, this model achieves high magnification (1.0X to 6.5X, 6:1 ratio) at a low price. Going beyond the standard for this class of microscope, total magnification ranges from 0.5X to 260X with optional auxiliary lenses and eyepieces.



The Illuminated Stand

Pictured here, the Illuminated stand allows observation of both opaque and transparent specimens because of individual controls for reflected and transmitted light. While reflected or incident light is a 15W Halogen with electronic dimmer, the transmitted light can be either a 15W Halogen with dimmer or a "cool" 5W fluorescent bulb for heat sensitive samples. Individual lighting controls provide ideal conditions for photographing images in a fully illuminated field.

Model Number		Illumination	Zoom Ratio	Magnification Range with 10X Eyepiece
Binocular	Trinocular			
GL6-208		Dual Halogen	6.5:1	10X - 65X
GL6-209		Halogen Fluorescent	6.5:1	10X - 65X
	GL6-380	Dual Halogen	6.5:1	10X - 65X
GL7-208		Dual Halogen	7:1	6.5X - 45X
GL7-209		Halogen Fluorescent	7:1	6.5X - 45X
	GL7-380	Dual Halogen	7:1	6.5X - 45X

Optical Body	Post Stand	Standard Boom	Smooth Boom	Articulating Arm Boom	Zoom Ratio
Binocular/	GL6-205/	GL6-206/	GL6-207/	GL6-208/	6.5:1
Trinocular	GL6-305	GL6-306	GL6-307	GL6-308	6.5:1
Binocular/	GL7-205/	GL7-206/	GL7-207/	GL7-208/	7:1
Trinocular	GL7-305	GL7-306	GL7-307	GL7-308	7:1

► GL Series Stereo Microscopes (continued)

The Non-illuminated stands

The Post and Boom stands are heavy duty and designed to provide ample support for many years. Allowing freedom of movement in multiple directions over the work area to facilitate inspection of large samples, their rugged structure minimizes vibration and tipping, even on a Trinocular head with camera attached.

GL Series optical bodies and stands master Industrial environments

Superb resolution meets demands in semi-conductor/high tech industries, medical device assembly and life science research.

- **Comfort First Design** - long duration tasks are less fatiguing with accessible controls
- **Large Field of view** - the GL7 boasts a 35mm object field size
- **Bonders & Probers** - compact design/long working distance facilitate machine mounts
- **Large Zoom Range** - accurate reproduction of the sample up to 260X
- **Wide range of imaging functions** - fully integrated camera/software systems

Boom Stands, available in three styles (pictured below) feature heavy bases for stability and tilting/swiveling mounts to facilitate observation of even hard to get to areas, but differ as follows:

Standard Boom is economical and well-matched to applications where continuous horizontal movement is not required. Used in medical device assembly where work stations and repetitive actions are common

Smooth Boom got its name from the smooth gliding motion produced by the ball bearings in the horizontal movement. Ideal for scanning large parts, like a circuit board, simply with the touch of a hand

Articulating Arm Boom features a counter balanced arm that moves vertically as well as horizontally, making it ideal for tight spaces



GL7-205 Post Stand has a slim, 1.25" / 35 mm, streamlined base for easy manipulation of large specimens
Measures: 12" (w) (30cm) x 12" (h) (30cm) x 11" (d) (27cm)



GL7-206 Standard Boom extends over a work area to aid in assembly/analysis
Measures: 10" (w) (25cm) x 19" (h) (49cm) x 18" (d) (45cm)



GL7-207 Smooth Boom utilizes ball bearings for smooth movement on X axis
Measures: 10" (w) (25cm) x 19" (h) (49cm) x 18" (d) (45cm)



GL7-208 Articulating Arm is spring balanced to articulate along XYZ axis
Measures: 13" (w) (33cm) x 16" (h) (41cm) x 33" (d) (84cm)

Specifications

Auxiliary Lens	10X Eye Piece, Field No. 22 Magnification	10X Eye Piece, Field No. 22 Field diameter (mm)	15X Eye Piece, Field No. 16 Magnification	15X Eye Piece, Field No. 16 Field diameter (mm)	20X Eye Piece, Field No. 13 Magnification	20X Eye Piece, Field No. 13 Field diameter (mm)	Working Distance
GL6 Series 6.5 :1 ratio							
0.5X	0.5X-32.5X	44.0 -6.7	7.5X -48.8X	21.3 -3.2	10X -65X	13 -2.0	220
0.75X	0.7X -48.8X	31.42 -4.5	11.2X-73.1X	14.2 -2.1	15X 97.5X	8.7 -1.3	120
1X (none)	10.0X -65X	22.0 -3.3	15X -97.5X	10.6 -1.6	20X -130X	6.5 -1.0	90
1.5X	1.5X -97.5X	14.6 -2.2	22.5X-146.2X	7.1-1.1	30X -195X	4.3 -0.7	43
2X	2X -130X	11.0 -1.6	30X -195X	5.3 -0.8	40X -260X	3.2 -0.5	30
GL7 Series 7 :1 ratio							
0.5X	3.3X -22.5X	67.7 -9.8	4.9X -33.8X	49.2 7.0	6.5X -45X	40 -5.8	163
0.75X	4.9X -33.8X	45.1 -6.5	7.3X -50.6X	32.8 -4.7	9.75X -67.5X	26.6 -3.8	117
1X (none)	6.5X -45X	33.8 -4.9	9.8X -67.5X	24.6 -3.5	13X -90X	20 -2.9	100
1.5X	9.8X -67.5X	14.6 -3	14.6X -101.3X	16.4- 2.3	19.5X -135X	13.3 -1.9	45
2X	13X -90X	19.5 -2.5	19.5X 135X	12.3 -1.8	26X -180X	13.3 -1.9	40

► GL Series Stereo Microscopes *(continued)*

Ordering Info

Illuminated Stand, Two Power and Zoom Magnification

GL6-2L	Binocular, 6.5:1 Zoom Ratio 10X to 65X, LED	each
GL6-280	Binocular, 6.5:1 Zoom Ratio 10X to 65X, Dual Halogen	each
GL6-290	Binocular, 6.5:1 Zoom Ratio 10X to 65X, Fluorescent/Halogen	each
GL6-3L	Trinocular, 6.5:1 Zoom Ratio 10X to 65X, LED	each
GL6-380	Trinocular, 6.5:1 Zoom Ratio 10X to 65X, Dual Halogen	each
GL6-390	Trinocular, 6.5:1 Zoom Ratio 10X to 65X, Fluorescent/Halogen	each
GL7-2L	Binocular, 7:1 Zoom Ratio 6.5X to 45X, LED	each
GL7-280	Binocular, 7:1 Zoom Ratio 6.5X to 45X, Dual Halogen	each
GL7-290	Binocular, 7:1 Zoom Ratio 6.5X to 45X, Fluorescent/Halogen	each
GL7-3L	Trinocular, 7:1 Zoom Ratio 6.5X to 45X, LED	each
GL7-380	Trinocular, 7:1 Zoom Ratio 6.5X to 45X, Dual Halogen	each
GL7-390	Trinocular, 7:1 Zoom Ratio 6.5X to 45X, Fluorescent/Halogen	each

Non Illuminated Post Stand

GL6-205	Binocular, 6.5:1 Zoom Ratio 10X to 65X	each
GL6-305	Trinocular 6.5:1 Zoom Ratio 10X to 65X	each
GL7-205	Binocular, 7:1 Zoom Ratio 6.5X to 45X	each
GL7-305	Trinocular 7:1 Zoom Ratio 6.5X to 45X	each

Note: Post Stands available with Reflected light only and Darkfield lighting

Non Illuminated Boom Stand

GL6-206	Binocular, 6.5:1 Zoom Ratio 10X to 65X	each
GL6-306	Trinocular 6.5:1 Zoom Ratio 10X to 65X	each
GL7-206	Binocular, 7:1 Zoom Ratio 6.5X to 45X	each
GL7-306	Trinocular 7:1 Zoom Ratio 6.5X to 45X	each
GL6-207	Binocular, 6.5:1 Zoom Ratio 10X to 65X, smooth ball bearing construction	each
GL6-307	Trinocular 6.5:1 Zoom Ratio 10X to 65X, smooth ball bearing construction	each
GL7-207	Binocular, 7:1 Zoom Ratio 6.5X to 45X, smooth ball bearing construction	each
GL7-307	Trinocular 7:1 Zoom Ratio 6.5X to 45X, smooth ball bearing construction	each
GL6-208	Binocular, 6.5:1 Zoom Ratio 10X to 65X, articulating boom	each
GL6-308	Trinocular 6.5:1 Zoom Ratio 10X to 65X, articulating boom	each
GL7-208	Binocular, 7:1 Zoom Ratio 6.5X to 45X, articulating boom	each
GL7-308	Trinocular 7:1 Zoom Ratio 6.5X to 45X, articulating boom	each

Accessories for GL Stereo Microscopes

GL-5X	0.5X Auxiliary Lens for GL Series	each
GL-15X	1.5X Auxiliary Lens for GL Series	each
GL-2X	2.0X Auxiliary Lens for GL Series	each
SM-0319	Polarization kit for GL7 Stereo	each
GL-E10	10X Wide Field Eye Piece for GL Series	each
GL-E15	15X Wide Field Eye Piece for GL Series	each
GL-E20	20X Wide Field Eye Piece for GL Series	each

► Z7 Series Zoom Stereo Microscope

Quality Optics and Illumination

Combine excellent optics with modern design for comfort/ease of use and you have the Jenco Z7 Series of Stereo Microscopes. Their affordability belies their performance: a zoom ratio of 7.6:1 produces a 6.6X to 50X magnification range. Durability to prevail beyond its 5 Year Warranty comes from the Z7 all metal focus mechanism and wide band coated optics. Welcome the Z7 into your analysis to unleash new discoveries without demolishing your budget.

- **Save Money** – economically priced with durable construction and LED illumination to help extend your savings
- **Save Time** - no need to refocus when zooming magnification, the Z7 is parfocal
- **Versatile** – Z7 suits multiple applications due to 4" working distance, wide field of view and cool LED lighting
- **Digital** – the built-in color camera model offers 3 Megapixel resolution and easy connection via USB 2.0

The Z7 Series has both Illuminated and Non-Illuminated Models

The Illuminated Stand - observe both opaque and transparent specimens using individual controls for the 5W upper LED and 3W lower LED lights. This bright cool light is good for heat sensitive samples and longevity of 10,000 hours.



Auxiliary Lens	10X Eye Piece, Field No. 22		15X Eye Piece, Field No. 16		20X Eye Piece, Field No. 13		Working Distance (mm)
	Magnification	Field Diameter (mm)	Magnification	Field Diameter (mm)	Magnification	Field Diameter (mm)	
0.5X	3.3X - 25X	69.7 - 9.2	4.9X - 37.5X	48.5 - 6.4	6.6X - 50X	36.4 - 4.8	189
0.75X	4.9X - 37.5X	46.5 - 6.1	7.4X - 56.2X	32 - 4.3	10X - 75X	24 - 3.2	122
1X (none)	6.6X - 50X	34.8 - 4.6	10X - 75X	24 - 3.2	13X - 100X	18 - 2.4	110
2X	13X - 100X	17 - 2.3	19.8X - 150	12 - 1.6	26X - 200X	09/01/02	36

Z7-2L	Binocular Zoom Stereo Microscope	each
Z7-3L	Trinocular Zoom Stereo Microscope	each
Z7-3M	Digital Zoom Stereo Microscope	each

► Polarized Microscope for Petrology

Polarized Investigations made Easy

The Polarizing Microscope is an excellent tool for Petrography and other mineral or earth science applications. Observation and analysis is easy with our strain-free optics and polarizing mechanisms that ensure concentric field of views and accurate identification. Built with user comfort in mind, the PL series is also built to last, with an all metal focusing mechanism, all metal frame and all glass condenser that will outlast the 5 year warranty. Key polarization features of models PL-211 and PL-311 Trinocular include:

- A rotatable (0-90°) Analyzer with slide in/out Bertrand Lens
- DIN standard full wave (first class red) and quarter wave compensators and quartz wedge with slide stops for positioning in the Analyzer
- A precision rotating stage graduated in 1° increments and a swing out polarizer
- Four strain-free objectives, each centerable, mounted on a rear facing four position turret

KEY SPECIFICATIONS

- Optical Body - Seidentopf design inclined 30° with 55 to 75 mm interpupillary adjustment, 360° rotation
- Nosepiece - Quadruple reversed
- Eye pieces - 10X; Focal Length 25mm, FN 18 mm. and one with crosshair and scale of 0.1mm.
- Objectives - Strain-free Achromat:
4X Working Distance 37.50mm NA 0.10 FOV 4.5mm
10X Working Distance 7.316mm NA 0.25 FOV 1.8mm
40X Working Distance 0.632mm NA 0.65 FOV 0.45mm
63X Working Distance 0.33mm NA 0.85 FOV 0.29mm
- Condenser - 1.25 N.A. 2 element Abbe with iris diaphragm and rack and pinion focusing
- Focusing - All metal mechanism with coaxial coarse/fine adjustment and markings at 0.002mm increments
- Illumination - 20 watt, 6 volt Halogen bulb with electronic dimmer
- Round stage - Diameter 145 mm., rotatable 360°, graduated in 1° increments, center adjustable
- Bertrand Lens- slides in and out of optical path
- Analyzer - Rotatable with 0-90° graduations
- Compensator- Full wave first class red and quarter wave and quartz wedge
- Polarizer - slides in and out of optical path
- Dimensions: (WHD) (in/cm) 8 x 15 x 9.5 / 29 x 61 x 38; Gross Weight (lb/kg) 19.8 / 9

Ordering Info

PL-211	Binocular, Polarizing Microscope	each
PL-311	Trinocular, Polarized Microscope	each



Analyzer with Bertrand Lens and Optical Compensators: full wave and ¼ wave



Round stage with 360° rotation and 1 mm. graduations



Polarizer slides in and out of light path above light collector



Camera Systems

EMS offers three types of camera systems for documenting resolved microscopic images.

Each system is fully integrated with:

- software for image analysis
- optical adapters to obtain the image in the correct focal plane
- cables for connection to computers, monitors or projectors

All components are conveniently packaged under one part number for easy ordering

Description	Stereo	Upright Compound	Inverted Compound
Digital Still Camera, 15 megapixel or better resolution, with memory card, USB cable, battery charger, optical adapter for microscope and Jenco Image Software	57-C15	59-C15	5A-C15
Digital Video Camera, USB 2.0, 5 Megapixel resolution for color imaging, optical adapter and measuring software	57-5M	59-5M	5A-5M
Digital Video Camera, USB 2.0, 3 Megapixel resolution for color imaging, optical adapter and measurement software	57-3M	59-3M	5A-3M
Adapter for Digital Still Camera	CM-0334-S	CM-0334-B	CM-0334-V
Adapter for Digital Video Camera, C-Mount	CM-0303	CM-0304	CM-0306

Note: CCD cameras and cooled CCD cameras for fluorescence available upon request.

► Metallurgical Microscopes

Materials Analysis and More

The Metallurgical Microscopes use long working distance objectives and reflected or incident illumination to deliver sharp, high contrast images of solid specimens. The large collector lens and light path combine with the specifically positioned diaphragms to allow more light for brighter images. A polarizer and analyzer and color filters are built-in to enhance observation. The Inverted model utilizes incident illumination for over size samples. The trinocular head allows for quick and easy attachment of cameras for documentation.

- Five long working distance objectives without cover slip correction for close specimen observation
- Transmitted illumination is facilitated with large glass inserts in the mechanical stage
- The polarizing analyzer is used in conjunction with the polarized filter cube, which is easily accessed via the push rod. The analyzer may also be placed on the lower light source and used with the polarized filter cube for transmitted light work.

KEY SPECIFICATIONS

- Optical body - Seidentopf design inclined 30°; 55 to 75 mm interpupillary adjustment, 360° rotation
- Nosepiece - quintuple, ball bearing
- Eye pieces - 10X, Focal Length 25mm, FN 18 mm.
- Focus mechanism - adjustable tension control to prohibit drift and adjustable up-stop to protect objective lenses; dial markings at 0.002mm increments
- Incident light system includes: condenser, iris diaphragm, color and polarizing filter. Transmitted illumination, 1.25 N.A. Abbe condenser with iris diaphragm; all systems use a 20 watt, 6 volt Halogen bulb



with dimmer

- Mechanical stage: (WxD) (in/cm) BC-233 two tiered: 10.7 5 x 10.875/ 27.30 x 27.62; MET-233: 6.3 x 3.4 / 16 x 14; BC4-311: 7.25 x 5.5 / 18.5x15; with right-hand coaxial dropdown control knobs
- Frame Dimensions: (WHD) (in/cm) BC-233:9.8x17x18/25x44x45; MET-233: 7.8x46.4x17/20x42x43; BC4-311; 7.7x13.5x22/19.5x34.5x55
- Gross Wt.: (lb/kg) BC-233: 80/36; MET-233 18/8.2; BC4-311 40/18.2

Objective Magnification	Numerical Aperture (mm)	Field of View w/ 10X E.P. (mm)	Working Distance Brightfield Plan Achromatic (mm)
5X LWD	0.12	3.6	18.3
10X LWD	0.25	1.8	8.9
20X LWD	0.40	0.9	8.7
50X R LWD	0.60	0.45	3.7
80X R LWD	0.80	0.225	0.96

Ordering Info

MET-233	Metallurgical Trinocular	each
BC4-311	Metallurgical Trinocular Inverted Model	each
BC-233	Metallurgical Trinocular	each

Image Software

Minimum System Requirements:

- 1) Microsoft Windows 98, ME, 2000, or XP. This software will not operate on Windows NT
- 2) A CD-ROM Drive to install the software.
- 3) An Ethernet Card for the license.dat file to identify (Software requires a License file to operate)

Jenco Image is a software tool for microscope image measurement. It captures or imports and archives database images and allows image annotation, Email links, or report generation. It can be used to measure point to point or multi-pointed lengths/distances and/or area of: lines, angles, circles, rectangles and ellipses in the captured image with calipers in metric, English or pixels. The system can also calculate a color area and percentage of color relative to the whole. The system can be calibrated to scale/magnification so the result of the measurements and virtual values will keep a 1:1 relation. All results can be saved in the computer for further research.

- Point-to-point linear measurement
- Radius and diameter on ellipse
- Area and perimeter for ellipse or rectangle
- Length of segmented lines
- Area and perimeter of irregular shapes
- Angle measurements
- Arc/Ellipse/Circle measurements including definition of center point, chord lengths, sweep angles, radii, and more

Jenco Image measurement software **JI-V1.2**



ProScope HR

high resolution handheld microscope

► The Wireless ProScope, ProScope HR and ProScope HR2 Digital Handheld Microscopes

► The Wireless ProScope Mobile

ProScope Mobile, the world's first handheld digital microscope, is now portable.

Powered by 3 AA batteries, ProScope Mobile creates its own Wi-Fi network. It can transmit images simultaneously to as many as 253 devices (iPad, iPod touch , or iPhone.) ProScope Mobile works on the free app called Airmicro (iPhone/iPod touch) and AirmicroPad (iPad) available from the iTunes App Store. With these apps, users can view live images, freeze and capture them to the photo album in their device. For Apple users, the photos will go directly into iPhoto when synced with a base computer.

Wireless offers new practical applications, which include:

- Field scientists can examine specimens on site without destroying them in transit to the lab
- Doctors can show patients live images and add them into practice management apps and software
- Teachers can simultaneously show images to a classroom of students using iPads
- Crime scene investigators can send images from the iPhone to a colleague in the lab or to a collaborative agency

Like the ProScope HR and HR2, ProScope Mobile users can select from a wide variety of lens magnifications from 1-10x, 30Nx, 50x, 100x, 200x and 400x. There are also adapters for analog microscopes and borescopes. ProScope Mobile is also sold in popular kits. See tables below for product specifications and comparisons.

► The ProScope HR and ProScope HR2 Digital Handheld Microscope

ProScope HR, the world's first handheld digital microscope, is now available in the original 1.3 mp imager and the **ProScope HR2**, adjustable 2.0 mp imager.

Since 2001 the ProScope HR has been a mainstay in science education, law enforcement, and manufacturing quality control worldwide. Included software for Windows and Mac will capture stills, video and time lapse. Lenses range 0-10X, 30X, 50X, 100X, 200X, 400X and 1000X. You can even connect the ProScope HR to your analog microscope, telescope or borescope. The ProScope HR is USB Video Class and needs no driver to run. You can even use the ProScope HR with programs like Skype or iChat to show others what your ProScope HR is seeing in real time over the internet!

Interchangeable lenses: 0-10X, 30N, 50X, 100X, 200X, 400X, 500X, 1000X, c-Mount and standard analog microscope adapters and borescope adapters

1.3 MP imager



ProScope HR

Interchangeable lenses: 1-10x, 30Nx, 50x, 100x, 200x and 400x c-Mount and standard analog microscope adapters

2 MP imager adjustable resolution up to 1600x1200



ProScope HR2

The ProScope HR Applications

Law Enforcement

Used by over 12,000 federal, state and municipal law enforcement agencies in 23 countries since 2001. Used by law enforcement for:

- Anti-Counterfeiting
- Ballistics examination
- Handwriting analysis
- Fingerprint Analysis
- Narcotics
- Crime Scene and Lab
- Blood Spatter
- Autopsy
- Interrogation Tool
- Court Room Presentations
- Iris and Dental Identification
- Explosives and Fire Investigations

Science Education

A few of the many applications in K-12 education are:

- Microbes
- Physical characteristics of soil
- Materials characterization
- Animal and plant structure
- Chemistry
- Minerals

Quality Inspections

- Inspection
- Detailed Measurements
- Image Analysis software and Screen Measurement software available



ProScope HR
high resolution handheld microscope

KEY FEATURES

ProScope HR:

- Accurate, repeatable measurement within 10 microns
- Modular lenses range from 1x to 1000x
- No driver needed. Just plug and play!
- Lead-free and RoHS compliant
- Attaches to other optics like Borescopes and analog microscopes
- Made in Oregon, USA
- 30-day no questions asked return policy
- Two year warranty

ProScope HR2:

The new ProScope HR2 features the new state-of-the-art, Aptina imager which was originally made for surveillance, with large pixels that take in more light than other imagers on the market. The Bodelin engineering team customized this imager to allow extensive imaging adjustment and LED intensity control. The most impressive feature is the ability to actually stream true pixels at higher resolutions. The ProScope HR2 is the only digital microscope in the world that can do this. Other imagers stream at 640X480 and only interpolate to simulate higher resolutions. The total effect in the ProScope HR2 is live video that appears to be 4 to 5 megapixels in clarity while only using an actual 2 megapixel imager. The new cobalt black handle says this is a serious tool yet the price point is equal to the previous ProScope HR, which will remain in the product line at a lower cost. The ProScope products are currently used in tens of thousands of schools, universities, law enforcement forensic labs, manufacturing quality control, medical and tele-medicine since 2001.

The ProScope HR and HR2 are made in Oregon, RoHS compliant (lead-free), UVC plug and play.

Software

ProScope HR software, for Mac OS X, Windows XP and Windows Vista, comes with every ProScope HR. The bundled software will capture stills, video and time lapse. Features include:

- Switch to any of three resolution settings: 320X240, 640X480, 1280X1024 with the ProScope HR and up to 1600X1200 with the ProScope HR2
- Show live views
- Still image capture
- Video capture
- Time lapse capture
- LED intensity control (HR2 only)
- Preview captured images
- Site license for use on your local network
- Standard images files can be saved in any folder

Mac System Requirements:

- OS 10.4.8 or later
- Quicktime 7 or later
- G4, G5 or Intel Mac
- Factory installed USB 2.0 or USB1.1 port
- USB 2.0 port recommended.

A USB 1.1 port may be used but only 640x480 (VGA) and 320x240 (QVGA) modes are supported and at a much reduced frame rate.

Windows System Requirements:

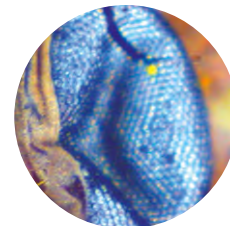
- Windows XP service pack 2 or later
- Quicktime 7 or later

DirectX 9 or later

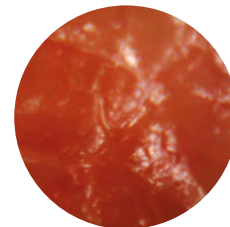
- P4 or equivalent
- Factory installed USB 2.0 or USB1.1 port
- USB 2.0 port recommended.

■ A USB 1.1 port may be used but only 640x480 (VGA) and 320x240 (QVGA) modes are supported and at a much reduced frame rate. Works with both original ProScope and new ProScope HR. (High Resolution mode only works with ProScope HR software and ProScope HR)

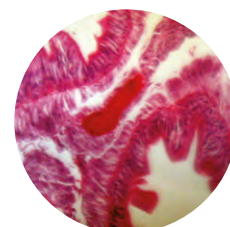
Three types of optional measurement software are also available. The software is accurate to within 10 microns and pre-calibrated for all ProScope lenses.



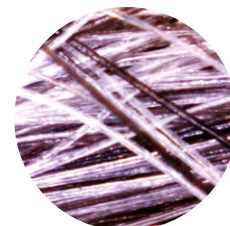
FLY EYE



CAPILLARIES



EARTHWORM



HAIR



PENNY

➤ ProScope Wireless, HR or HR2
CSI Science Level 1

KIT INCLUDES:

- ProScope HR™
- 0-10x Lens
- 50x Lens
- Carrying Case



68350-60	ProScope HR™ CSI Science Level 1	each
68350-60-2	ProScope HR2 CSI Science Level 1	each
68350-60-M	ProScope Mobile CSI Science Level 1	each

➤ ProScope Wireless, HR or HR2
CSI Science Level 2

KIT INCLUDES:

- ProScope HR™
- 0-10x Lens
- 50x Lens
- 200x Lens
- Precision Stand
- Carrying Case



68350-61	ProScope HR™ CSI Science Level 2	each
68350-61-2	ProScope HR2 CSI Science Level 2	each
68350-61-M	ProScope Mobile CSI Science Level 2	each

➤ ProScope Wireless, HR or HR2 Lab

KIT INCLUDES:

- ProScope HR™
- 0-10x Lens
- 50x Lens
- 200x Lens
- Precision Stand
- C-Mount Adapter
- Lens Tube Adapter
- Carrying Case



68350-62	ProScope HR™ Lab	each
68350-62-2	ProScope HR2 Lab	each
68350-62-M	ProScope Wireless Lab	each

➤ ProScope Wireless, HR or HR2
Advanced Lab

KIT INCLUDES:

- ProScope HR™
- 0-10x Lens
- 30Nx Lens
- 100x Lens
- 400x Lens
- Precision Stand
- C-Mount Adapter
- Lens Tube Adapter
- Carrying Case



68350-63	ProScope HR™ Advanced Lab	each
68350-63-2	ProScope HR2 Advanced Lab	each
68350-63-M	ProScope Mobile Advanced Lab	each

➤ ProScope HR and ProScope HR2
QC Inspector

KIT INCLUDES:

- HR base
- 0-10x Lens
- 50x Lens
- HR round base stand
- Proscope HR software
- Screen Measurement software
- Deluxe case



68350-64	QC Inspector ProScope HR	each
68350-64-2	QC Inspector ProScope HR2	each

➤ ProScope HR and ProScope HR2
QC LAB

KIT INCLUDES:

- HR base
- 0-10x Lens
- 30N Lens
- 100x Lens
- 200x Lens
- HR round base stand
- Proscope HR software
- LX Proscope HR software
- Deluxe case



68350-65	QC Lab ProScope HR	each
68350-65-2	QC Lab ProScope HR2	each

▶ ProScope Wireless, HR, or HR2 w/ 50x Lens

The ProScope HR™ with the 50x lens is perfect for a wide variety of uses from science education, crime scene investigation, industrial inspection and more.

68350-50x	ProScope HR™ w/ 50x Lens	each
68350-50x-2	ProScope HR2™ w/ 50x Lens	each
68350-50x-M	ProScope Wireless w/ 50x Lens	each



▶ ProScope Wireless with 30n Lens

The ProScope Mobile with 30n lens is made for dermatology and dental use as it utilizes a ring of polarized LEDs as well as white reflective LEDs.

68350-3n-M	ProScope HR w/ 30n Lens	each
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▶ ProScope HR™ and ProScope HR2™ Base Unit w/o Lens

Start with the base and add whatever lenses suit your needs. If you owned the previous version of the ProScope, then all you need is this base and your current lenses to enjoy the new high resolution ProScope HR™.

68350-00	ProScope HR™ Base Unit	each
68350-00-2	ProScope HR2™ Base Unit	each



▶ The ProScope Stand

Designed and developed for law enforcement, the ProScope Stand will steadily hold the ProScope in a wide variety of positions. Perfect for law enforcement, industrial inspection, and biology when working at high magnification.



68353-13	ProScope Stand	each
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▶ The ProScope Flexible Stand

With a smooth z-axis adjustment and solid base, the ProScope Flexible Stand is perfect to hold the ProScope steady for classroom science experiments or quality inspections.



68353-13-2	The ProScope Flexible Stand	each
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▶ 0-10x LENS

Our most versatile lens, the 0-10x is a variable focus lens that can be used as a webcam, still or video camera lens, or manually adjusted to 10x magnification. Perfect for text, dissection, entomology, gems, crime scene investigation, circuit board inspection, assembly inspection and much more. 12 white LEDs give great illumination at short distances. Turn the LEDs off and use your own light source.

68352-10	0-10X Lens	each
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▶ 30N LENS

The 30N lens utilizes white and polarized LED's for a non-reflective view. Perfect for skin, teeth, gems and metal surfaces.

68352-30	30N Lens	each
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▶ 50x LENS

Preferred by science educators and law enforcement investigators, the 50x lens is the best base lens to start with for almost any use.

68352-50	50X Lens	each
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▶ 100x LENS

Perfect for fingerprints, agricultural inspection, general biological studies. With this lens you can actually watch perspiration ooze from the pores on your fingerprints.

68352-100	100X Lens	each
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▶ 200x LENS

Perfect for fiber analysis, ballistics, print inspection and microorganism study.

68352-320	200X Lens	each
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▶ 400x LENS

Our most powerful lens, used for microorganism imaging.

68352-340	400X Lens	each
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▶ C-Mount Adapter

Use your own optics with our industry standard 25.4mm c-mount adapter. Attach the ProScope to an existing microscope, telescope or camera lenses to capture digital images and expand your digital imaging tools.

68353-10	C-Mount Adapter	each
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► C-Mount Adapter w/ IR Cut Filter for ProScope

This special C-Mount adapter incorporates a high quality IR cut filter. Highly recommended for professional users that require best color reproduction when using the ProScope HR/HR2 with a microscope, telescope, or borescope. The IR cut filter is made from high quality BK7 optical glass and has a transmission range of approximately 380nm to 700nm, the visible light spectrum. Invisible wavelengths, that can still be seen by the high quality HR series imagers, are removed for best color reproduction in critical applications.



68353-10-2 C-Mount Adapter w/ IR Cut Filter for ProScope each

► Lens Tube Adapter

If your microscope DOES NOT have a c-mount, our microscope lens tube adapter slides into a common 23mm ocular tube under the eyepiece which makes the connection from the ProScope to your microscope or telescope. YOU MUST USE THE C-MOUNT ADAPTER WITH THE MICROSCOPE LENS TUBE ADAPTER TO BE ABLE TO ATTACH THE PROSCOPE TO YOUR MICROSCOPE OR TELESCOPE.



68353-12 Lens Tube Adapter each

► The ProScope Case

The ProScope case is made of durable hard plastic shell and a soft inner mold with slots for the ProScope, all the lenses and the ProScope stand. Perfect for safely and securely taking your ProScope and lenses into field.



68353-14 ProScope Case each

► The ProScope Large Deluxe Case

Need one of everything? This large hard-sided case with foam interior will hold the ProScope and all the accessories.



68353-14-2 The ProScope Large Deluxe Case each

► Image Analyzer

ImageAnalyzer is a powerful multi-featured program designed to work with your original ProScope or ProScope HR. Measurements, grids, powerful image enhancement tools, and screen capture with voice-over are just a few of its many features.



68353-17 Image Analyzer each

► Measurement Software

Screen Calipers, Screen Compass and Screen Protractor are unique on-screen measurement tools that let you measure anything on your computer screen with ultimate accuracy.



68353-18 MacCalipers ProScope Edition each
68353-19 Screen Calipers for Windows ProScope Edition each
68353-20 Screen Measurement Pack Mac Edition each
68353-21 Screen Measurement Pack Windows Edition each

► LX-PROSCOPE HR (Windows XP SP2/Vista and up / Mac OS X 10.4.8 and up)

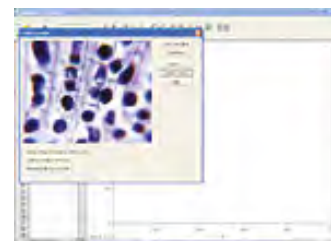
Capture stills, video, time lapse, perform detailed measurement, and annotate your still images with this elegant and sophisticated interface. Works with the original ProScope or ProScope HR under Mac OS X, Windows XP and Vista. (Windows XP SP2/Vista and up / Mac OS X 10.4.8 and up)



68353-22 LX-PROSCOPE HR each

► Logger Pro® 3

Logger Pro is the premier data collection and analysis software for education.



KEY FEATURES INCLUDE:

- Ability to take stills, movies, and time-lapse movies from the ProScope HR
- Supports data collection with 60+ Vernier sensors
- Automatically synchronizes sensor data with movies
- Statistical analysis of sensor data includes integrals, tangents, curve fitting, and more
- Allows for manual entry of data into a data table, to easily create graphs, and do further analysis of data
- 12 built-in self guided tutorials

Educational purchases of Logger Pro include a site license for all computers in a K-12 school or college department, including students' personal computers.

68353-23 Logger Pro3 each

Technical Specifications

	ProScope HR
Imager	¼ inch high resolution 1.3Mp color sensor 1,310,720 effective pixels
Interface	USB 2.0 or USB 1.1, USB 2.0 required for high resolution mode (SXGA) and higher frame rates.
Magnification	Varies based on attached lens. ProScope HR base unit can also attach to a traditional microscope via our optional C-mount adapter. 1-1 0x, 30Nx, 50x, 1 00x, 200x and 400x lens options available (approximate magnification when displayed on a 14-inch video monitor).
Dimensions	152mm (length), 45mm (width)
Weight	About 150g, without lens unit attached. About 185g with lens unit attached.
Power Consumption	About 400mA When using a 5V light source.
Length of cable	About 1 .8m (6 ft)
Capture Button	Initiates still, movie, and time lapse capture in ProScope HR software.
Light Switch	3-position on/off switch for lens LEDs A-OFF-B
Camera Mount	(2) standard tripod mount ¼" — 20 threads
Lens Release Button	Disengages lens lock pin for lens removal.
Video Preview	30 fps @ 320x240 pixels (QVGA) 15 fps @ 640x480 pixels (VGA)--- 3.75 fps @ 1280x1 024 pixels (SXGA)
LED Control	3-position on/off switch for lens LEDs. A-OFF-B Variable LED Intensity through ProScope HR Software.
Video Controls	Brightness, Contrast, Hue, Saturation, and Sharpness. Light Source/White Balance options include ProScope HR LED, Incandescent, Fluorescent, Daylight, and Auto.
Still Capture	USB 2.0 High Speed 320x240 pixels (QVGA) 640x480 pixels (VGA) USB 1.1 Full Speed 320x240 pixels (QVGA) 640x480 pixels (VGA) 1280x1 024 pixels (SXGA) High resolution mode (SXGA) not available
Video Capture	USB 2.0 High Speed 30 fps @ 320x240 pixels (QVGA) 15 fps @ 640x480 pixels (VGA) 3.75 fps @ 1280x1 024 pixels (SXGA) USB 1.1 Full Speed ~4 fps @ 320x240 pixels (QVGA) ~ 1 fps @ 640x480 pixels (VGA) High resolution mode (SXGA) not available.
Driver	USB Video Class USB Human Interface Device Class
Macintosh minimum system requirements	OS 10.4.8 or later Quicktime 7 or later Factory installed USB 2.0 or USB 1.1 port G4, G5 or Intel Mac USB 2.0 port recommended. A USB 1.1 port may be used but only 640x480 (VGA) and 320x240 (QVGA) modes are supported and at a much reduced frame rate.
Windows minimum	Windows XP Service Pack 2 or later Quicktime 7 or later DirectX 9 or later Factory installed USB 2.0 or USB 1.1 port Pentium 4 or equivalent USB 2.0 port recommended. A USB 1.1 port may be used but only 640x480 (VGA) and 320x240 (QVGA) modes are supported and at a much reduced frame rate
Operating Temperature Range	5°C~40°C
Storage Temperature Range	-10°C~60°C (Without condensation)
Other	RoHS Compliant, Lead Free, Made in USA
Warranty	Two Year Warranty

	ProScope HR2
Imager	¼ inch high resolution 2Mp color sensor 1,920,000 effective pixels.
Interface	USB 2.0 High Speed
Magnification	Varies based on attached lens. ProScope HR base unit can also attach to a traditional microscope via our optional C-mount adapter. 1-10x, 30Nx, 50x, 100x, 200x and 400x lens options available (approximate magnification when displayed on a 14-inch video monitor).
Dimensions	152mm (length), 45mm (width).
Weight	About 150g without lens unit attached. About 185g with lens unit attached.
Power Consumption	About 400mA When using a 5V light source.
Length of cable	About 1 .8m (6 ft)
Capture Button	Initiates still, movie, and time lapse capture in ProScope HR software.
Light Switch	3-position on/off switch for lens LEDs A-OFF-B
Camera Mount	(2) standard tripod mount ¼" — 20 threads
Lens Release Button	Disengages lens lock pin for lens removal.
Video Preview	30 fps @ 320x240 pixels (QVGA) 15 fps @ 640x480 pixels (VGA) 3.75 fps @ 1280x1024 pixels (SXGA) 2.5 fps @ 1600x1200 pixels (UXGA)
LED Control	3-position on/off switch for lens LEDs. A-OFF-B Variable LED Intensity through ProScope HR Software.
Video Controls	Brightness, Contrast, Saturation, Sharpness, Manual and Auto Exposure, Image Orientation (Flip and Mirror), Manual and Auto White Balance presets, and RGB White Balance components. Light Source/White Balance presets include ProScope HR LED, Incandescent, Fluorescent, Daylight, and Auto.
Still Capture	320x240 pixels (QVGA) 640x480 pixels (VGA) 1280x1024 pixels (SXGA) 1600x1200 (UXGA)
Video Capture	30 fps @ 320x240 pixels (QVGA) 15 fps @ 640x480 pixels (VGA) 3.75 fps @ 1280x1024 pixels (SXGA) 2.5 fps @ 1600x1200 pixels (UXGA)
Driver	USB Video Class USB Human Interface Device Class
Macintosh minimum system requirements	OS 10.4.8 or later Quicktime 7 or later Factory installed USB 2.0 high speed port G4, G5 or Intel Mac
Windows minimum	USB 2.0 port recommended. A USB 1.1 port may be used but only 640x480 (VGA) and 320x240 (QVGA) modes are supported and at a much reduced frame rate
Operating Temperature Range	5°C~40°C
Storage Temperature Range	-10°C~60°C (Without condensation)
Other	RoHS Compliant, Lead Free, Made in USA
Warranty	Two Year Warranty

	NEW! ProScope Wireless
Imager	¼ inch 5Mp Color CMOS
Interface	Wi-Fi
Magnification	X50 (when standard lens is used) Approximate magnification when displayed on 14-inch monitor.
Dimensions	153mm(H)x46mm(W)x43mm(D) (without Lens) 130g (without battery, with Lens)
Power Consumption	about 2.5W with standard lens
Length of cable	N/A
Capture Button	a) Freeze/Release b) Still image capture c) Push W/B after still image captured d) QVGA/VGA exchange e) Initialize for factory settings (Maintained after power supply is switched OFF)
Light Switch	"A-OFF-B (depends on the attached lens) A: OFF, or reflective LEDs"
Camera Mount	"OFF:OFF B: Reflective LEDs, or Non Reflective LEDs" 1/4-20 UNC
Lens Release Button	Unlocks Lens for Removal
Video Preview	15 fps (It changes with radio wave environment and the use device.) 320x240 (QVGA) / 640x480 (VGA)
LED Control	ON: The image is being transmitted OFF: Power OFF or Battery is low Flash 0.5sec: The W/B is being changed Flash 1sec: The resolution is being changed Flash 2sec: Initialize for factory settings Manual White Balance, Automatic Gain Control
Video Controls	Still image capture varies by Application
Still Capture	15 fps (It changes with radio wave environment and the use device.) 320x240 (QVGA) / 640x480 (VGA)
Video Capture	
Driver	N/A
Macintosh minimum system requirements	N/A
Windows minimum	N/A
Operating Temperature Range	0°C~40°C
Storage Temperature Range	-10°C~60°C
Other	US Patent 5,442,489
Warranty	Two Year Warranty

Using ProScope HR Software

Once installed, ProScope HR software basically works like the LCD screen on your digital camera. The main viewscreen displays what the ProScope HR 'sees' in real time until you're ready to capture the image or video. This is called live mode. Images and video can be captured two ways:



1. Depressing the large white button on the ProScope HR itself.
2. Click the red capture button on the upper right side of the main window.

After an image or video clip has been captured, the image can be previewed by clicking the thumbnails below the main window. This is called preview mode. To return to live mode, click the main window.

There are three capture modes in which to shoot your subject:



1. **Still Image** - located at the top-left of the main window. Use this setting when you want to take still images, not video. You can capture images in three resolutions. Click the bar to activate.
2. **Video** - located at the top-center of the main window. Use this setting when you want to record video. You can record video in three resolutions. Click the bar to activate.
3. **Time Lapse** - located at the top-right of the main window. Use this setting when you want to record subjects in time lapse. You can record



Attaching a lens



To attach a lens, line up the mark on the side of the base...



...with the dot on the side of the lens.



Turn the lens clockwise until it clicks into place.



Turn on the lens lighting to make sure the lens is properly attached.

Removing a lens



To remove a lens, press and hold the lens release button...



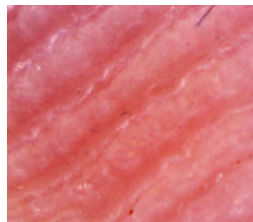
while turning the lens counter-clockwise until the lens dot and mark on the base line up. Then remove the lens.



Finger at 10x



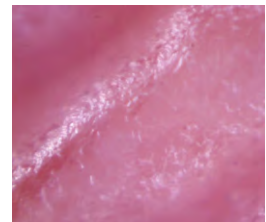
Finger at 50x



Finger at 100x



Finger at 200x



Finger at 400x

Focusing



For 30N and 50x lenses, turn the lens cone counter-clockwise until it stops. The lens cone is now fully extended and in touch view position. Simply touch the object to the end of the lens cone.



Turning the cone clockwise until it stops will fully retract it. The lens cone is now in distance view position. The focal distance is approx. 1/2-inch from the cone end. Use this mode if you do not want to touch the lens cone to your subject.



The 1/10x lens only works at a distance and can be adjusted in focus and magnification from 0x to 10x by turning the outer one. Great for use as a digital camera, web cam or dissecting scope.



The 100x, 200x and 400x lenses can be adjusted from touch view to distance view by turning the the forward part of the lens cone. Unlike the 30N or 50x lens, there is not an exact cone position for touch or distance view.

Adapting your old microscope into a digital microscope



Your old microscope.



Remove the ocular or eyepiece. On binocular microscopes, this would be the left ocular.



Depending on whether your microscope has a C (camera) mount, you may need to use one or both adapters.



This is the C-mount adapter.



If you have tiny C-mount threads under the ocular, then you only need the C-mount adapter.



If you don't have C-mount threads, then you'll need to use the Lens Tube with C-mount adapter.



Simply thread the C-mount adapter on to the lens tube.



Connect the C-mount/lens tube to the ProScope like you would any ProScope lens.



Now your ProScope HR is able to receive the image and you can view it on your computer screen.



When using the ProScope HR in distance view position, we recommend the ProScope HR stand — it will keep your ProScope HR steady and at the perfect focal distance.

ProScope HR
high resolution handheld microscope

► The ProScope Micro Mobile

ProScope Micro Mobile, the world's first handheld digital microscope, is now adaptable to mobile devices.

The first professional mobile microscope for our mobile device world. The new ProScope Micro Mobile uses custom coated glass optics to work with your onboard camera and provide superb quality images up to 80X. Built-in LEDs adjust to reduce reflection and are powered by a sleek rechargeable battery for up to 5 hours continuous use. Made with impact resistant Nylon and ABS for years of field, lab, classroom and exam room use.

FEATURES

- 20X to 80X magnification via Edmund pro level glass optics (specially coated lenses for better image quality and color reproduction).
- Adjustable LEDs to reduce surface reflection and powered by a sleek onboard Lithium Ion battery for 5 hours of continuous use.
- USB charging cable to recharge to full capacity in 2 hours.
- Built in desktop stand for hands free use.
- Made with impact resistant nylon and ABS for years of field operation.
- 1 year warranty.
- Made in Oregon, USA.

Applications

- Field scientists can examine specimens on site without destroying them in transit to the lab
- Doctors can show patients images and add them into practice management apps and software
- Crime scene investigators can send images from the device to a colleague in the lab or to a collaborative agency

There are adapters for use with other camera-equipped smart phones and tablets. ProScope Micro Mobile is also sold in popular kits. See tables below for product specifications and comparisons.



ProScope Micro Mobile with iPhone



ProScope Micro Mobile with iPad Mini



ProScope Micro Mobile with iPad

Technical Specifications

Compatibility	iPhone 5, iPhone 4/4S, iPad mini, iPad 2nd/3rd/4th gen, and iPod touch 4th gen. Also works with other camera-equipped Smartphones and tablets. (additional adapters may be required)
Lens Options	PMM-2080X - 20-80x lens Digital Zoom Magnification Range of 20x to 80x Precision glass optics for sharp image detail and accurate color reproduction
Buttons and Switches	Light Switch A/B A: 6 LEDs B: 6 LEDs Rocker Switch Increases/Decreases LED intensity Rocker Switch - Center Button Turns LEDs and charging circuit ON/OFF
LEDs	12 White LEDs 6 illuminated in A switch position 6 illuminated in B switch position (for use with optional polarizing filter)
Indicator LED	Indicates battery charge status While Charging: <20% = Blinking Red <50% = Blinking Yellow <99% = Blinking Green 100% = Solid Green While Operating: <20% = Solid Red <50% = Solid Yellow <=100% = Solid Green
Ports	USB MiniB (F) For connecting USB cable to charge internal battery
Power	Rechargeable Internal Lithium-ion Polymer Battery - 3.7v 340mAh Continuous operation at full LED intensity, approx 5 hours Typical use operation, several days Charging time from depleted state to full charge, approx 2 hours MiniB (M) to USB A (M) USB cable Powers LEDs when battery has no charge Charges Battery from standard computer USB port or charger with USB 5-volt port

Ordering Information

➤ ProScope Micro Mobile Kit for iPad

Kit Includes:

- ProScope
- 20-80x Lens
- iPad Sleeve
- Adjustable Nylon Lens Cone
- Stand
- USB Charging Cable



Cat. #	Description	Qty.
68351-01	ProScope Micro Mobile, iPad Kit	each

➤ ProScope Micro Mobile Kit for iPad Mini

Kit Includes:

- ProScope
- 20-80x Lens
- iPad Mini Sleeve
- Adjustable Nylon Lens Cone
- Stand
- USB Charging Cable



Cat. #	Description	Qty.
68351-02	ProScope Micro Mobile, iPad Mini Kit	each

➤ ProScope Micro Mobile Kit for iPhone 4/4S

Kit Includes:

- ProScope
- 20-80x Lens
- iPhone 4/4S Sleeve
- Adjustable Nylon Lens Cone
- Stand
- USB Charging Cable



Cat. #	Description	Qty.
68351-03	ProScope Micro Mobile, iPhone 4/4S Kit	each

➤ ProScope Micro Mobile Kit for iPhone 5

Kit Includes:

- ProScope
- 20-80x Lens
- iPhone 5 Sleeve
- Adjustable Nylon Lens Cone
- Stand
- USB Charging Cable



Cat. #	Description	Qty.
68351-04	ProScope Micro Mobile, iPhone 5 Kit	each

➤ ProScope Micro Mobile Kit for iPod Touch 4th Gen

Kit Includes:

- ProScope
- 20-80x Lens
- iPod touch 4th gen Sleeve
- Adjustable Nylon Lens Cone
- Stand
- USB Charging Cable



Cat. #	Description	Qty.
68351-05	ProScope Micro Mobile, iPod Touch 4th Gen	each

➤ ProScope Micro Mobile Base without Sleeve

- ProScope
- 20-80x Lens
- Adjustable Nylon Lens Cone
- Stand
- USB Charging Cable



Cat. #	Description	Qty.
68351-06	ProScope Micro Mobile Base Only	each



iPhone 4/4S Sleeve iPad Sleeve

ProScope Micro Mobile a la carte

68351-20	iPad Sleeve	each
68351-21	iPad Mini Sleeve	each
68351-22	iPhone 4/4S Sleeve	each
68351-23	iPhone 5 Sleeve	each
68351-24	iPod Touch (4th Gen) Sleeve	each
68351-25	Replacement USB Charging Cable	each
68351-26	Replacement Nylon Lens Core and Stand Set	each
68351-27	Power Adapter/Charger - dual USB Ports	each
68351-28	20x-80x lens	each
68351-29	Polarizing Filter	each

Optional Accessories

➤ 4x5 Slim Edge Light Pad

Plants, leaves and even the internal organs of insects can be seen live when you turn off your ProScope light and turn on your new Logan Light Pad. AC and DC (6 AAA batteries not included) your backlight source goes everywhere you need to use your ProScope.



68353-02	4x5 Slim Edge Light Pad	each
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Fluorescence isn't just for research microscopes anymore...

Now sort on your laboratory-level stereos
Use to facilitate micromanipulation and dissection
Expand from your research lab to your classroom

Modular...

Installs in seconds - just clicks into place
Interchangeable excitation/emission combinations
Move from microscope to microscope
No modification to your microscope needed

Economical - More Glow for the Dough...

Stretch your lab budget
Inexpensive enough for classroom use

Grows as your lab grows...

Buy just what you need now (up to 5 different wavelength sets)
Add more as your needs expand

▶ NIGHTSEA™ Stereo Microscope Fluorescence Adapter

Adapt your existing lab stereo microscopes for fluorescence

The NIGHTSEA™ Stereo Microscope Fluorescence Adapter adapts just about any stereo microscope (dissecting microscope) for fluorescence with no modification to the microscope itself. The modular design lets you easily switch between several different excitation/emission combinations to work with a variety of fluorescent proteins and other fluorophores. There are now five different excitation/emission combinations available, plus white light.

Applications

This simple system is excellent for:

- Quick screening of your fluorescent genotypes -Drosophila, zebrafish, C. elegans,...
- Genotype sorting
- Fluorescence-aided dissection, injection, or micromanipulation
- Freeing up your research-grade fluorescence microscopes for more demanding work
- New faculty start-up budgets
- Bringing fluorescence into the teaching laboratory

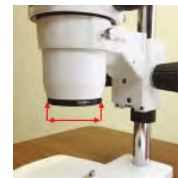
The Stereo Microscope Fluorescence Adapter system consists of:

- Flexible gooseneck lamp base with power supply
- Light head
- Ring adapter for microscope
- Barrier filter
- Filter shield

The light head, barrier filter, and filter shield are interchangeable so that you can easily switch between excitation/emission light+filter combinations.

The microscope mounting adapter fits up to 67mm to work with the majority of stereo microscopes.

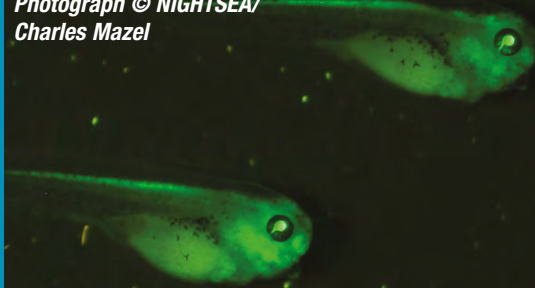
Once you are set up for one excitation/ emission wavelength combination, additional combinations can be added by purchasing a kit that consists of a light head, barrier filter, and viewing shield. These three elements can be removed and replaced in seconds, and color coding ensures that you are using the right combination. The barrier filter clicks on to the ring adapter magnetically, so it is easy to remove it to switch back to white light viewing.



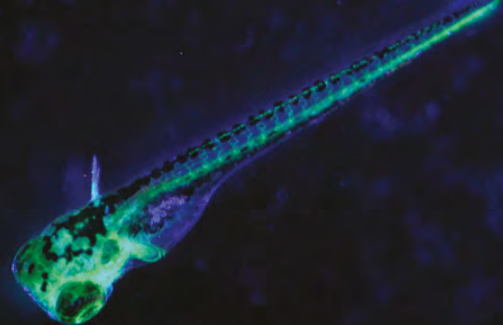
GFP-tagged Drosophila larva.
Photo © NIGHTSEA™/
Charles Mazel



Stage 41 X. tropicalis, transgenic OTX-GFP eyes.
Photograph © NIGHTSEA/
Charles Mazel



Zebrafish - GFP fluorescence
© NIGHTSEA/Charles Mazel



► NIGHTSEA™ Stereo Microscope Fluorescence Adapter (continued)

Specifications

Filter Set	Excitation	Emission	Fluorophores
RB - Royal Blue	440-460nm	500nm LP	GFP, eGFP, fluorescein...
CY - Cyan	490-515nm	550nm LP	YFP, Venus, Lucifer Yellow...
GR - Green	510-540nm	600nm LP	DsRed, dTomato...
VI - Violet	400-415nm	460nm LP	CFP, ...
UV - Ultra Violet	360-380nm	415nm LP	DAPI, ...

Microscope Mounting Adapter - fits up to 67mm standard

Ordering Information

Adapter system:

Full system with one illumination color consisting of:
 Lamp Base with Power Supply
 Light Head-Royal Blue, Cyan, Green, or Violet
 Microscopy Mounting adapter
 Barrier Filter
 Viewing Shield
 Padded Storage Box

Cat No.	Description	Qty.
SFA-RB	Full System with Royal Blue	each
SFA-CY	Full System with Cyan	each
SFA-GR	Full System with Green	each
SFA-VI	Full System with Violet	each
SFA-UV	Full System with Ultra Violet	each

See how it works... Learn how to do it...

We've added video content to our website to help you get to know our latest products even better! Stop by and see what it's all about.



Stereo microscope configured for green fluorescence, viewing *Xenopus* through shield filter for sorting.



Accessories:

► Add-On Light and Filter Sets:

Each add-on excitation/emission set consists of:

- Light Head
- Barrier Filter
- Viewing Shield
- Padded Storage Box



Cat No.	Description	Qty.
SFA-LFS-RB	Add-On Light and Filter Set, Royal Blue	each
SFA-LFS-CY	Add-On Light and Filter Set, Cyan	each
SFA-LFS-GR	Add-On Light and Filter Set, Green	each
SFA-LFS-VI	Add-On Light and Filter Set, Violet	each
SFA-LFS-UV	Add-On Light and Filter Set, Ultra Violet	each

► Modular White Light Head

A white light head is also available as an illumination option for the Stereo Microscope Fluorescence Adapter. Now if you are using the NIGHTSEA system for fluorescence you do not need a separate light source for your white-light work - just exchange the fluorescence excitation light head module for the white-light module in a matter of seconds. Extremely convenient for general illumination and as a focusing aid for fluorescence imaging.



Cat No.	Description	Qty.
SFA-LFS-WH	Modular White Light Head	each

NIGHTSEA™ Accessories continued on next page ►►►

► NIGHTSEA™ Stereo Microscope Fluorescence Adapter (continued) Accessories

► Eclipse MicroTent



The Eclipse MicroTent™ is a unique product for fluorescence microscopy that provides local darkness around conventional laboratory stereo microscopes. Fluorescence microscopes are kept in dark rooms for good reason - fluorescence can be weak and in many cases it can be difficult to see well if there is any ambient light. Microscopes may be on lab benches in shared spaces, near windows, or in other difficult-to-darken locations such as in the field. Turning off overhead lights can help but inconveniences others.

The Eclipse Microtent creates local darkness around a microscope while still providing easy access to the sample stage and the focus and zoom controls. It is designed for stereo microscopes but could potentially be used with many varieties of compound microscopes.

Features

- Opening for the microscope oculars with elastic sleeve to minimize light entry
- Large front flap provides easy access to the sample stage and can fasten open
- Arm slots on sides to provide access to focus and zoom controls
- User-customizable to provide additional penetrations for camera port, power cords, CO2 lines, or other features as you need
- Tru-Block™ Eye Shields included with every Eclipse MicroTent
Folds flat for storage

Dimensions: 46 x 30 x 50 cm (18 x 12 x 20 in.)

Cat No.	Description	Qty.
SFA-TENT	Eclipse MicroTent	each

► Eye Shields

Light entering your eyes from the side can interfere with what you want to see in microscopy in general, and fluorescence microscopy in particular. Eye cups are available, but the standard ones don't extend far from the microscope and don't do a good job as ambient light increases. Our soft, molded rubber high-sided microscope eye shields are the answer. The tall wings extend up far enough to truly shield your eyes from any level of ambient light and eliminate distractions so that you can see your subject better. Two pairs (one Standard, one Compact) will be included with every Eclipse MicroTent™, and you can also purchase them separately.



The Tru-Block Eye Shields are available in two sizes:

Standard —
fits 36 - 45mm (1.45 - 1.75")

Compact —
fits 28 - 37mm (1.10 - 1.46")

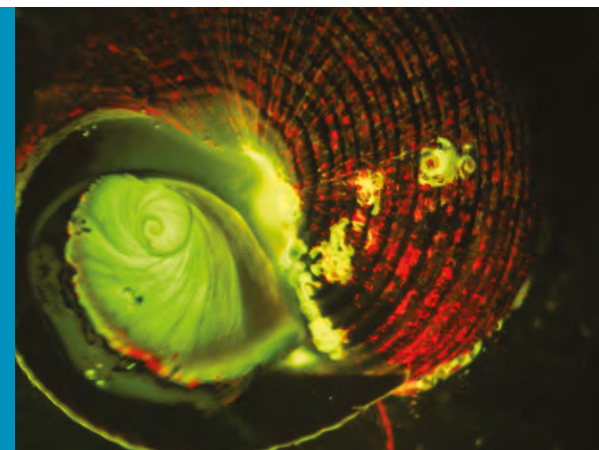


Standard



Compact

Cat No.	Description	Qty.
SFA-EYE-S	Tru-Block Eye Shields - Standard	set
SFA-EYE-C	Tru-Block Eye Shields - Compact	set



► NIGHTSEA™ Stereo Microscope Fluorescence Adapter (continued)

Accessories

► NIGHTSEA™ a la carte

Need an extra, not a set?
Order from here:



Cat No.	Description	Qty.
SFA-LH-RB	Nightsea Light Head-Royal Blue	each
SFA-LH-CY	Nightsea Light Head-Cyan	each
SFA-LH-GR	Nightsea Light Head-Green	each
SFA-LH-VI	Nightsea Light Head-Violet	each
SFA-LH-UV	Nightsea Light Head-Ultra Violet	each
SFA-LH-WH	Nightsea Light Head-White	each
SFA-BF-RB	Nightsea Barrier Filter-Royal Blue	each
SFA-BF-CY	Nightsea Barrier Filter-Cyan	each
SFA-BF-GR	Nightsea Barrier Filter-Green	each
SFA-SH-RB	Nightsea Shield-Royal Blue	each
SFA-SH-CY	Nightsea Shield-Cyan	each
SFA-SH-GR	Nightsea Shield-Green	each
SFA-AD	Nightsea Adapter	each
SFA-BASE	Nightsea Base	each

► NIGHTSEA BlueStar™ Flashlight

The BlueStar flashlight combined with the matched barrier filter glasses is a convenient, powerful tool for exciting fluorescence in many subjects.

The BlueStar uses the latest in high intensity LED technology combined with specialized optics to produce an ultra-tight, ultra-bright 10-degree beam pattern for maximum excitation of fluorescence.

Comes with adjustable, cushioned wrist lanyard, rubber glare guard. Made in USA.



Specifications

Bulb Type	High intensity 1W LED Royal Blue - 440 - 460nm
Burn Time	6 hours at full power
Lamp Life	>10,000 hours
Battery	3 C-cell

Cat No.	Description	Qty.
BLS-1	BlueStar light plus style VG1 filter glasses	each
BLS-2	BlueStar light plus style VG2 filter glasses	each
BLS-3	BlueStar light plus style VG3 filter glasses	each

► NIGHTSEA™ Barrier Filter Glasses

Styles 1 and 2 fit over eyeglasses, Style 3 does not.

Glasses meet ANSI Z87.1 impact standards for safety glasses.

Cat No.	Description	Qty.
VG-1	Yellow filter glasses, style 1	each
VG-2	Yellow filter glasses, style 2	each
VG-3	Yellow filter glasses, style 3	each
RG-2	Red filter glasses, style 2	each



► NIGHTSEA™ Fluorescence Excitation Flashlights

Rapid screening of your fluorescent transgenic experiments

► NIGHTSEA DFP-1 Dual Fluorescent Protein Flashlight

The Model DFP Dual Fluorescent Protein Flashlights include two different, switch-selectable high intensity LEDs for excitation of fluorescent proteins. For years the most popular fluorescent colors have been green (GFP, eGFP, fluorescein, etc.) and red (DsRed, TdTomato, etc.), and we offered only one version of the DFP, with a combination of blue and green LEDs for exciting these fluorophores. This is still our 'standard' DFP product, but we are now offering build-to-order combinations using any two of the excitation colors that are available with our popular Model SFA Stereo Microscope Fluorescence Adapter.

With every DFP light you will receive two pairs of barrier filter glasses and a convenient storage case. The glasses are well matched to the excitation so that they block the reflected excitation light while transmitting the fluorescence with high efficiency, providing excellent viewing contrast.



Specifications

Filter Set	Excitation	Emission	Fluorophores
RB - Royal Blue	440-460nm	500nm LP	GFP, eGFP, fluorescein...
CY - Cyan	490-515nm	550nm LP	YFP, Venus, Lucifer Yellow...
GR - Green	510-540nm	600nm LP	DsRed, dTomato...
VI - Violet	400-415nm	460nm LP	CFP, ...
UV - Ultra Violet	360-380nm	415nm LP	DAPI, ...

Dimensions:	5 x 3 x 2
Battery Type:	4 C-cell
Bulb Type:	Two high intensity 3W LED
Burn Time:	4 hours at full power
Lamp Life:	10,000 hours

Cat No.	Description	Qty.
Includes DFP Flashlight, Carrying Case and the following choice of LEDs:		
DFP-1	DFP Flashlight with RB and GR LEDs	each
DFP-CG	DFP Flashlight with CY and GR LEDs	each
DFP-RC	DFP Flashlight with RB and CY LEDs	each
DFP-VC	DFP Flashlight with VI and CY LEDs	each
DFP-VG	DFP Flashlight with VI and GR LEDs	each
DFP-VR	DFP Flashlight with VI and RB LEDs	each
DFP-UC	DFP Flashlight with UV and CY LEDs	each
DFP-UG	DFP Flashlight with UV and GR LEDs	each
DFP-UR	DFP Flashlight with UV and RB LEDs	each
DFP-UV	DFP Flashlight with UV and VI LEDs,	each

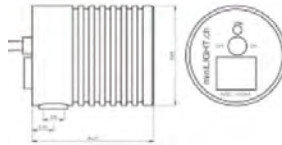
► miniLight

Constructed from the highest quality material and small as its name, this miniLight offers the most universal light source, handling many tasks that require a bright light but with a small foot print that fits into most locations.

► miniLight components:

Lamp - Available with 1 or 2 W power LED in 3 models each producing 15°, 28°, and 42° light cones. The miniLight's main component is the miniLamp. This is a small but powerful light source. It is able to brightly illuminate small areas with the following properties:

- Shines very bright on a small area.
- Low dissipation loss – no hot parts
- Long life – lifetime of a LED is 50,000 hours
- Little power needed (1watt)
- Adjustable intensity
- CE compatible

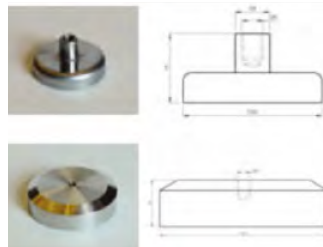


Gooseneck - For the mounting of the miniLight

- Flexible - easy to adjust
- Both ends come with different threads: one for the minilamp and one which connects to the base
- Made from brass and is anodized black.
- End-to-end measures 184mm (172mm actual length)

Magnetic Base - For mounting the miniLight

- Made from stainless steel with the magnet encased
- Threaded center for mounting the gooseneck or mounting bar
- Easily affixes to any magnetized surface
- Affix force is 64N



Steel Base - For mounting the MiniLight with a heavy base

- Stainless steel
- Threaded center for gooseneck or mounting rod
- Weight 450 g (1 lb)
- Measures: 65mm diameter x 18mm height.

Mounting Rods - For mounting the miniLight in a stable position

- Made from stainless steel
- Easy to mount and adjust the lamp with adjustable joint
- Short rod to mount Lamp – Long Rod to mount to the Steel Base

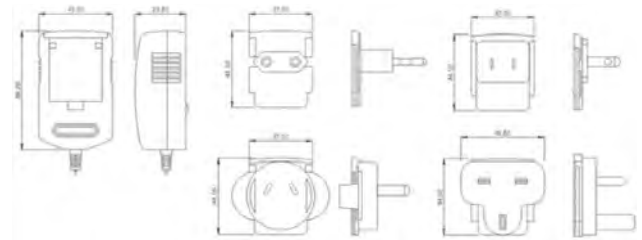
Joint - Connect the Mounting Rods

This joint is used to connect the mounting rod together in any angle, any position so the Lamp shines the way you want



- Very precisely made
- Anodized aluminum
- Knurled tighten screw.

Power Supply 12V - to power the miniLight



Supply with international AC-plug for feeding miniLight lamp with a constant tension of 12Volts. It is characterized by the following properties:

- Input voltage 90-264VAC
- Input frequency 47-63Hz
- Output Voltage 12V
- Power 8W
- AC-Connector for EU, GB, US, AUS
- Operating temperature 0-40°
- Weight 135gr. (without AC-plug)
- Dimensions 69.2x43.3x29.8mm without AC plug
- International approval UL60950, EN60950, SAA, PSE, CE, FCC Part 15 Class B



Application

Some applications that the miniLight is ideal for:

- Micro-technical working places, mounting, inspection
- Micro-electrical assembly
- Microscope, microbiology, cell counting ...
- Block trimming, etc.

Technical Data:

	ML-10 Series	ML-20 Series
Supply:	110 – 230 VAC (12V (±30%))	110 – 230 VAC (12V (±30%))
Current cons.:	150 mA@12V,	300mA@12V
Power LED:	1Watt	2Watt
Flux lumen min.:	91 lumens	160 lumens
Flux lumen typical:	100 lumens	180 lumens
Temp. case:	<50°C @tamb=25°C	65°C @tamb=25°C
Light cone:*	15° / 28° / 42°	15° / 28° / 42°
Fixation:	M6 ou D28	M6 ou D28
Dimensions:	28mm Dia x 34mm L	28mm Dia x 34mm L
Weight:	40 g	40 g
Accessories	power supply, steel base, magnetic base, gooseneck, fixation bare, joint	

*Definition of light cone: Angle in which the intensity is on the border of the cone half than in the middle of the cone.

► miniLight (continued)

ATTENTION:

Never look direct in the light of the lamp, otherwise you risk injury to your eyes

Cat. #	Description	Power	Qty
71665-01	miniLight Set 1.	1W	each
71666-01	Includes: Light source 15°, Goosebeck, Power Supply, and Magnet Base	2W	each
71665-02	miniLight Set 2.	1W	each
71666-02	Includes: Light source 28°, Gooseneck, Power Supply, and Steel Base	2W	each
71665-03	miniLight Set 3.	1W	each
71666-03	Includes: Light source 42°, Mounting Rods, Joint, Power Supply, and Magnet Base	2W	each
71665-04	miniLight Set 4. Includes:	1W	each
71666-04	Light source 28°, Mounting Rods, Joint, Power Supply, and Steel Base	2W	each
71665-05	Complete Set.	1W	each
71666-05	Includes: all three Light Sources 15, 28 & 42°, Gooseneck, Mounting Rods, Joint, Power Supply, Magnet Base, and Steel Base.	2W	each

Ordering:

Cat. #	Components	Power	Qty
71665-15	miniLight Light Source, 15° Light Cone	1W	each
71665-28	miniLight Light Source, 28° Light Cone	1W	each
71665-42	miniLight Light Source, 42° Light Cone	1W	each
71666-15	miniLight Light Source, 15° Light Cone	2W	each
71666-28	miniLight Light Source, 28° Light Cone	2W	each
71666-42	miniLight Light Source, 42° Light Cone	2W	each
71665-50	Gooseneck for Mounting miniLight	–	each
71665-51	Stainless Steel Mounting Rod for Mounting miniLight	–	each
71665-52	Joint – to joint the mounting rods	–	each
71665-55	Magnetic Base	–	each
71665-56	Steel Base	–	each
71665-60	Power Supply	–	each

For our Photomicrograph Scale Marker, See page 168 >>>>

Dusting Products; Compressed Gas; Mini Vac, See Cleaning Section, pages 945–947, 953 >>>>

Lint Free Gloves, See Cleaning Section, see page 948 >>>>

Cotton Gloves, See Cleaning Section, see page 948 >>>>

Electron Microscopy Sciences Announces their State of the Art

Scientific Equipment Repair Center



No equipment is too small or impossible to either
Repair, Refurbish, or Upgrade!

Our facility is equipped to handle the following Manufacturers:

- Balzers/Baltech
- Leica
- Denton
- Reichert-Jung
- Edwards
- LKB
- Emitech
- RMC-Boeckeler
- Emscope
- And Many More...
- Bio-Rad

Our unique service allows us to come to you, or you send the equipment to us, depending on the level of Repair/Refurbishment needed.

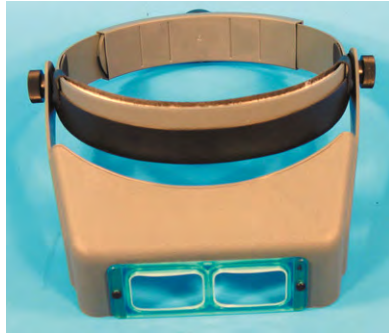
Equipment such as:

- Vacuum Systems
- Tissue Processors
- Microtomes
- Lynx
- Ultramicrotomes
- Freeze Fracture Instruments
- Tissue Slicers
- High Pressure Freezers/Slammers/Propane Jet Freezers
- Vibratomes
- And Much More...
- Ovens
- Baths
- Shakers

For more information on any of our services, a comprehensive quote, please call, write, or e-mail us today.

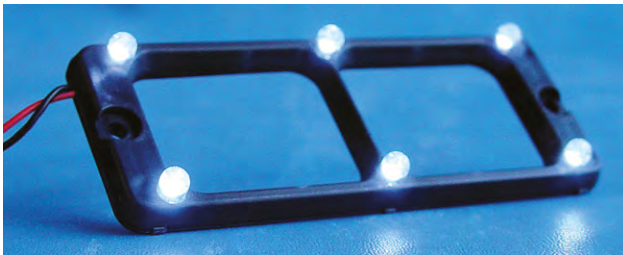
▶ Optivision™ Head Band Magnifiers

Features a dial adjustment headband that fits any head size. Well-made magnifiers they are lightweight and durable, and fit over eyeglasses. Adjustable pivot assembly on visor can be set to desired tension, so it will stay in place when tilted. Lenses are ground and polished prismatic.



Ordering: Lens plate replacement is also available.

Magnifier Cat. #	Lens Plate Replacement #	Working Distance		Power	Qty
		inch	mm		
68107-02	68107-12	20	508	1½ x	each
68107-03	68107-13	14	356	1¾ x	each
68107-04	68107-14	10	254	2 x	each
68107-05	68107-15	8	203	2½ x	each
68107-06	68107-16	6	152	2¾ x	each
68107-07	68107-17	4	102	3½ x	each
68107-50	Optivisor Auxiliary Lens (increase 2½ x magnification)				each
68107-60	Optivisor Add-on Light				each



▶ QUASAR™ LS

L.E.D. Lighting System for Optivision Head Band Magnifiers

- Custom fit lighting attachment for magnifying visions
- Patent pending design utilizes the latest in LED technology
- Reduces shadows and increases visibility in any environment
- Lights up holes and deep cavities
- Super long batteries life – light remains bright after 16 hours of straight use
- Lasts up to 96 hours solid on a single set of batteries
- Over 100,000 hour bulb life expectant

QUASAR™ LS KIT INCLUDES:

- Lighting system frame
- Retro fit attachment pins
- Longer screw for OptiLOUPE™ fitted visors
- 2 'AA' batteries
- Velcro strap

68107-70 QUASAR™ LS Kit each

▶ PEAK Achromatic Magnifier; 4X



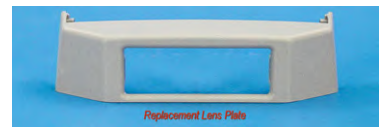
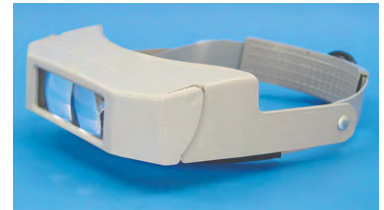
Uses high-resolution achromatic lenses whose chromatic aberration has been corrected. With its wide square Field-of-View (45x45mm) and its interchangeable semi-transparent/black skirt, this unique magnifier offers you a variety of uses for precision work. Fine focus adjustment with multi-groove screw helicoid system gives you very smooth operation. Neck strap is included.

Magnification:4X
 Field of View:.....45x45mm
 Size:51x65x51mm
 Net Weight:80g

68128-04 4X Achromatic Magnifier each

▶ Headband with Magnifier

- Lightweight, adjustable headband for comfort.
- Tilt up and away when not in use.
- Close-up magnification while leaving both hands free for working.
- Single lens with no center post means clear, comfortable, unobstructed vision with less eye strain and fatigue.



- Available in a variety of magnifications.

Cat. #	Magnification	Range	Pack
68108-01	1½X	14"	each
68108-02	2½X	8"	each
68108-03	2¾X	6"	each
68108-04	3½X	4"	each
68108-05*	4¼, 1¾X	4", 14"	each
68108-06*	4¾, 2¾X	3", 8"	each
68108-07*	5¼, 2¾X	2", 6"	each
68108-20	3.5X Magnification Auxiliary Lens		each

* Includes Auxiliary Lens #68108-20

Replacement Lens Plates for above Headband Magnifiers

Cat. #	Magnification	Pack
68108-11	1½X	each
68108-12	2½X	each
68108-13	2¾X	each
68108-14	3½X	each
68108-15	1¾, 4¼X	each
68108-16	2¾, 4¾X	each
68108-17	2¾, 5¼X	each

► Clip-on Magnifiers

Clips on to any eyeglass frame leaving hands free. Optical quality plastic lenses enables you to see tiny details without distortion using both eyes. Lightweight, comfortable and adjustable. Comes with carrying pouch.



Cat.#	Diopters	Working Distance		Power	Pack
		(in)	(mm)		
68260-02	2	20	508	1½ X	each
68260-03	3	14	356	1½ X	each
68260-05	5	8	203	2¼ X	each
68260-07	7	6	152	2¼ X	each
68260-10	10	4	102	3½ X	each

► Bausch & Lomb Classic Metal Eyeglass Loupes

Bausch & Lomb is pleased to bring back a classic. The classic Metal™ Eyeglass Loupes which set the standard for quality optics many years ago and they are now back with major enhancements.



- Made from precision optical glass
- Available in single or double lens configurations
- Side shield adapter kit provided for use with Safety Eyewear and Shields
- Ideal for any detail work
- Improved mounting system for more secure attachment
- High quality case provided to protect your investment
- Lens diameter is 24.0 mm

Cat.#	Description	Focal Distance	Diopters	Qty
68250-25	Single Eyeglass Loupe 4x	2.5"/6.4 cm	16D	each
68250-20	Single Eyeglass Loupe 5x	2.0"/5.1 cm	20D	each
68250-15	Single Eyeglass Loupe 7x	1.5"/3.8 cm	28D	each
68251-12	Dual Eyeglass Loupe 3x – 5x	3.3"/8.4 cm and 2.0"/5.1 cm	12D 20D	each
68251-32	Dual Eyeglass Loupe 4x – 7x	2.5"/6.4 cm and 1.5"/3.8 cm	16D 28D	each
68250-50	Side Shield Adapter Kit			each

► Bausch & Lomb Large Hand Held Magnifier

Round and rectangular magnifiers incorporate optics and an ergonomic design for increased clarity and comfort during use.



- 5" Round Magnifier
 - 2x powder with 4x inset power
 - 133 mm lens diameter
- 68274** Large Hand Held Magnifier each

► Bausch & Lomb Illuminated Coddington

Correction in the Coddington magnifiers is achieved through the use of a single thick lens with a central groove diaphragm. This provides for sharp, crisp image.



A problem sometimes encountered in using a high power magnifier is the lack of sufficient light on the object. A bulb inserted in the groove of the Coddington lens illuminates the object being examined eliminating this problem. Requires two 'AA' batteries (not included).

- 10x power
 - 1" / 2.5cm focal distance
 - 40 diopters
 - 19.8 mm lens diameter
- 68272** Illuminated Coddington each

► Bausch & Lomb Illuminated Stand Magnifier

This Bausch & Lomb Illuminated Stand Magnifier offers versatility across a number of different applications. Both the lens and the light are adjustable. Simply tilt the lens and small



hand held objects can be worked on or inspected. With the lens parallel to the work surface, lay the object directly beneath the lens and it's in focus. The lens is 2" x 4" and the lamp is a 7 watt GE 7C7 (or equal) 115 volt. The stand is nickel-plated steel rod.

- 2x power with 4x inset power
 - 50.8 x 101.6mm lens diameter
- 68270** Illuminated Stand Magnifier each

► Bausch & Lomb Pre-Moistened Lens Cleaning Tissue

A lot of clean in a little package. With Sight Savers® Pre-Moistened Lens Cleaning Tissues, you can conveniently clean lenses and a variety of other surfaces. Place the gravity feed dispenser where it's most accessible in a workplace or office environment.



- Individually wrapped.
 - 100 pre-moistened tissues per box, 5" x 8"
 - Box measures 5½" x 9" x 2¾"
- 68282** Pre-moistened Lens Tissue each

► Bausch & Lomb Magna Visor



Bausch & Lomb quality optics and contemporary design come together in this quality visor for hands-free-viewing. Lightweight acrylic lenses give you the precision you need for detail work, crafts, laboratory, and hobbies. Hard working features provide comfort and convenience. The molded frame is padded with a removable, washable fabric. The lenses are easily changed to a variety of focal lengths. Magna Visor with 3 interchangeable lens including 12", 8", and 6" lenses.

68253-00	Magna Visor w/3 Interchangeable Lens	each
68253-12	12" Lens, 1.8x Power, 7.2 diopters	each
68253-08	8" Lens, 2.2x Power, 8.8 diopters	each
68253-06	6" Lens, 2.6x Power, 10.4 diopters	each

► Edroy Binocular Loupe



Deluxe quality loupe with individual lenses provides the ultimate in comfortable mag-nified viewing. Can be worn over eyeglasses and each lens can be adjusted individually. The headband is adjustable with foam padding for added comfort. Magnification is 2½ X at a working distance of 14" (365 mm), and the field of view is 2" (51mm).

68255-10	Edroy Binocular Loupe	each
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Peak™ ABC Lupe

Seven kinds of magnifying power

The Peak ABC Lupe is a precision folding lupe, consisting of A lens (12X), B lens (3X) and C lens (6X). With these three lenses combined, seven kinds of magnifying power are available.

The lens is made from high quality glass optics and the body is made of aluminum.

The magnification desired will be available from the combination table shown on the back of the lupe.

68160	ABC Lupe	each
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► Penlight



A rugged, clear-coat, aluminum-shelled flashlight that is de-signed to last for years. Comes with two AAA batteries and storage tube.

68190-01	Penlight	each
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► Pocket Measuring Microscope

It is as small as a fountain pen. A standard scale is incorporated in its lens barrel, giving an effecient brightness and excellent definition. It can be focused in the same way as a conventional microscope.



(1) Magnification:	.....25X
Field of view:	.....3.30mm
Min. scale division:	.....0.05
Measuring range:	.....3mm
Size:12.4 x 127mm
Weight:12.2g

68130	Pocket Measuring Microscope 25X	each
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(2) Magnification:50X
Field of view:2.00mm
Size:12.4 x 127mm
Min. Scale Division:0.02
Measuring range:1.60mm
Weight:12.2g

68131	Pocket Measuring Microscope 50X	each
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► Parasite Magnifier

An improved version of the conventional magnifying glass. A 20mm diameter parasite like lens is cemented on a large

75mm diameter lens. Magnifi-cation of the large one is 2.5X, while the small lens area has the magnification of 5X.

The mag-nified image is very sharp and clear. Weight: 111g

68110	Parasite Magnifier	each
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► Stereo Viewer

A simple device, used for viewing a set of 3-dimensional aerial photos in 3-dimension. It comes with two support legs that are folded flat for storage and are unfolded for the viewing position. Photos are viewed through the two lenses simultaneously with both eyes.



Lenses may be adjusted for suitable eye-to-eye width. The coated lenses are 32mm in diameter and magnifying power is two (2) for #68100 and four (4) for #68101. The size for 68100 is 118mmx56mmx124mm (2X Net Weight: 227g) and for 68101 is 118mm x 56mmx82mm 4X Net Weight: 216g).

68100	Pocket Mirror Stereo Viewer	each
68101	Pocket Mirror Stereo Viewer	each

► Mirror Stereo Viewer



For the viewing of 4"x5" (100x 125mm) stereo pairs. It stands on 4 folding legs. One of the legs is equip-ped with a length adjusting device, that provides stabilization to the unit during observation. The magnifier can be replaced depending on the application.

Base line spacing:	.....260mm
Magnification:	.....1.8X
Field of view without magnifier:	.....260x200mm
Field of view with magnifier:	.....210x150mm
Maximum size set up:713x267x255mm
Net weight:2.65Kg

68105	Mirror Stereo Viewer	each
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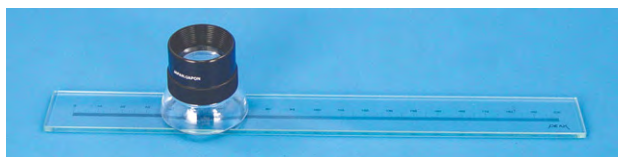
► 3D Stereo Glasses

EMS now offers Anaglyph 3D glasses, Red-Cyan Type and Red-Blue Type. White cardboard frames with temples for your red/cyan or Red-Blue 3D anaglyph needs. With red and cyan filters or Red and Blue filters, the glasses can be used for either red left or red right depending on which way you fold the temples. Two different fold-scores allow you to fit the glasses to smaller or larger viewer's heads.



68139-10	3D stereo Glasses Red-Cyan	10/pk
68139-20	3D Stereo Glasses Red-Blue	10/pk

► Glass Scale



A transparent glass plate well polished and marked by the photo-printing technique. It provides very accurate readings and it is a helpful tool for the stereo viewer.

Glass Scale Type	Thickness (mm)	Width (mm)	Length (mm)	Marking area (mm)	Increment (mm)
50	3	25	80	50	0.1
100	3	25	140	100	0.1
200	3	25	220	200	0.1

68140	Glass Scale 50	each
68141	Glass Scale 100	each
68142	Glass Scale 200	each



► Achromatic Magnifier, 4x and 2x

The magnifying glass introduced here is the new version of the classic magnifying glass used by the famous detective Sherlock Holmes. This achromatic is more defined in its function and can give you more accurate details of the subject to be observed. This magnifier is composed by two optical glass lenses, which are cemented together. The image seen through this lens is free of color and gives sharp contours so that no vague lines will be found throughout the entire image field.

With a solid red wood handle and a red mark at the base of the lens frame, this reminds you to use the face having this red point upwards.

The lens diameter is 37mm and the magnifying power is 4x. Both faces are purple coated and they measure 39 x 15 x 155mm., Weight 73g

68111-4X	Achromatic Magnifier, 4x	each
68111-2X	Achromatic Magnifier, 2x	each

► Folding Magnifier

Lightweight, compact, and simple; it comes with a measuring scale on the base frame. Base size is 1 square inch opening; marked every 1/8" on two sides and every millimeter on two other sides. Comes with 6X magnifier lens in a black anodized aluminum body. Folds flat when it is not in use.



68112	6X Folding Magnifier	each
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► Magnifying Lights: Green-Lite™

EMS is proud to introduce the next generation of Magnifying Lights

Product Description

Equipped with next generation, surface mount LEDs, these innovative designs create the new standard for illuminated magnifiers. Your investment in new technology quickly pays for itself through energy savings. Made in the USA.



Lighting Features

- Highest lumen output in a lighted magnifier
- Reduced glare, heat and energy consumption
- Multi-angle LEDs for shadowless lighting at a full range of focal lengths and heights
- User controlled LED groups shine desired level of light exactly where required
- Superb dimming software via convenient, reliable membrane switch

Optical Features

- Precision ground, optical grade glass
- Largest lenses in the industry
- Standard 4 diopter (2x) lens – O.C. White exclusive
- Optional 5 diopter (2.25x) lens available

Electrical Features

- Low voltage (15-24v) power supplies are auto-switchable with worldwide approvals
- Plug in around the world by simply switching the end power cord
- Energy Star compliant (each unit uses 8 watts maximum)
- Auto shut off at 4 hour intervals to prevent energy waste while users are away

Mechanical Features

- High quality die cast aluminum shades and all steel arm components for ESD safety
- Patented "Elite" arms are slim but have the greatest holding power of any arm of this type in the world
- Virtually "maintenance zero"

Catalog Number	Description	Magnification	Mounting Style	Voltage	Reach	Qty
68194-10	Green-Lite™ - 6" Round LED	2X	Table Edge Clamp	120 - 240 Volt	43"	each
68194-11	Green-Lite™ - 6" Round LED	2X	Screw Down Base	120 - 240 Volt	43"	each
68194-12	Green-Lite™ - 7.5" Round LED	2X	Screw Down Base	120 - 240 Volt	43"	each
68194-13	Green-Lite™ - 7.5" Round LED	2X	Table Edge Clamp	120 - 240 Volt	43"	each
68194-14	Green-Lite™ - 7x5 1/4 " Rectangular LED	2X	Screw Down Base	120 - 240 Volt	43"	each
68194-15	Green-Lite™ - 7x5 1/4 " Rectangular LED	2X	Table Edge Clamp	120 - 240 Volt	43"	each
68194-16	Green-Lite™ - 7" Round LED	2X	Weighted Base	120 - 240 Volt	43"	each
68194-17	Green-Lite™ - 7x5 1/4 " Rectangular LED	2X	Weighted Base	120 - 240 Volt	43"	each

► Lighted Flex Magnifier

A desktop portable magnifier with gooseneck that allows your hands to be doing other things. It may be used as an alternative to a dissecting microscope. It works with an AC adaptor or batteries. Both the adapter and batteries are sold separately



SPECIFICATIONS:

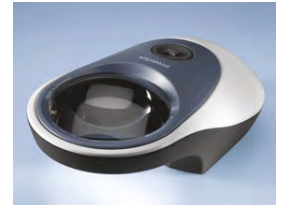
Magnification: 2x/6x Mini Bifocal
Diopter : 2.9 D
Lens Size: 102mm
Lens Shape: Biaspheric

Working Distance: Variable
Lens Material: PMMA Acrylic
Illumination: LED

Cat. #	Description	Qty.
68113-01	Lighted Flex Magnifier	each
68113-02	120V Wall Adapter	each
68113-03	220 V Wall Adapter	each

► Ergonomic Magnifier

This magnifier is easily maneuvered with the palm of your hand. The magnifier has an automatic switch off feature which turns the light off automatically after 30 minutes. The magnifier comes in a protective case .



SPECIFICATIONS:

Magnification: 5X
Diopter : 2.0 D
Lens Size: 58mm
Lens Material: PXMTM lightweight lens with patented Ceratec™ scratch-resistant coating

Lens Shape: Aspheric
Illumination: LED~ 8000k Cool light
Power Source: 2 AA Batteries (Included)

Cat. #	Description	Qty.
68113-04	Ergonomic Magnifier	each

► Steinheil Magnifier

A biconvex lens. Pocket size. The sliding frame is designed for the storage of the lens after use. It is good for the preliminary inspection of microscopic specimens. It is lightweight and has excellent chromatic correction with a reasonably wide field of view. The magnifier helps the user eliminate bulky and heavier conventional magnifiers.

Size: 39x24x22mm; Average weight: 20g

68145	7X Steinheil Magnifier	each
68146	10X Steinheil Magnifier	each
68147	14X Steinheil Magnifier	each
68148	20X Steinheil Magnifier	each



► Illuminated Magnilites® Vision-Lite® 2000

The Vision-Lite® 2000 is the world's first dimmable fluorescent illuminated magnifier. New "patented" state-of-the-art microchip controlled ballast technology allows the Vision-Lite® 2000 to be dimmable from 100% down to 25% so that highly reflective surfaces can easily be seen by dimming the units exclusive "Full Spectrum" bulb.

An exclusive slide switch allows the operator to change illumination intensity with the stroke of a finger.

The bulbs unique design provides three-sided illumination, eliminating annoying shadows that are associated with magnifiers, that have only two-sided, or left and right-sided bulbs.

It also eliminates all fluorescent flickering, reducing eye fatigue.

Ergonomic positioning.

The Vision-Lite 2000 boasts one of the largest 46.5 sq. in (7.5" x 6.2") (290 cm²) and clearest 3 diopter (1.75x – 1.85x) lens.

It is also equipped with an ESD Safe shade.

OPTIONS INCLUDE:

- 4-diopter lens (2x)
- Anti reflective coating (AVR) to reduce overhead glare
- Exclusive UV bulb, 365 nm



68225-01



68215

Electrical Specs	Mechanical Features
Low voltage, 12V	7.5" x 6.2" lens
120 volt, 230 volt optional	43" reach standard clamp-on
Molded 3-wire plug	25" reach standard portable
34 watt maximum	Springs (music wire)
Electric transformer "patented"	Bulb (U shaped), 10,000 hour life
UL/cUL & CE available	½" square x .042" rugged arm

Ordering Vision-Lite® 2000:

Cat.#	Model	Description	Qty
68215-10	71600GF-BL	Portable, 1.75x Color Black	each
68216-10	71600GF	Portable, 1.75x Color Gray	each
68217-10	72400GF-Bk	Clamp-on, 1.75x, Color Black	each
68218-10	72400GF	Clamp-on, Color Gray	each
68219-10	72400GF-4	Clamp-on, 2X, color Gray	each

Accessories for Vision-Lite® 2000

Cat.#	Model	Description	Qty
68225-01	13226	Bulb Shield	each
68225-04	13392	Full Spectrum Bulb; Glare Free	each
68225-05	13393	UV Bulb	each
68225-06	13394	White Bulb	each



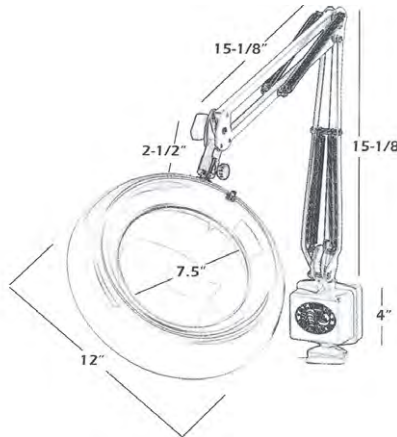
68218

► Illuminated Magnilites® Big Eye™

"Big Eye" is one of our largest magnilites® with a 7.5", 3 diopter (1.75x) or a 7.5" 4 diopter (2x) optical quality lens. Wrapped in a ESD safe shade, it includes a 10" (250cm) shadowless 34-watt circline bulb.

Available with cool white or our exclusive "Glare-Free" bulb, 25" or 43" Ultraflex® arms, excellent holding ability with superior clamp (cast iron). 10 years mechanical warranty.

Electrical Specs	Mechanical Features
120 volt or 230 volt	Standard reach 25" & 43"
UL /CUL approved	½" square x .042" rugged arms
CE available -230 volt	Easy spring load movements
34 watt maximum	Steel & aluminum construction for strength and ESD safety
3-wire grounded cord	Wide, quality clamp or 38 lb base
Switch	



68196

Ordering: We are offering the most popular models:

► Model 51400 - 1.75x, Light Gray

ESD Safe construction - Ergonomic large lens - 7.5" optical lens
25" Ultraflex® arms - Clamp-On - Cool white bulb - UL/CUL

► Model 51600 - 1.75x, Light Gray

ESD Safe construction - Ergonomic large lens - 7.5" optical lens
25" Ultraflex® arms - 38 lb Weighted base (not shown) - Cool white bulb - UL / CUL

► Model 52300GF - 1.75x, Light Gray

ESD safe construction - Ergonomic large lens - 7.5" optical lens
43" Ultraflex® arms - Screw down - Glare-free bulb - UL/CUL

► Model 52400 - 1.75x, Light Gray

ESD safe construction - Ergonomic large lens - 7.5" optical lens
43" Ultraflex® arms - Clamp-on - Cool white bulb - UL/CUL

► Model 52400-4 - 2x, Light Gray

ESD safe construction - Ergonomic large lens - 7.5" optical lens
43" Ultraflex® arms - Clamp-on - Cool white bulb - UL/CUL

► Model 52400GF - 1.75x, Light Gray

ESD safe construction - Ergonomic large lens - 7.5" optical lens
43" Ultraflex® arms - Clamp-on - Glare-free bulb - UL/CUL



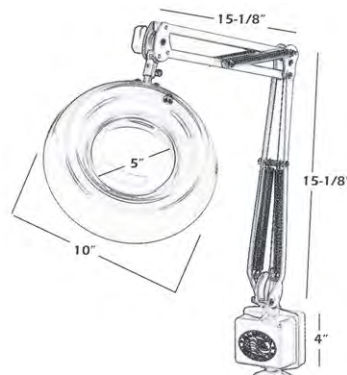
68201

Cat. #	Model	Description	Pack
68196-10	51400	Clamp-on, 1.75x, Cool White Bulb	each
68201-10	51600	Portable, 1.75x, Cool White Bulb	each
68197-10	52300GF	Screw Down, 1.75x, Glare-Free	each
68200-10	52400	Clamp-on, 1.75x, Cool White Bulb	each
68202-10	52400-4	Clamp-on, 2x, Cool White Bulb	each
68198-10	52400GF	Clamp-on, 1.75x, Glare-Free	each
68204-00	13363	Replacement Glare-Free Bulb	each
68204-10	13362	Replacement Cool White Bulb	each

► Illuminated Magnilites® Standard Magnifiers

Quality 5" Magnilites®. A standard at many work areas for years; Available in either 3 diopter (1.75x) or 5 diopter (2.25x). An optional 3 diopter add-on lens is available to increase magnification.

Electrical Specs	Mechanical Features
120 volt / 60 hz	Standard reach 25", 37", 43", 45"
UL /CUL approved	½" square x .042" rugged arms
22 watt bulb	Easy spring loaded movements
3-wire grounded cord	Steel & aluminum construction for strength and ESD safety
Switch	Wide, quality clamp or weighed bases



Ordering: We offer the most popular models, which suits most any needs.

► Model 53139 - 1.75x, Light Gray (68205)

ESD Safe construction - Ergonomic 5" diameter lens - 45" Prolite® reach. - Clamp on - 22-watt cool white bulb

► Model 52139 - 1.75x, Light Gray (68206)

ESD Safe construction - Ergonomic 5" diameter lens - 37" Prolite® reach. - Clamp on - 22-watt cool white bulb

► Model 51739 - 1.75x, Light Gray (68207)

ESD Safe construction - Ergonomic 5" diameter lens - 25" Prolite® reach. - Portable with 11lb mounting base - 22-watt cool white bulb

► Model 51739-5 - 2.25x, Light Gray (68210)

ESD Safe construction - Ergonomic 5" diameter lens - 25" Prolite® reach. - Portable with 11lb mounting base - 22-watt cool white bulb

► Model 53139-5 - 2x, Light Gray (68208)

ESD Safe construction - Ergonomic 5" diameter lens - 45" Prolite® reach. - Clamp on - 22-watt cool white bulb

► Model 52139-5 - 2.25x, Light Gray (68209)

ESD Safe construction - Ergonomic 5" diameter lens - 37" Prolite® reach. - Clamp on - 22-watt cool white bulb

► Model 32300-5 - 2.25x, Light Gray (68211)

ESD Safe construction - Ergonomic 5" diameter lens - 43" Ultraflex® reach. - Screw down - 22-watt cool white bulb- 10 years mechanical warranty

Cat.#	Model	Description	Pack
68205-10	53139	Clamp-on, 1.75x, 45" Reach	each
68206-10	52139	Clamp on, 1.75x, 37" Reach	each
68207-10	51739	Portable, 1.75x, 25" Reach	each
68208-10	53139-5	Clamp-on, 2.25x, 45" Reach	each
68209-10	52139-5	Clamp-on, 2.25x, 37"	each
68210-10	51739-5	Portable, 2.25x, 25" Reach	each
68211-10	32300-5	Screw down, 2.25x, 43" Reach	each
68212-01	13367	Replacement Bulb	each
68212-02	13381	Ultra-Violet Light Bulb	each



68205



68207

► Lighted Magnifiers

A flashlight is attached to the magnifier that illuminates poorly lighted background making it bright and clear for easy observation. A variety of types and magnifications are available.

► (1) 3.5X Lighted Magnifier

Comes with a large square magnifier lens which measures 50mm/side. The lens is removable and the flashlight can be used alone.

Magnification:3.5X Battery:.....It takes 2 "C" batteries
Flashlight Size Alone:140mm(L) (UM-2, 1.5V/ea. not included)
.....x 30mm(dia) Weight:120g

68120 3.5X Lighted Magnifier each



68120

► (2) 7X Lighted Magnifier

A simple and accurate comparator. High quality measuring scale; detachable flashlight.

Magnification:7X Battery:.....It takes 2 "C" batteries
Scale Diameter:22mm (UM-2, 1.5V/ea-not included).
Divisions:0.1mm Weight:118g
Size: ...36mm(dia) x 58mm(H) x 175mm(L)

68121 7X Lighted Magnifier each



68121

► (3) 10X Lighted Magnifier

A simple and accurate comparator. High quality measuring scale; detachable flashlight.

Magnification:10X Size: ...47mm(dia) x 45mm(H) x 185mm(L)
Scale Diameter:32mm Battery: It takes 2 "C" batteries (UM-2,
Divisions:0.1mm 1.5V/ea-not included).

68122 10X Lighted Magnifier each



68122

► (4) 15X Lighted Magnifier

High quality magnifier lens. Very convenient to see details under poor lighting conditions.

Magnification:15X Battery: It takes 2 "C" batteries (UM-2,
Field of view:.....19mm 1.5V/ea-not included).
Size: ...36mm(dia) x 42mm(H) x 180mm(L) Weight:90g

68123 10X Lighted Magnifier each



68123

► (5) 15X Lighted Scale Magnifier

Scale magnifier 15X (EMS # 68158) is attached to an illuminating device to improve the visibility. Comes with one metric scale. Battery is not included.

68123-L 15X Lighted Scale Magnifier each



68123-L

► Magnifier 8X For 35mm Slide

For high performance. Well designed. The 8X magnifier uses a 24mm x 37mm angular objective lens and a two-element achromatic lens for the eyepiece. This arrangement enables the 8X magnifier to cover the entire 24mm x 36mm picture area of a single frame of 35mm film, and it is suitable for checking negatives. Engraved on the bottom edge of the transparent acrylic skirt is a 30mm long, 1mm division scale, which does not interfere with the field of view. With all of these features, you should have one for every day use.

Measurements: 46mm x 49mm x 39mm. Weight: 52g

68125 Magnifier 8X for 35mm Film each



► Film Marker

This device when fitted to the 8X magnifier (68125) enables you to view and check the 35mm roll film while marking the desired frame by depressing the puncher (located on the side of the device). The puncher punches out a V-shaped piece of film

on the perforation to mark the frame. When fitted in the reverse position to the 8X magnifier, you are able to view and check the slides.

68126 Film Marker each
68127 Film Marker and 8X Magnifier set



▶ Measuring Magnifiers

Excellent achromatic lenses with a photo-printed precise scale. Focusing ring. Accuracy and low prices.



68150



68154



68158

▶ (1) Magnification: 7X (3 lens, 2 groups)

Objective Lens:19mm
 Eyepiece:18mm
 Scale Diameter:26mm
 Measuring scale:20mm(L);
 Divisions:0.1mm or 0.8"(L);
 Divisions:0.005"(Metric &
English scale interchangeable)
 Size:36mm (d) x 62mm
 Weight:56 g

68150	7X Measuring Magnifier w/Metric Scale	each
68151	English Scale for 7X	each

▶ (2) Magnification: 10X (coated 4 lens, 2 groups)

Field of view:28mm
 Eyepiece:20mm
 Scale Diameter:35mm
 Measuring Scale:20mm(L);
 Divisions:0.1mm or 0.8"(L);
 Divisions:0.005"(Metric &
English scale interchangeable)
 Size:46mm (d) x 44mm
 Weight:74g

68154	10X Measuring Magnifier w/Metric Scale	each
68155	English Scale for 10X	each

▶ (3) Magnification: 15X (4 lens, 3 groups or 6 air-to-glass-lenses)

Field of view:14mm
 Eyepiece:13mm(L)
 Scale Diameter:26mm
 Measuring Scale:20mm(L);
 Divisions:0.1mm or 0.8"(L);
 Size:35mm (d) x 36mm
 Divisions:0.005"(Metric &
English scale interchangeable)
 Weight:40g

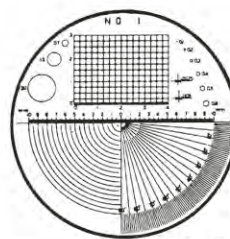
68158	15X Measuring Magnifier w/Metric Scale	each
68159	English Scale for 15X	each

For more Magnifiers see our Photography section page 734 <<<<<

▶ Measuring Scale, For Measuring Magnifiers

These scales are available in two different sizes; for use with the Measuring Magnifiers at left:

■ 26mm for 7X and some for 15X Magnifiers ■ 35mm for 10X Magnifiers



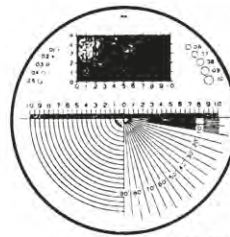
P.S. No. 1



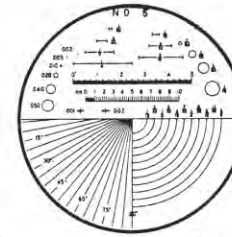
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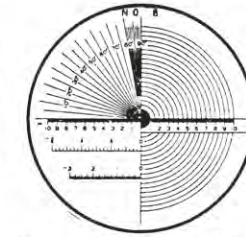
P.S. No. 3



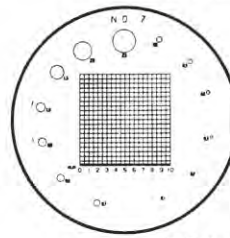
P.S. No. 4



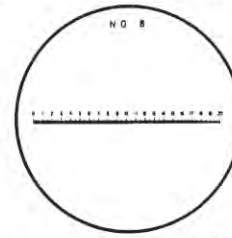
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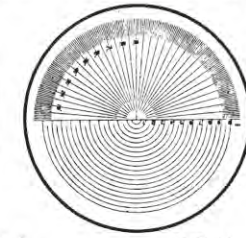
P.S. No. 6



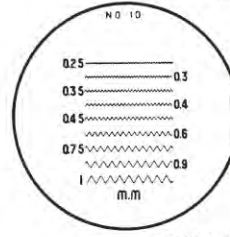
P.S. No. 7



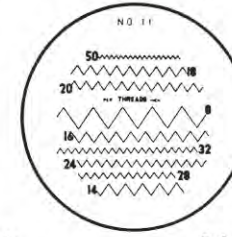
P.S. No. 8



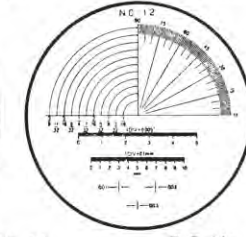
P.S. No. 9



P.S. No. 10



P.S. No. 11



P.S. No. 12

▶ Scale No. 1

68161 Size 26mm for 7X each and 15X

68162 Size 35mm for 10X each

▶ Scale No. 2

68163 Size 26mm for 7X each and 15X

68164 Size 35mm for 10X each

▶ Scale No. 3

68165 Size 26mm for 7X each

68166 Size 35mm for 10X each

▶ Scale No. 4

68167 Size 26mm for 7X each

68168 Size 35mm for 10X each

▶ Scale No. 5

68169 Size 26mm for 7X each

68170 Size 35mm for 10X each

▶ Scale No. 6

68171 Size 26mm for 7X each

68172 Size 35mm for 10X each

▶ Scale No. 7

68173 Size 26mm for 7X each

68174 Size 35mm for 10X each

▶ Scale No. 8

68175 Size 26mm for 7X and 15X each

68176 Size 35mm for 10X each

▶ Scale No. 9

68177 Size 26mm for 7X each

68178 Size 35mm for 10X each

▶ Scale No. 10

68179 Size 26mm for 7X each

68180 Size 35mm for 10X each

▶ Scale No. 11

68181 Size 26mm for 7X each

68182 Size 35mm for 10X each

▶ Scale No. 12

68183 Size 26mm for 7X each

68184 Size 35mm for 10X each

EMS proudly adds to our supply line a wide range of Microscopy Calibration Standards and Standard Graticules, which are manufactured to very tight tolerances and high precision. All Standards are available with or without Secondary or Direct NIST certification as per your choice. Made in the USA.

► I. Microscope Graticules and Stage Micrometers

► A. Linear Reference Scales

We offer Chrome-on-Glass (G) and Chrome-on-Opal glass (O) or Chrome-on Quartz (Q). The Opal and Quartz are offered by request only.

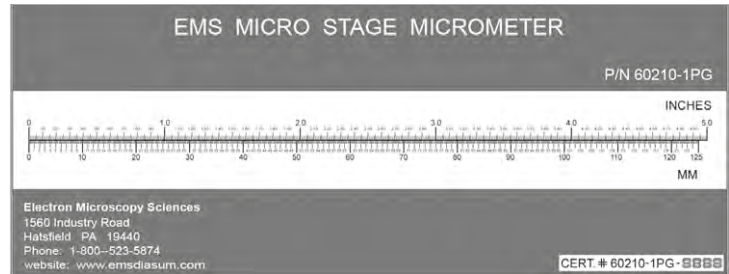
P: positive image (mostly clear or white); **N:** negative image (mostly opaque or black)

All EMS micrometers are come with sturdy wooden box, and last for years to come.

► Model SM-1

Glass Size:2" x 5.25" (50 mm x 132 mm).
 Scale Length:5 inch (English) X-axis only
125 mm (Metric) X-axis only
 Divisions:English = 0.01"; Metric = 100 μ m (0.1mm)
 With numerical labeling every 1 mm and 0.1"

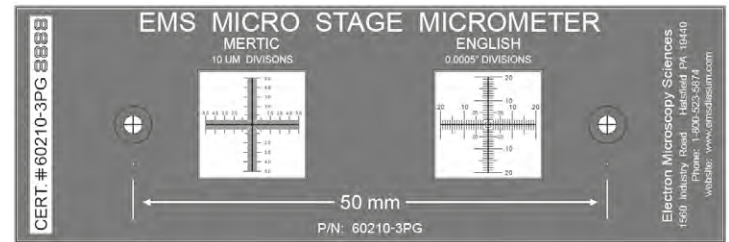
Cat #	Description	Qty
60210-1PG	Stage Micrometer, SM-1, chrome on glass	each
60210-1PGC	Stage Micrometer, SM-1 with Calibration	each



► Model SM-3

Glass Size:1" x 3" (25mm x 75mm). \geq 1.42 mm (0.056") thickness
 Scale Length:0.04 inch (English) X & Y axis
10 mm (Metric) X & Y axis
 Divisions:English = 0.0005"; Metric = 10 μ m (0.010mm)
 With numerical labeling every 0.1 mm and 0.05"
 Flatness: \leq 10 μ m / 100 mm
 Image Forming Material:Chrome
 Image Contrast/Density:Chrome transmission density is \geq 2.0
 Feature Size Accuracy:2 μ m
 Image Placement Accuracy:0.001 mm / 100 mm
 Polarity: Scales are opaque on a clear background
 Reading Direction:Right Read Chrome Up (RRCU)
 Typical Uses:SM-3 is useful for calibration of magnification in microscopes and other optical magnification systems. Its auto-location features can be used for testing of an image analysis auto-location system.

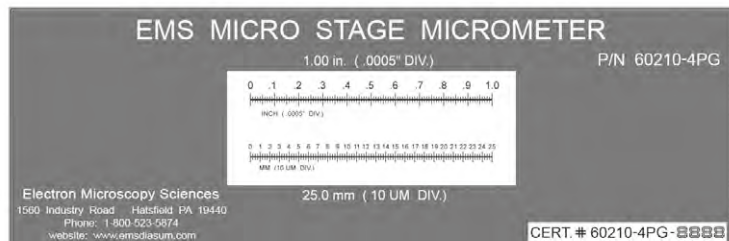
Cat #	Description	Qty
60210-3PG	Stage Micrometer, SM-3, chrome on glass	each
60210-3PGC	Stage Micrometer, SM-3 with Calibration	each



► Model SM-4

Glass Size:1" x 3" (25mm x 75mm).
 Scale Length:1 inch (English) X-axis only
25 mm (Metric) X-axis only
 Divisions:English = 0.0005"; Metric = 10 μ m (0.010 mm)
 With numerical labeling every 0.1 mm and 0.05"

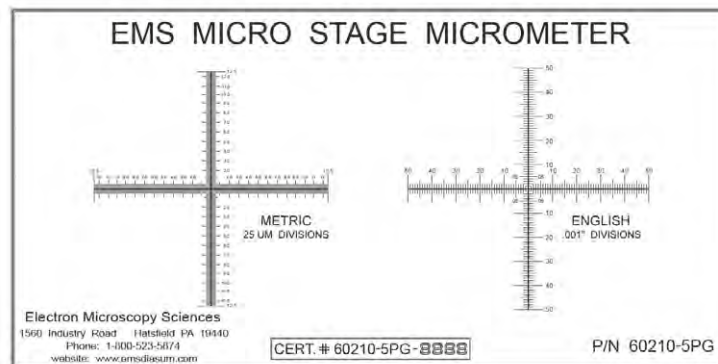
Cat #	Description	Qty
60210-4PG	Stage Micrometer, SM-4, Chrome on glass	each
60210-4PGC	Stage Micrometer, SM-4 with Calibration	each



► **Model SM-5**

Glass Size:1.5" x 3" (38mm x 75mm).
 Scale Length:1 inch (English) X & Y axis
 25 mm (Metric) X & Y axis
 Divisions:English = 0.001"; Metric = 25µm (0.025 mm)
 With numerical labeling every 1 mm and 0.1"

Cat #	Description	Qty
60210-5PG	Stage Micrometer, SM-5, Chrome on glass	each
60210-5PGC	Stage Micrometer, SM-5 with Calibration	each

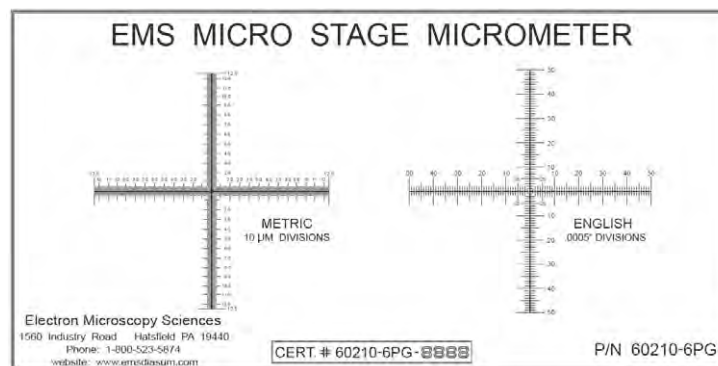


► **Model SM-6**

Same as scale SM-5, but smaller division

Glass Size:1.5" x 3" (38mm x 75mm).
 Scale Length:1 inch (English) X & Y axis
 25 mm (Metric) X & Y axis
 Divisions:English = 0.0005"; Metric = 10µm (0.010 mm)
 With numerical labeling every 0.1 mm and 0.05"

Cat #	Description	Qty
60210-6PG	Stage Micrometer, SM-6, Chrome on Glass	each
60210-6PGC	Stage Micrometer, SM-6 with Calibration	each



► **Model SM-12**

Glass Size:1" x 3" (25mm x 75mm). ≥1.42 mm (0.056") thickness
 Scale Length:0.08 inch (English) X-axis only
 2.0 mm (Metric) X-axis only
 Divisions:English = 0.001"; Metric = 25µm (0.025 mm)
 No numerical scale labeling
 Flatness: ≤ 10 µm / 100 mm
 Image Forming Material:Chrome
 Image Contrast/Density: ...Chrome transmission density is ≥ 2.0
 Feature Size Accuracy:2 µm
 Image Placement Accuracy:0.001 mm / 100 mm
 Polarity: Scales are opaque on a clear background
 Reading Direction:Right Read Chrome Up (RRCU)

Cat #	Description	Qty
60210-12PG	Stage Micrometer, SM-12, chrome on glass	each
60210-12PGC	Stage Micrometer, SM-12 with Calibration	each



Typical Uses: SM-12 is useful for calibration of magnification in microscopes and other optical magnification systems.

► **Model SM-13**

Glass Size:1" x 3" (25mm x 75mm).
 Scale Length:0.08 inch (English) X & Y axis
 2.0 mm (Metric) X & Y axis
 Divisions:English = 0.001"; Metric = 25µm (0.025 mm)
 No numerical scale labeling

Cat #	Description	Qty
60210-13PG	Stage Micrometer, SM-13, Chrome on glass	each
60210-13PGC	Stage Micrometer, SM-13 with Calibration	each



► B. Image Analysis & Microscopy (IAM)

Vision Calibration Standards

We are proud to introduce the first complete and true line of Image Analysis Microscopy Calibration Standards, specially designed to address the current needs to accommodate the new generation of image analysis and machine vision systems. These unique standards are designed to test multiple morphometric parameters to assure that your image analysis systems are working properly, meeting the required calibration – certification requirements of your vision measurement systems.

We offer Chrome-on-Glass (G) and Chrome-on-Opal glass (O) or Chrome on Quartz (Q). The Opal and Quartz are offered by request only.

P: positive image (mostly clear or white); N: negative image (mostly opaque or black)

► Model IAM-1 – Morphometric Image Analysis Standards

Ideally for morphological calibration where two dimensional shapes have to be measured precisely. Standard is included of eight test plates of various shapes, positions, angles and sizes. Also included a linear measurement scale for calibrating your imaging system.

Overall size: 1" x 3" (25mm x 75mm). Positive image / Chrome on glass (PG)

Cat #	Description	Qty
60216-1PG	Morphology Stage Micrometer, Model IAM- 1	each
60216-1PGC	Morphology Stage Micrometer, Model IAM-1, T/L, Calibrated only plates 1, 2 & 8	each
-----	Additional calibrated each plate for IA 1	each

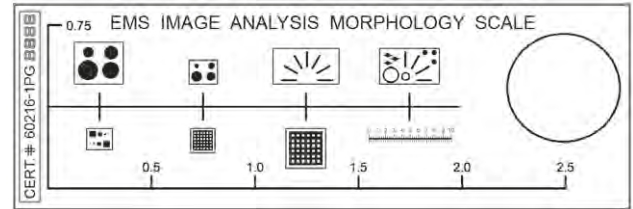


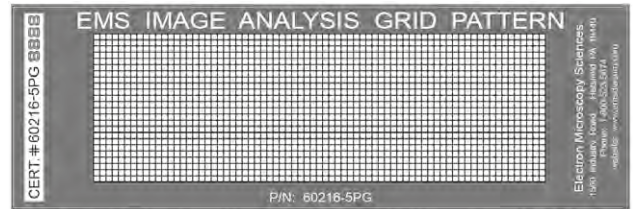
Plate	Frame Size	Description
1	4600 x 3500µm	Circles – 2000, 1000, 500 & 250 µm diameters
2	1000 x 800 µm	Circles – 500, 250, 125 & 62.5 µm diameters
3	1000 x 800 µm	Bars – 200x20 µm at 30 degrees increments
4	1000 x 800 µm	Various Shapes, Circles, Bars & Angular designs.
5	1000 x 800 µm	Squares – 100, 40, 20 µm set of 2 each.
6	2050 x 1650µm	Grid Patterns – 50 µm lines at 100 µm pitch
7	4200 x 3400 µm	Grid Patterns – 200 µm lines at 200 µm pitch
8	10 mm long	Scale with 10 µm divisions

► Model IAM-5 – Stage Mapping – Grid Pattern

This ideal standard is for verifying or qualifying multiple image analysis parameters such as optical distortion, alignment between systems or optical paths, cell areas for particle counting. The image area is 20mm x 50mm.

Overall size:1" x 3" (25mm x 75mm)
Image:Negative image / chrome on glass (NG)

Cat #	Description	Qty
60216-5SNG	Model IAM-5S, Grids, Small Size, 10µm Pitch	each
60216-5SNGC	Model IAM-5S with Calibrated (12 pts)	each
60216-5MNG	Model IAM-5M, Grids, Medium Size, 200µm Pitch	each
60216-5MNGC	Model IAM-5M with Calibrated (12 pts)	each
60216-5LNG	Model IAM-5L, Grids, Large Size, 1000µm Pitch	each
60216-5LNGC	Model IAM-5L with Calibrated (12 pts)	each



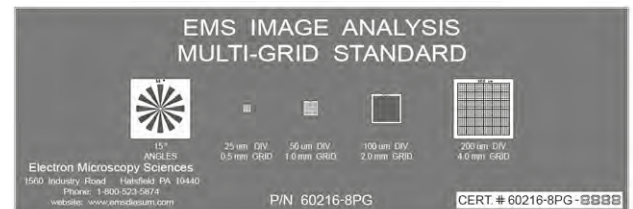
Model No.	Clear Aperture	Opaque Lines	Pitch
IAM-5S	8.5 µm square	1.5 µm sq.	10 µm
IAM-5M	180 µm square	20 µm sq.	200 µm
IAM-5L	980 µm square	20 µm sq.	1000 µm

► Model IAM-8 – Multi Grid Standard

A unique designed standard with 4 different grid size patterns: 0.5 x 0.5 mm grid with 25 µm pitch; 1.0 x 1.0 mm grid with 50 µm pitch; 2.0 x 2.0 grid with 100 µm pitch; and 4.0 x 4.0 mm grid with 200 µm pitch. Also includes a Star Target with 15 degree angle increments. This standard can be used to test not only the overall frame distortion issue but also linear distances for a wide variety of magnification ranges from 1x to 1000x power.

Overall Size:1" x 3" (25mm x 75mm)
Image:Positive image / chrome on glass (PG)

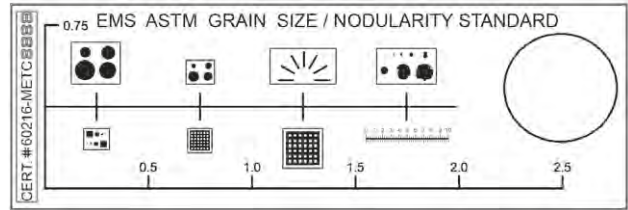
Cat #	Description	Qty
60216-8PG	Model IAM-8, Multi Grids Standard	each
60216-8PGC	Model IAM-8 Calibrated (16 pts)	each



➤ Model IAM-MET ASTM Grain Size / Nodularity Analysis Standard

Based on the IAM-1 – Morphometric Image Analysis above, the IAM-MET is a multi-morphology calibration standard designed specifically for ASTM. The IAM-MET includes all plates as found in IAM-1 except that plate 4 as is pictured above. This picture contains 9 images of irregular shapes, simulating features commonly found in metallurgical applications. As required by the ASTM standard, the IAM-MET includes secondary certification of plates 1, 2 and 8.

Overall size:76.2 mm x 25.4 mm (3" x 1")
Image:Chrome on glass / positive. Calibrated 32 points.

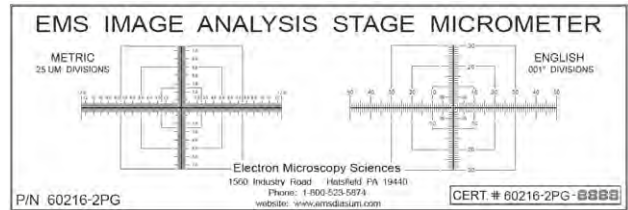


Cat #	Description	Qty
60216-METC	Model IAM-MET, ASTM Grain Size, 32 pts Calibrated	each

➤ Model IAM-2 – Linear (X & Y axis) Scale

A dual axis linear micrometer that can accurately calibrated both X & Y directions without rotation, for optical magnification, and camera aspect ratio using single stage. In addition, it can be used to calibrate and check linear stage motion or related auto measuring systems. Scales are in both English and Metric measurements

Overall size:1" x 3" (25 mm x 75 mm)
Scale Image:X = 1" (right scale); 25 mm (left scale)
 Y = 0.60" (right scale); 15 mm (left scale)
Divisions:English = 0.001", Metric = 25µm
Positive image / Chrome on glass (PG)



Cat #	Description	Qty
60216-2PG	Linear (X&Y axis) Stage Micrometer, Model IAM-2	each
60216-2PGC	Linear (X&Y axis) Stage Micrometer, Model IAM-2, T/L, Calibrated	each

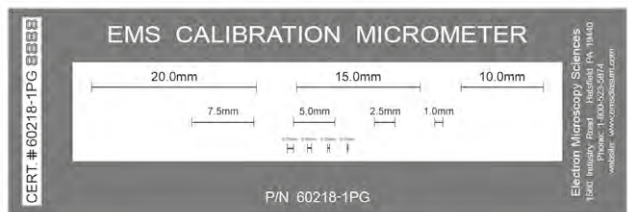
➤ C. ACM-1 – Calibration Micrometer

This ideal standard is accurately calibrated of any eyepiece, reticles, filar micrometers, or electronic measuring instrument. Features a series of 'H' shaped fiducial images in a range of sizes from 0.1 mm through 20 mm, useful for calibration range from 1X to 1000X power.

Standard Size:25 mm x 75 mm
Substrate Type:Transparent glass (G), 1.42 mm or thicker
 Opal glass (O) is available per request.

Image Forming Material: Evaporated chromium on glass
Image Description: 'H' shaped fiducials as follows,
 centerline to centerline

Polarity:Positive (opaque or black features on clear background)
Reading Direction:Right Read Chrome Up (RRCU)
Image Placement Accuracy:3.0 microns or better
Image Contrast/Density:Chrome optical density grater than 2.0
Typical Use:Verification or calibration of magnification.



Pattern Length (mm)	Pattern Height	Line Width
0.10, 0.25, 0.50, 0.75	0.50 mm	10 µm
1.00, 2.50, 5.00, 7.50	1.00 mm	20 µm
10.0, 15.0, 20.0	3.00 mm	40 µm

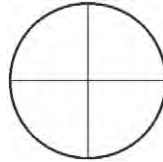
Cat #	Description	Qty
60218-1PG	Model ACM-1, Calibrating Micrometer	each
60218-1PGC	Model ACM-1, with 11 pts Calibrated	each

► Standard Reticles

These standard reticles are manufactured to use with our microscope eyepieces. High quality, precision made with different designs and styles that help you do your work. We offer as a standard the following popular eyepiece diameters: 19 mm and 21 mm. Other eyepiece diameter sizes can be supplied as a special order.

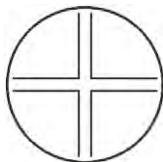
All reticles are chrome on glass and positive polarity.

► Single Solid Cross Lines and Broken Cross Lines



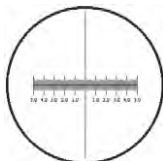
Cat. #	Description	Qty
Single Cross Lines		
60250-19	RET 42, 9µm wide, 19mm Diameter	each
60250-21	RET 42, 9µm wide, 21mm Diameter	each
60251-19	RET 41, 17µm wide, 19mm Diameter	each
60251-21	RET 41, 17µm wide, 21mm Diameter	each
60252-19	RET 43, 25µm wide, 19mm Diameter	each
60252-21	RET 43, 25µm wide, 21mm Diameter	each
Broken Cross Lines		
60255-19	RET 50, 13 µm wide, 19 mm Diameter	each
60255-21	RET 50, 13 µm wide, 21 mm Diameter	each
60256-19	RET 51, 63 µm wide, 19 mm Diameter	each
60256-21	RET 51, 63 µm wide, 21 mm Diameter	each

► Double Cross Lines



Cat. #	Description	Qty
60260-19	RET 60, 0.025 mm gap, 19mm Diameter	each
60260-21	RET 60, 0.025 mm gap, 21mm Diameter	each
60261-19	RET 61, 0.075 mm gap, 19mm Diameter	each
60261-21	RET 61, 0.075 mm gap, 21mm Diameter	each
60262-19	RET 62, 0.125 mm gap, 19mm Diameter	each
60262-21	RET 62, 0.125 mm gap, 21mm Diameter	each
60263-19	RET 63, 0.50 mm gap, 19mm Diameter	each
60263-21	RET 63, 0.50 mm gap, 21mm Diameter	each
60264-19	RET 64, 1.0 mm gap, 19mm Diameter	each
60264-21	RET 64, 1.0 mm gap, 21mm Diameter	each
60265-19	RET 65, 2.0 mm gap, 19mm Diameter	each
60265-21	RET 65, 2.0 mm gap, 21mm Diameter	each

► Cross Lines with Scale

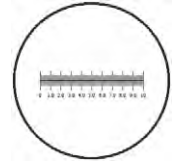


Cat. #	Description	Qty
60267-19	RET 21, 20mm of 0.10 mm Division Scale, 19mm Diameter	each
60267-21	RET 21, 20mm of 0.10mm Division Scale, 21mm Diameter	each

► Indexed Grid Scales

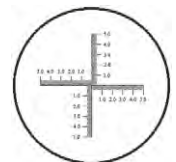
Cat. #	Description	Qty
60286-19	RET 83, Indexed Grid 5mm x 5mm x 1mm with 0.01mm Line, 1 - 5 horiz / 1 - 5 vert, 19mm Diameter	each
60286-21	RET 83, Indexed Grid 5mm x 5mm x 1mm with 0.01m Line, 1 - 5 horiz / 1 - 5 vert, 21mm Diameter	each
60287-19	RET 80, Indexed Grid 10mm x 10mm x 0.5mm with 0.025mm Line, 1 - 10 horiz / 1 - 10 vert. 19mm Diameter	each
60287-21	RET 80, Indexed Grid 10mm x 10mm x 0.5mm with 0.025mm Line, 1 - 10 horiz / A - Z vert. 21mm Diameter	each

► Scales



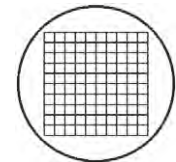
Cat. #	Description	Qty
60270-19	RET 14, Scale 2mm, 200 Div of 0.01mm, 19mm Diameter	each
60270-21	RET 14, Scale 2mm, 200 Div of 0.01mm, 21mm Diameter	each
60271-19	RET 15, Scale 5mm, 50 Div. of 0.1mm, 19mm Diameter	each
60271-21	RET 15, Scale 5mm, 50 Div of 0.1mm 21mm Diameter	each
60272-19	RET 11, Scale 5mm, 100 Div of 0.05mm, 19mm Diameter	each
60272-21	RET 11, Scale 5mm, 100 Div of 0.05mm, 21mm Diameter	each
60273-19	RET 10, Scale 10mm, 100 Div of 0.1mm, 19mm Diameter	each
60273-21	RET 10, Scale 10mm, 100 Div of 0.1mm, 21mm Diameter	each
60274-19	RET 16, Scale 10mm, 200 Div of 0.05mm, 19mm Diameter	each
60274-21	RET 16, Scale 10mm, 200 Div of 0.05mm, 21mm Diameter	each
60276-19	RET 12, Scale 20mm, 200 Div of 0.10mm, 19mm Diameter	each
60276-21	RET 12, Scale 20mm, 200 Div of 0.1mm, 21mm Diameter	each

► Crossed Scales



Cat. #	Description	Qty
60278-19	RET 30, Cross Scale 10mm, 100 Div of 0.10mm, 19mm Diameter	each
60278-21	RET 30, Cross Scale 10mm, 100 Div of 0.10mm, 21mm Diameter	each
60279-19	RET 32, Cross Scale 20mm, 200 Div. of 0.10mm, 19mm Diameter	each
60279-21	RET 32, Cross Scale 20mm, 200 Div of 0.10mm 21mm Diameter	each

► Simple Grid Scales



Cat. #	Description	Qty
60282-19	RET 71, Grid 5mm x 5mm x 0.5mm with 0.025mm Line, 19mm Diameter	each
60282-21	RET 71, Grid 5mm x 5mm x 0.5mm with 0.025mm Line, 21mm Diameter	each
60283-19	RET 73, Grid 10mm x 10mm x 1mm with 0.025mm Line, 19mm Diameter	each
60283-21	RET 73, Grid 5mm x 5mm x 1mm with 0.025mm Line, 21mm Diameter	each

➤ II. Microscope Graticules

Microscope graticules can be divided into two main classes:

Eye-piece graticules and Stage graticules

Eye-piece Graticules: These are placed at a focal plane of the eyepiece coincident with the primary plane of the objective. When the microscope is focused the image of the specimen and graticule will be seen together.

Stage Graticules: These are mounted on the stage either in plane of the normal specimen or in contact with it.

Eye-piece graticules insertion:

These are inserted in the focal plane of the eyepiece in one of two planes depending on the type of eyepiece used:

1. Below the eye-lens a **Huygenian** type, normally in contact with the field stop.
2. Below the field of lens a **Ramsden** or **Kellner** type usually in a special mount.

Choosing the correct eyepiece graticule:

1. Type of pattern. The type of pattern will largely depend on the analysis that is being undertaken.

2. Measurement divisions on the graticule scale.

It is important to note that the dimensions of the eyepiece patterns offered in this catalog refer always to the absolute dimensions on the graticule itself, and NOT the dimensions of the specimen that is being measured.

Care must also be taken to choose a graticule with dimensions large enough to be seen by the operator. For instance, an E28 with scale units of 0.01mm will be too fine to be seen clearly in an eyepiece with magnification less than X20.

3. Field of view. Another factor to consider is the field of view of the eyepiece defined by the diaphragm. Many eyepieces cover a field of 16mm diameter, but smaller fields often found in higher powered eyepieces will restrict the area of eyepiece graticule seen and will influence the choice.

4. Size of the graticule. The size of the graticule disc required will be determined by the size of the eyepiece tube. Eyepiece graticules are available in 16, 19 or 21mm diameter discs as a standard (others available upon request).

5. Type of image. Eyepiece graticules are available in two forms. Sandwich type (Reference E) where the pattern is produced in a layer between two glass discs. Dust and surface blemishes on the glass discs remain out of focus when the graticule is clearly defined.

Surface type (Reference NE) where the pattern is formed in a layer bonded to the surface of the glass disc. In this type the pattern reads correctly when viewed through the glass.

6. Calibration of Microscopes

In general, the total magnification of your microscope can be determined by simply multiplying the objective power by that of the eyepiece.

Objective	Eyepiece	Total Magnification
X20	X10	200

For most work, especially with modern optics, this is sufficient. However, where actual size is critical it is often necessary to modify the dimension, so when ordering eyepiece graticules, the following information is needed.

- Calibration factor.
- The objective in use.
- The eyepiece in use.
- Make and model of microscope.

To calibrate the instrument, fit the micro-scope with an eyepiece scale and appropriate stage micrometer. Compare the length of the stage micrometer with the eyepiece scale. An exact Calibration Factor can then be calculated.

Example: Using a 40X objective, a circle in the eyepiece requires a diameter of 4000 microns (4mm) to coincide with or read a 100 micron circle on the stage. The factor is therefore defined as 4.

7. Alternatively:

With the stage micrometer and eyepiece graticule in place, the microscope is focused in the normal way. The eyepiece scale now becomes superimposed upon the enlarged image of the stage micrometer.

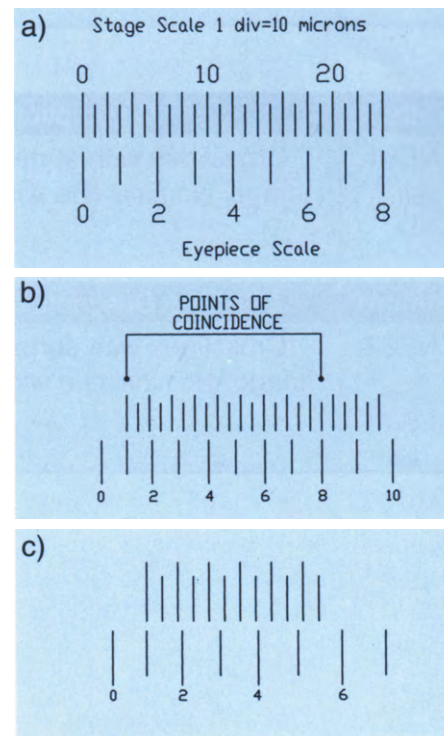
Move the stage micrometer until the zero on each scale are coincident. Further along another coincident point will be found. The relationship between the two points can now be seen and calculated.

a)
$$\text{Number of units} = \frac{\text{Number of stage micrometer divisions}}{\text{Number of eyepiece scale divisions}}$$

On scale shown a) there are 24 stage micrometer divisions which align with 8 eyepiece scale divisions. Therefore each eyepiece division is: $24/8 = 3$ units

b) In this case the 17 divisions on the stage micrometer line up with divisions 1 to 8 on the eyepiece scale. Thus $17/7 = 2.42857$ units. If the unit of the stage micrometer is 10 microns, then each division = 24.2857 microns. In practice terms this figure may be rounded to 24 or 24.3

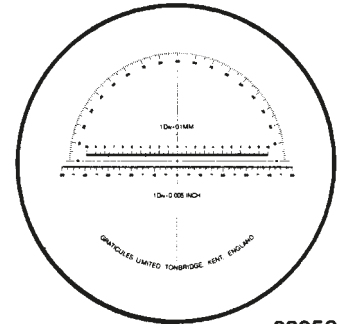
c) It is possible that there is no second point of coincidence. Then on microscopes with an adjustable tube length coincidence can be obtained by lengthening or shortening the tube. Where there is no tube length adjustment, all measurement will be approximate.



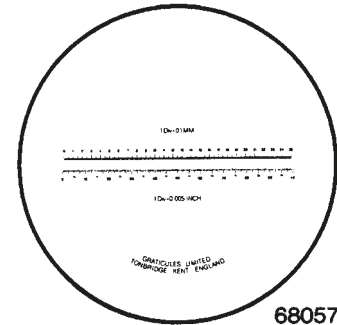
► Inspecta Measuring Magnifier MAG 6

A hand-held magnifier for measurement and inspection. Their construction make them ideal aids for anyone concerned with quality control, inspection, drafting, photography, etc.

The clear base allows ample surface light to fall on the subject being measured and the eye lens can be focused to suit individual sight. Interchangeable graticules fitted in the base ring permit a variety of measurements to be made quickly and accurately. Comes complete with a leather case.



68056



68057

Specifications:

Divisions:0.1mm or 0.8"(L)
 Magnification:8X
 Field of view:25mm
 Height:65mm
 Overall Diameter:40mm

68055 MAG6 Measuring Magnifier each

Graticule for use with MAG6

68056 MT8 Combination Scale and Protractor each
 68057 M6T20 Inch/Metric Scale (0.1mm/0.005") each

► Focusing Eyepieces

► Huygenian Eyepiece X 7

Composed of two plano convex lenses, separated by an air space. The image plane is between the two lenses. The top lens is adjusted to bring the graticule into focus.

Field of view:15mm diameter
 Graticule:16mm diameter
 Reference No.:F7

► Kellner Eyepiece x 10

The F10 eyepiece, which fits most standard monocular microscopes, is specially designed to receive eyepiece graticules of 16mm diameter. This allows the graticule to be brought into sharp focus when superimposed on the object image, which is often difficult to achieve with fixed focus eyepieces. The graticule is held by a screw-on retaining ring and is easily removed for cleaning or replacement for another pattern.

Composed of a convex lens and an achromatic lens. The image plane is below the lens elements. The use of an achromatic lens provides a larger field of view, better color correction and substantial eye relief. The top lens adjusts to focus on the graticule.

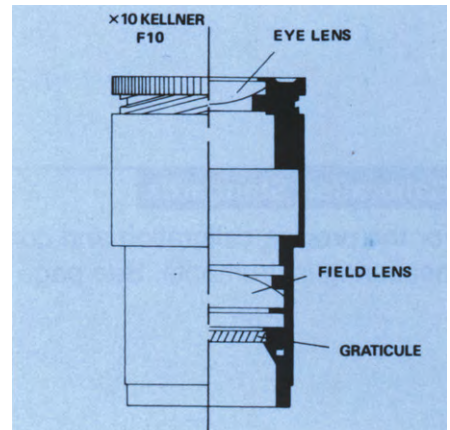
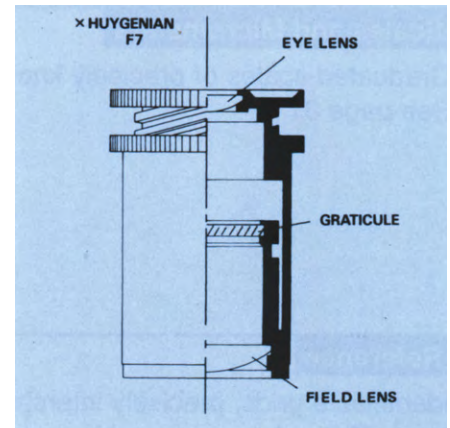
Field of view:15mm diameter
 Graticule:16mm diameter
 Reference No.:F10

► Kellner Type Eyepiece (Wide Field x10)

With high eye point (useful for spectacle wearers). Non -focusing wide field.

Field of view:18mm diameter
 Graticule:19mm diameter
 Reference No.:F12

67990-F7 Huygenian Eyepiece, x7 each
 67990-F10 Kellner Eyepiece, x10 each
 67990-F12 Kellner Wide-Field Eyepiece, x10 each



► Eyepiece Graticules

The standard diameter size of the Eyepiece Graticules is 16, 19, 21mm. All other sizes are available upon request

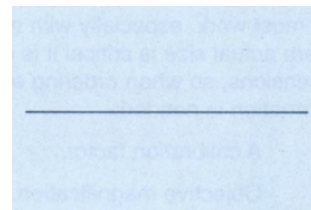
► A. SIZE AND POSITION SCALES

► Line and Crosses

► Single Lines – NE50

For measurement of large objects in conjunction with a graduated mechanical stage, and for alignment as well.

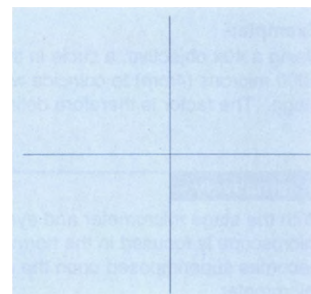
Pattern	Description	Dia.	Cat.#
NE50	Single Line, nominal width 0.02mm. Image covers entire field of view Surface chrome image	16mm	67982-16
		19mm	67982-19
		21mm	67982-21



► Cross Lines – NE8, NE81, NE82

Used as NE50 but for measurements in two directions and for sighting and alignment. Image covers the entire field of view.

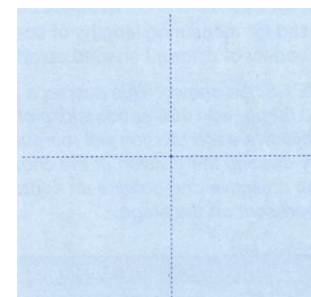
Pattern	Description	Dia.	Cat.#
NE8	Cross lines with surface chrome image. Nominal line width 0.020mm	16mm	67983-01
		19mm	67983-05
		21mm	67983-10
NE81	Cross lines with surface chrome image. Nominal line width 0.04mm	16mm	67983-20
		19mm	67983-25
		21mm	67983-30
NE82	Cross lines with surface chrome image. Nominal line width 0.005mm	16mm	67984-16
		19mm	67984-19
		21mm	67984-21



► Broken Crosslines – NE56

Used as above. Broken lines enable fine detail to be seen at the breaks. A thin boundary would be lost behind a continuous line.

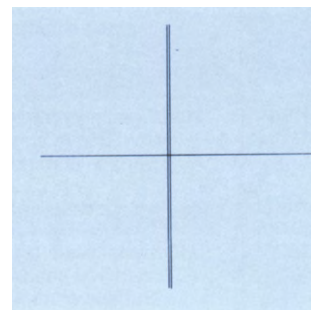
Pattern	Description	Dia.	Cat.#
NE56	Broken cross lines. Image covers the entire field of view. Surface chrome image.	16mm	67985-16
		19mm	67985-19
		21mm	67985-21



► Crossed Gauge Lines – NE53, NE 54

Use as crossed lines, but for the measuring of distances between the lines. Greater accuracy can be obtained by locating the specimen detail between the graticules gauge pair.

Pattern	Description	Dia.	Cat. #
NE53	Two vertical lines 0.1mm apart with horizontal line. Image covers the entire field of view. Surface chrome image.	16mm	67986-16
		19mm	67986-19
		21mm	67986-21
NE54	Two vertical lines 0.2mm apart	16mm	67975-16
		19mm	67975-19
		21mm	67975-21
		Any Custom Size	67975-50



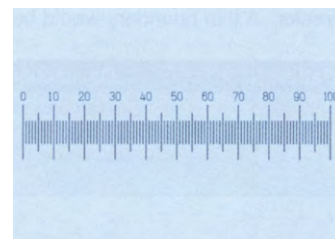
continued >>>>>

► Eyepiece Graticules

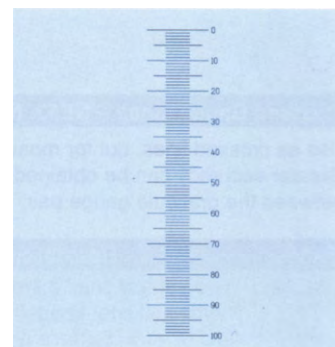
► Horizontal & Vertical Scales - NE1, NE2, NE5, NE20, NE28, NE31, NE41, NE120

These scales are used for the measuring of lengths of specimen or distances between points on a variety of different shaped objects. **NE1 scale showed:** This eyepiece graticule has an overall length of 10.00mm with 100 subdivisions of 0.1mm. When used with a x 10 objective each division will represent 10 microns on the specimen. By dividing the division of the chosen graticule by the magnification of the objective one obtains an approximate value that each division will represent on the stage.

Pattern	Description	Dia.	Cat.#
NE1	Horizontal micrometer scale 10mm long with 0.1mm subdivisions. Surface chrome image.	16mm	68010-16
		19mm	68010-19
		21mm	68010-21
NE2	Vertical micrometer scale 10mm long with 0.1mm subdivisions. Surface chrome image.	16mm	68006-16
		19mm	68006-19
		21mm	68006-21
NE5	Horizontal micrometer scale 5mm long with 0.05mm subdivisions. Surface chrome image.	16mm	67988-16
		19mm	67988-19
		21mm	67988-21
NE20	Horizontal scale 0.1inch long with 100 subdivisions. Surface scale image.	16mm	67987-16
		19mm	67987-19
		21mm	67987-21
NE28	Horizontal micrometer scale. 1mm long with 100 subdivisions. Surface chrome image.	16mm	67992-16
		19mm	67992-19
		21mm	67992-21
NE41	Horizontal micrometer scale 10mm long with 200 subdivisions. Surface chrome image	16mm	67993-16
		19mm	67993-19
		21mm	67993-21
NE120	Horizontal Micrometer 20mm long with 100 divisions of 0.1mm	16mm	67976-16
		19mm	67976-19
		21mm	67976-21
		Any Custom Size	67976-50
NE31	Horizontal scale 0.5" long with 100 divisions of 0.0005"	16mm	67977-16
		19mm	67977-19
		21mm	67977-21
		Any Custom Size	67977-50



Horizontal Scale

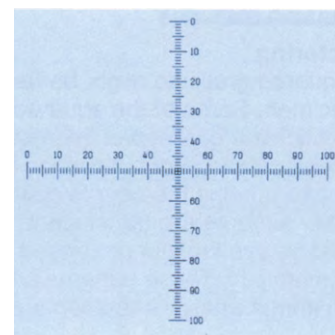


Vertical Scale

► Crossed Scales - NE17, NE18, NE70, NE72

Used as a horizontal and a vertical scale, they are especially useful when interested in measurement in different axis.

Pattern	Description	Dia.	Cat.#
NE17	Crossed micrometer scales 10mm long with 0.1mm subdivisions. Surface chrome image.	16mm	67989-16
		19mm	67989-19
		21mm	67989-21
NE18	Crossed micrometer scales 5mm long with 0.05mm subdivisions. Surface chrome image.	16mm	67994-16
		19mm	67994-19
		21mm	67994-21
NE72	Crossed Micrometer scale, each 20mm long with 200 Divisions of 0.1mm	23mm	67978-23
		24mm	67978-24
		26mm	67978-26
		27mm	67978-27
		Any Custom Size	67978-50
NE70	Crossed micrometer scale(imperial) Each 0.8" long with 400 divisions of 0.002"	21mm	67978-21
		23mm	67979-23
		24mm	67979-24
		26mm	67979-26
		27mm	67979-27
Any Custom Size	67979-50		



Crossed Scale

continued >>>>

► Eyepiece Graticules

► Square and Grids

Note: These scales may need to be calibrated, according to intended use. There are a number of uses for the grids and squares listed and they will largely depend on the individual user's application.

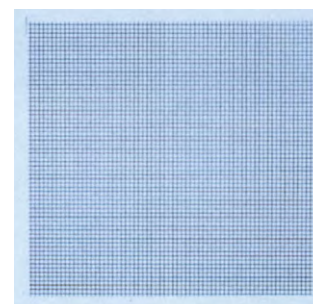
EYEPIECE SCALES:

- **Sectoring:** A squared graticule might be used for the systematic examination of a specimen. Some of the squared patterns are numbered to aid in the identification of areas of interest. Sectioning is particularly useful for making drawings of specimens onto graph paper. The chessboard type of pattern helps the user to distinguish the position being examined: the darker squares are translucent, while the lighter ones are transparent, avoiding eyestrain in prolonged counting as many be necessary in hematology. These patterns provide the same advantages when used with image analysis and capture devices.
- **Counting:** A squared graticule can be used for counting. Here the basic principle is that a small area of the specimen is analyzed in order to obtain information about the total area. This minimizes wasteful work enabling simple analysis of a particular area. An example of this would be the comparison of large to small particles in a specimen. By using the Miller graticule (NE57) only the smaller particles in the small square are counted, the result being multiplied by ten for comparison with the number of larger particles in the large square.
- **Squared Grids:** Squared grids can be used in particle size analysis as simple technical aids where sophisticated image analysis systems are not required. The areas of the particles to be measured can be estimated by simply counting the number of squares occupied by those particles. It is necessary to estimate fractions of a square or make a rule (e.g. count as a square all partly covered squares at the right and bottom sides of the grid, and ignore partly covered squares at the left and upper sides of the squares). This method would only be useful for a fairly crude estimation of a large diameter. For more detailed optical analysis it is advisable to use a specialized graticule, such as those in the Particle Size Analysis section, on page 908-909.

► Squared Grids - NE10, NE11, NE34, NE7N

Simple grids are convenient for making sketches of the observed specimen on graph paper. They are also useful for particle counting.

Pattern	Description	Dia.	Cat.#
NE10	Grid (net) 0.5mm pitch. Surface chrome image (Pitch: distance of center bar to center bar)	16mm	68011-16
		19mm	68011-19
		21mm	68011-21
NE11	Grid (net) 1.0mm pitch. Surface chrome image (Pitch: distance of center bar to center bar)	16mm	68015-16
		19mm	68015-19
		21mm	68015-21
NE34	Grid (net) 0.1mm squares. Surface chrome image	16mm	68018-16
		19mm	68018-19
		21mm	68018-21

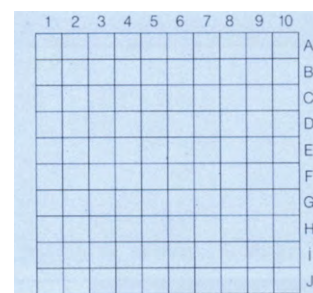


Square Grids

► Indexed Grids - NE10A, NE11A, NE34A, NE7I

Useful for particle counting, particularly when reference is needed between workers. Also, they are useful for area of specimen determinations.

Pattern	Description	Dia.	Cat.#
NE10A	Numbered grid 5mm x 5mm. 0.5mm pitch. Marked 1 – 10 and A -J. Surface chrome image.	16mm	68011-16A
		19mm	68011-19A
		21mm	68011-21A
NE11A	Numbered grid 10mm x 10mm. 1.0mm pitch. Marked 1 – 10 and A -J. Surface chrome image	16mm	68016-16
		19mm	68016-19
		21mm	68016-21
NE34A	Numbered grid 1mm x 1mm. 0.1mm pitch. Marked 1 – 10 and A -J. Surface chrome image.	16mm	68018-16A
		19mm	68018-19A
		21mm	68018-21A
NE7I	Index Pattern 20x20 Grid of 0.5mm squares	21mm	67981-21
		23mm	67981-23
		24mm	67981-24
		26mm	67981-26
		Any Custom Size	67981-50

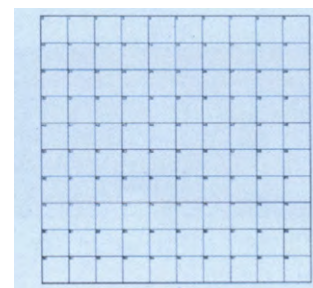


Indexed Grids

► Indexed Grids – NE35

Useful for area of specimen determinations, especially rectangular shapes, also for particle counting.

Pattern	Description	Dia.	Cat.#
NE35	Numbered grid 10mm x 10mm. 1mm indexed squares. Surface chrome image.	16mm	68014-16
		19mm	68014-19
		21mm	68014-21



NE35

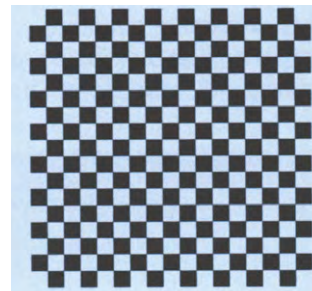
continued >>>>

► Eyepiece Graticules

► Chessboard Squares – NE15

The dark squares are translucent. Used as an alternative to simple grids for area of specimen determination and particle counting. Alternative light and dark squares help to reduce eyestrain.

Pattern	Description	Dia.	Cat.#
NE15	Chessboard (net) 2.0mm squares. Surface chrome image.	16mm	68008-16
		19mm	68008-19
		21mm	68008-21

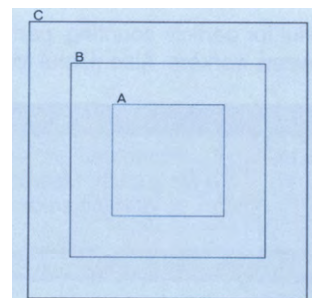


NE15

► Squares – NE38

Combines three areas in one for convenience, giving area ratios A:B of 1:3 and B:C of 1:2.

Pattern	Description	Dia.	Cat.#
NE38	Squares 10mm, 7mm & 4mm. Glass sandwich.	16mm	68017-16
		19mm	68017-19
		21mm	68017-21



NE38

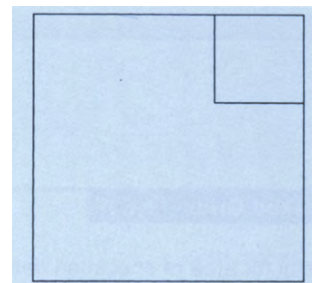
► Miller Squares – NE57

The ratio of large to small squares is 9:1. Originally designed for hematology, they can be utilized for rapid counting of any evenly spread field of particle.

References:

1. American J. of Clin. Pathol. Vol.20, 1950, page 1079. "Time Saving Device For Counting Reticulocyte." G.Brescher and Schneiderman.
2. Practicle Haemotology – J.D. Dacy. Published by J.A. Churchill. 2nd Edition 1956 page 25.

Pattern	Description	Dia.	Cat.#
NE57	Miller 7 x 7mm grid. Glass sandwich.	16mm	68020-16
		19mm	68020-19
		21mm	68020-21



NE57

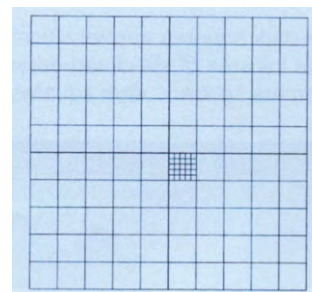
► Whipple Grid – NE29

Originally designed for water particle analysis, but may be used for other aspects of particle counting.

Grid showed: Ratio of full square to smallest is 50:1. Area is 2500:1

Reference: Microscopy of Drinking Water.

Pattern	Description	Dia.	Cat.#
NE29	Whipple grid 100 squares in 7mm area. Surface chrome image.	16mm	68009-16
		19mm	68009-19
		21mm	68009-21



NE29

continued >>>>

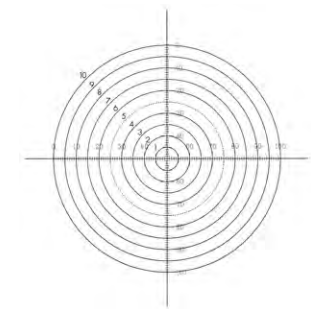
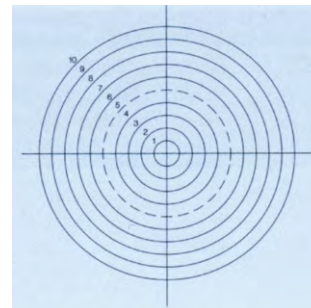
► Eyepiece Graticules

► Gauges

► Concentric Circles – NE42, NE43, NE44, NE47

Can be used for two-way measurement when calibrated as a micrometer.

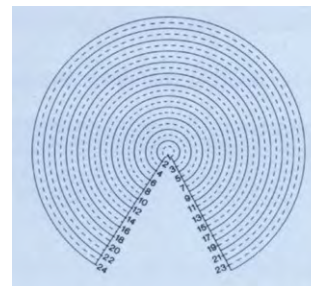
Pattern	Description	Dia.	Cat.#
NE42	Concentric circle 0.25mm – 2.5mm diameter. 10 circles. Surface chrome image.	16mm	68019-16
		19mm	68019-19
		21mm	68019-21
NE43	Concentric circle 0.5mm – 5mm diameter. 10 circles. Surface chrome image.	16mm	67997-16
		19mm	67997-19
		21mm	67997-21
NE44	Concentric circle 1mm – 10mm diameter. 10 circles. Surface chrome image.	16mm	67998-16
		19mm	67998-19
		21mm	67998-21
NE47	Concentric circle 2mm – 20mm diameter. 10 circles. Surface chrome image.	16mm	67999-16
		19mm	67999-19
		21mm	67999-21



NE48

► Concentric Circles and Cross Scales, NE48

Pattern	Description	Dia.	Cat. #
NE48	Concentric circles, 10 circles 1mm-10mm, with Graduated cross hairs	16mm	67991-16
		19mm	67991-19
		21mm	67991-21
		23mm	67991-23
		Any Custom Size	67991-50



NE22

► Concentric Circle – NE22

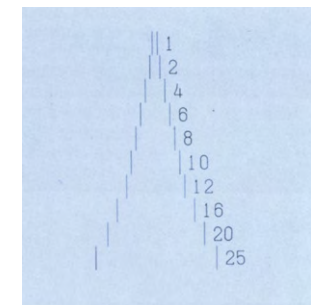
This design leaves the circle clear of obstruction. In addition the intermediate lines are broken to improve ease of reading.

Pattern	Description	Dia.	Cat.#
NE22	Concentric circle 0.5mm – 12mm diameter. 24 circles. Surface chrome image.	16mm	68000-16
		19mm	68000-19
		21mm	68000-21

► Gauge Pairs – NE19

Gauge pairs occupying a field of view of 10mm. Each gauge is proportional to its adjacent number. The approximately size of the smallest pair = 0.1mm.

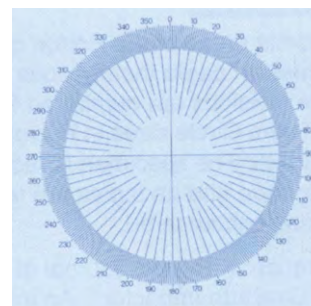
Pattern	Description	Dia.	Cat.#
NE19	Gauge pairs. Surface chrome image.	16mm	68001-16
		19mm	68001-19
		21mm	68001-21



Full Protractor

► Full Protractor – NE45

Pattern	Description	Dia.	Cat.#
NE45	Full protractor scale 10mm diameter divided in degrees. Surface chrome image	16mm	68002-16
		19mm	68002-19
		21mm	68002-21



Full Protractor

continued >>>>

► Eyepiece Graticules

► B. PARTICLE SIZING AND DISTRIBUTING

The use of the eyepiece graticules showed in this section make it possible to analyze specimens containing particles as an alternative, or in addition to, sieving. Graticules for particle size analysis are particularly popular when there are only limited quantities of particles or where particles are smaller than 50 microns in diameter. Typical substances analyzed are sand grains, soil particles, plant seeds, fertilizers, abrasives, liquid droplets, pigments, pulverized coal, silica, fibers and fine dust.

The basic principle employed is to compare particles to the globes and circles of varying sizes that appear on the graticule – dark particles being compared to solids globes, and light or transparent ones to the circles. Naturally the procedure varies with the graticule concerned, more information about which is given below.

Please note that for calibration the circles and globes will represent particles smaller in diameter by the magnification of the objective.

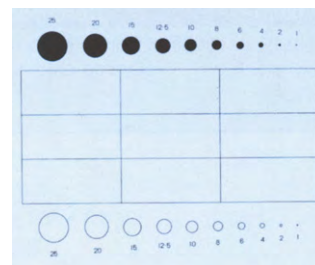
► Paterson Globes and Circles – NG1

The graticule consists of a central rectangle, sub-divided into nine smaller rectangles with a number of increasing circles outside the top and bottom horizontal edges. The marked figures are the diameters of the circles in units. 250 units represent the horizontal length of the large rectangle. Rectangle size is 4.5mm x 2.025mm. Circle sizes in microns are 450, 360, 270, 225, 180, 145, 110, 74, 37, and 18.

Reference:

H.S. Patterson and W. Cawood. Transactions of the Faraday Society, Vol. 32 Feb. 1936. "The Determination of Size Distribution in Smokes." pp. 1084-1088

Pattern	Description	Dia.	Cat.#
NG1	Paterson globes/circles. Surface chrome image.	16mm	68031-16
		19mm	68031-19
		21mm	68031-21



NG1

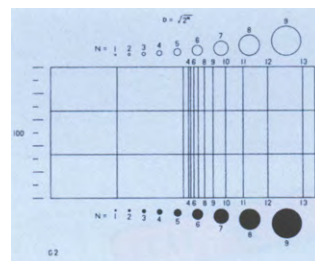
► Porton – NG2

The circle areas of the Porton graticules increases with Root 2 progression as do the divisions on the right hand side of the rectangle. These divisions are numbered for convenience. The rectangle size is 4.5mm x 2.25mm. Circle sizes in microns are 560, 400, 280, 200, 140, 100, 70, 50, and 35. The specimen is racked on the mechanical stage of the microscope and traverses are taken right across the deposit sizing all the particles encountered.

Reference:

K.R. May, J. of Science Instrument. Vol. 22, Oct 1945. "The Cascade Impactor" An instrument for sampling coarse aerosols. Pp 187-195.

Pattern	Description	Dia.	Cat.#
NG2	Original Porton globes/circles. Surface chrome image.	16mm	68024-16
		19mm	68024-19
		21mm	68024-21



NG2

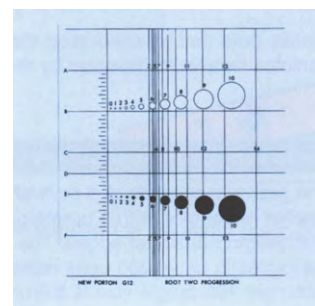
► New Porton – NG12

The NG12 is particularly useful since the array of globes and circles are conveniently close to where the particles pass. At the end of each band of the sample the mechanical stage is traversed vertically to take in the next band until the whole sample has been covered.

Reference:

K.R. May, J. of Science Instrument. Vol. 42, 1965. "A New Graticule For Particle Counting and Sizing". Pp 500-501.

Pattern	Description	Dia.	Cat.#
NG12	Modified Porton pattern globes/circles. Surface chrome image	16mm	68032-16
		19mm	68032-19
		21mm	68032-21



NG12

continued >>>>

► Eyepiece Graticules

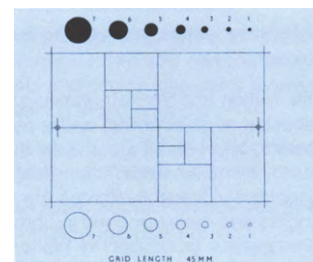
► British Standard Graticule – NG10

In this graticule the circle areas double progressively, hence the diameters alter by Root 2, so that the size classes can form a continuation of the standard series of sieves for particle sizing. Each particle is assigned to a size class defined by two adjacent circles, which represent the size limits of that class. Thus the distribution of size is obtained in terms of the diameter of circles having the same projected area as the particles. This method will cover particles in the range 150 micron to 0.38 micron. The size distributions with respect to their number and weight are determined separately. Final results are calculated as cumulative percents.

Originally designed by the National Coal Board for use in coal mining.

References: B.S. 3625/B.S. 3260

Pattern	Description	Dia.	Cat.#
NG10	British Standard (BS3625/BS3260) Globes & Circles.	16mm	68026-16
	Surface chrome image	19mm	68026-19
		21mm	68026-21



NG10

► Fairs – NG5

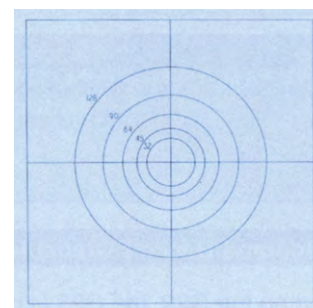
Designed to extend the sizing range of globe and circle graticules.

Example: Used in conjunction with NG2 the overall size range = 128:1. The circles increase by 2.

Note: Both graticules would have to be used with the same microscope, eyepiece and objective.

Reference: G.L. Fairs. Chem Ind. 1943 Vol 62. pp 374-378. "The Use Of The Microscope In Particle Size Analysis."

Pattern	Description	Dia.	Cat.#
NG5	Fairs. Grid length 4mm. Glass Sandwich.	16mm	68033-16
		19mm	68033-19
		21mm	68033-21



NG5

► Asbestos Fiber Analysis

► Walton and Beckett Graticule for Asbestos – G22, G24

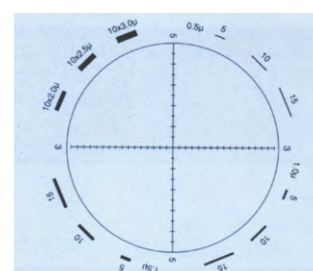
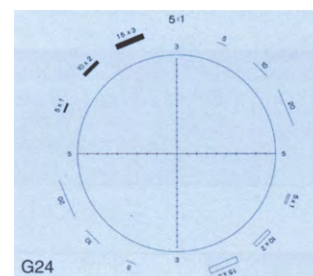
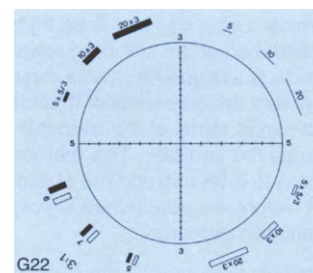
Calibration factors are required for each of these graticules. See note below.

The Walton and Beckett graticule is used for counting fibrous dust (e.g. asbestos or glass fibers) and is particularly useful where the majority of fibers to be counted are shorter than 5 microns. The circle is divided into four by two diametrical lines scaled in units of 5 and 3 microns respectively. 3 and 5 microns are the critical measurements of fiber lengths and diameters used in fiber counting. Unlike the usual globes of other particle graticules, the Walton and Beckett have a series of shapes to compare objects with. These shapes have been designed for comparison with fibers, especially since they incorporate an aspect ratio of

3:1 or 5:1 essential for such analysis.

Reference: W.H. Walton and S.T. Beckett. Occupational Hygiene. Vol.20, pp19-23. "A Microscope Eyepiece For The Evaluation of Fibrous Dusts."

Pattern	Description	Dia.	Cat.#
G22	Walton & Beckett for asbestos. 3:1 ratio. Glass sandwich.	16mm	68028-16
		19mm	68028-19
		21mm	68028-21
G24	Walton & Beckett for asbestos. 5:1 ratio. Glass sandwich.	16mm	68029-16
		19mm	68029-19
		21mm	68029-21
G25	Based on the G22, the G25 is produced by the Institute of Occupational Health (1996). Glass sandwich.	16mm	68030-16
		19mm	68030-19
		21mm	68030-21



G25

IMPORTANT NOTE: The circle on these Walton & Beckett graticules must represent 100 microns at the stage and each one must be manufactured to suit the individual instrument. Therefore, details should be provided with your order of:

1) Calibration factor, if known (see page 493 for this information); 2) Objective magnification; 3) Eyepiece magnification; 4) Diameter of graticule disc required; 5) Microscope make and model.

Also see HSE Test Slide S84 under Stage Graticules, page 920 >>>>

continued >>>>

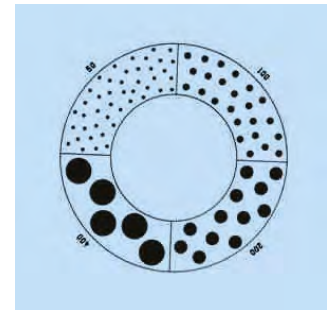
► Eyepiece Graticules

► Specialist Designs

► Spray Droplet Sizing Reticle (Matthews), NG 30

For size and distribution assessments of aerosol droplets. Used in conjunction with a 40X Microscope for direct measurements of droplets from 50–400 micron diameters. The actual pattern sizes are 50, 100, 200, and 400 microns. W.H.O. (Details on Request) and G.A. Matthews. Imperial College.

Pattern	Description	Dia.	Cat. #
NG30	Matthews Spray Droplet	16mm	68003-16
		19mm	68003-19
		21mm	68003-21
		23mm	68003-23
		Any Custom Size	68003-50

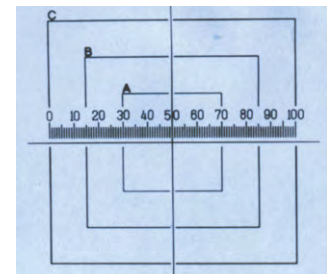


NG30

► Thompson - G23

For counting particles in any of three areas of known size. The graticule is calibrated in the same manner as a normal eyepiece scale. The result is then used to calculate the area of any square.

Pattern	Description	Dia.	Cat.#
G23	Thompson for dust analysis 10mm, 7mm and 4mm squares. Glass sandwich.	16mm	68090-16
		19mm	68090-19
		21mm	68090-21



G23

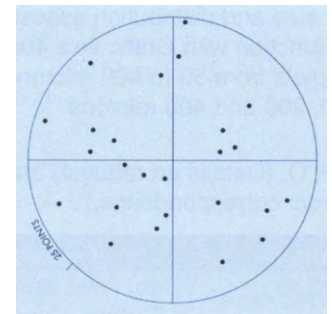
► Chalkley Point Array - NG52

This is used to quickly determine the relationship of components to each other using random sampling.

Curtis gives an example of its application, where a researcher may want to see whether or not a certain drug affects the volume proportion of cell types in a given organ. With this graticule the proportion of points lying over the image of one type of component is statistically proportional to the area occupied by that component. The 25 points of the array are placed over the field of view at random, so that a comparison can be made between the number of points touching the one type of component, with number touching the other type of component in each viewing. A series of observations will yield an increasingly accurate ratio of the comparative incidence of each type of particle.

Reference: A.S.C. Curtis. Medical and Biological Illustration, Vol. 10. pp 261-266. "Area and Volume Measurements by Random Sampling Methods."

Pattern	Description	Dia.	Cat.#
NG52	Chalkley point array. Surface chrome image.	16mm	68034-16
		19mm	68034-19
		21mm	68034-21



NG52

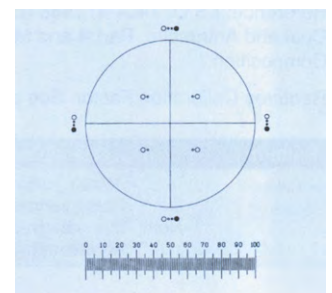
► Pharmaceutical PSA Pattern - G57

This graticule was designed for the pharmaceutical industry. However, it is also useful where particle size considerations are restricted to 10mm and 25mm. Dots and circles give quick references for these two sizes. In addition a scale is incorporated.

The microscope must be calibrated when ordering this graticule, such that the circle must equate to 1mm on the microscope stage.

Reference: The United State Pharmaceutical Conventions Inc. Pharmaceutical Forum Vol. 19 No 6.

Pattern	Description	Dia.	Cat.#
G57	Pharmaceutical PSA Pattern. Glass sandwich.	19mm	68091-19
		21mm	68091-21



G57

continued >>>>

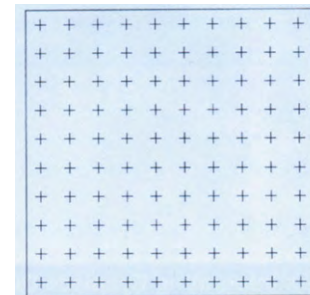
► Eyepiece Graticules

► Counting Pattern - NG14

Simple counting for geological and soil analysis.

Reference: L.G. Briarty. "Stereology: Methods for Quantitative Light and Electron Microscopy." Sci. Prog. Oxf. 1975 62; 1-32.

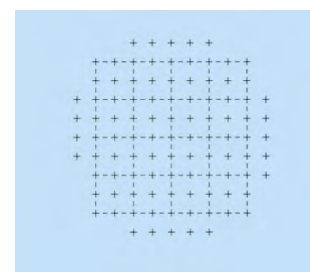
Pattern	Description	Dia.	Cat.#
NG14	Counting pattern for soil analysis, 10mm square.	16mm	68092-16
	Surface chrome image.	19mm	68092-19
		21mm	68092-21



NG14

► Lennox Grain Analysis, NG21

Pattern	Description	Dia.	Cat. #
NG21	Lennox for Grain analysis	16mm	68004-16
		19mm	68004-19
		21mm	68004-21
		23mm	68004-23
		Any Custom Size	68004-50

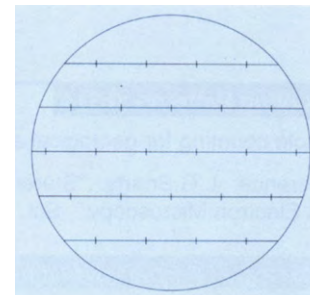


NG21

► Zeiss Integrating Disc 1 or Henning Resseau Pattern 25 Points – G49

Reference: Zeiss Werkzeitschrift. No 30, page 80

Pattern	Description	Dia.	Cat.#
G-49	Henning Resseau pattern (Zeiss integrating disc 1). Glass sandwich.	16mm	68093-16
		19mm	68093-19
		21mm	68093-21

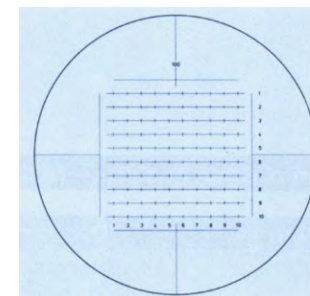


G49

► Zeiss Integrating Eyepiece Disc 100 Points – G47

Similar to G49 but extended to 100 points, which are indexed.

Pattern	Description	Dia.	Cat.#
G-47	Zeiss integrating eyepiece disc. Glass sandwich.	16mm	68094-16
		19mm	68094-19
		21mm	68094-21



G47

continued >>>>

► Eyepiece Graticules

► C. STEREOLOGY

In this simplest form, stereology is the science where information about a three dimensional object is obtained from only a two-dimensional section of that structure.

Measurements are usually made with these graticules in the following manner:

1. An adequate representation of sections of a specimen is obtained.
2. The graticule is superimposed upon the specimen (or micrograph/ projected image of the section).
3. Finally, the interaction between the superimposed graticule and the test sections are recorded.

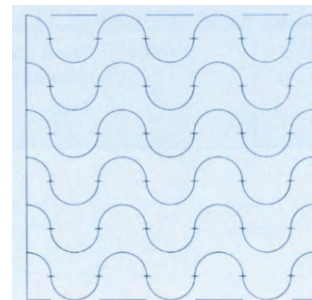
An overall introduction is given by: L.G. Brianrty. "Stereology: Methods for Quantitative Light and Electron Microscopy." Sci. Prog. Oxf. 1975, 62; 1-32.

► The Mertz Graticule (36 Points) – NGM1

Used to estimate the three-dimensional surface areas or the surface density of a component in a given volume, when the component does not have a random orientation. It comprises a test system with parallel curved lines used for measuring the intersection of points.

Reference: W.A. Mertz. "Mikroskopie" Vol. 22 1967 pp 132-142.

Pattern	Description	Dia.	Cat.#
NGM1	Mertz for Stereology. Surface chrome image.	16mm	68035-16
		19mm	68035-19
		21mm	68035-21



NGM1

► Weibel 1 – NGW1

Consists of 15 lines of equal length connecting the verticals of a regular hexagonal point network.

Reference: E.R. Weibel Lab. Invest. Vol. 22 pp 131-152. "Principal and Methods for the Morphometric Study of the Lung and other Organs."

Pattern	Description	Dia.	Cat.#
NGW1	Weibel Type 1 for Stereology. Surface chrome image.	16mm	68022-16
		19mm	68022-19
		21mm	68022-21



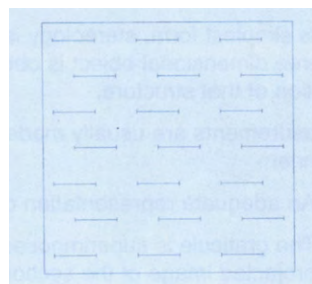
NGW1

► Weibel 2 – NGW2

Used when making a surface to volume ratio of a structure per mass unit. This graticule consists of a number of short lines with interruptions as long as the lines. Basically, the number of intersections falling over the short lines is counted and the number of endpoints falling on the end of the structure is determined.

Reference: E.R. Weibel, Journal of Microscopy Vol. 95. pp 373-378. Current Capabilities and Limitations of Available Stereological Technique, point counting method.

Pattern	Description	Dia.	Cat.#
NGW2	Weibel Type 2 for Stereology Surface chrome image.	16mm	68025-16
		19mm	68025-19
		21mm	68025-21

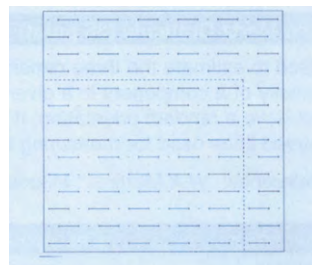


NGW2

► Weibel 3 – GW3

Reference: E.R. Weibel, G.S. Kistler & W.F. Scherle. 1986. J. Cell Biology.30, 23.

Pattern	Description	Dia.	Cat.#
GW3	Weibel Type 3 for Stereology. Glass sandwich.	16mm	68023-16
		19mm	68023-19
		21mm	68023-21



NGW3

continued >>>>

► Eyepiece Graticules

► D. METALLURGY

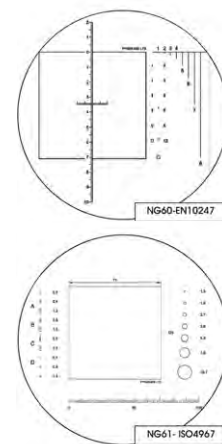
Standard pattern discs for metallurgical stereometric analysis of grain size in polished metal sections.

► Grain Sizing Pattern EN10247/ISO4976

For the determination of non-metallic inclusion content of steel

NG60 meets EN 10247 and NG61 Meets ISO 4976. Both are scaled for use with 10x objective magnification

Pattern	Description	Dia.	Cat. #
NG60	Grain Sizing reticle to En 10247	21mm	68007-21
		23mm	68007-23
		24mm	68007-24
		26mm	68007-26
		Any Custom Size	68007-50
NG61	Grain Sizing reticle to ISO 4967	21mm	68036-21
		23mm	68036-23
		24mm	68036-24
		26mm	68036-26
		Any Custom Size	68036-50

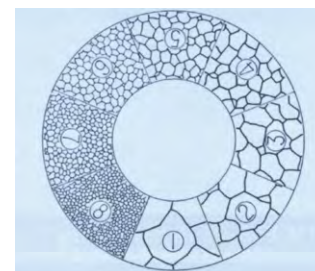


Grain Sizing Pattern

► ASTM Austenite 1:1 Grain Sizing Disc – G41

Reference: VDEH 1510-61

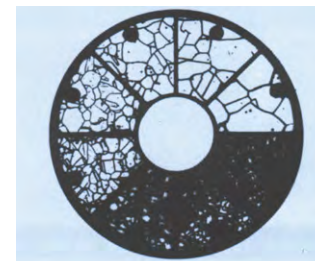
Pattern	Description	Dia.	Cat.#
G41	ASTM Grain Size austenite. Glass sandwich.	19mm	68065-19
		21mm	68065-21



G41

► ASTM E112 Plate 1 Grain Sizing Disc – G42

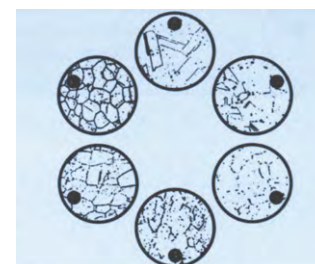
Pattern	Description	Dia.	Cat.#
G42	Grain sizing (E112.) Glass sandwich.	19mm	68066-19
		21mm	68066-21



G42

► ASTM Carbide Grain Sizing Chart – G43

Pattern	Description	Dia.	Cat.#
G43	ASTM Grain Sizing carbide. Glass sandwich.	19mm	68067-19
		21mm	68067-21

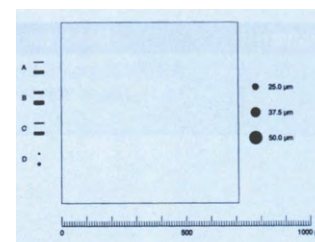


G43

► ASTM E45 – G44

Reference: ASTM E45

Pattern	Description	Dia.	Cat.#
G44	ASTM E45. Root 2 sides. 7.1mm square. 10mm scale.	19mm	68068-19
		21mm	68068-21



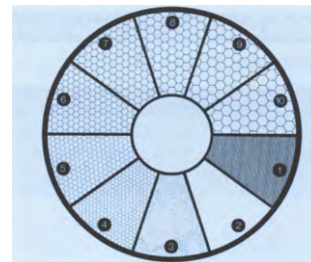
G44

continued >>>>

► Eyepiece Graticules

► ASTM E19-46 Grain Sizing Disc – G45

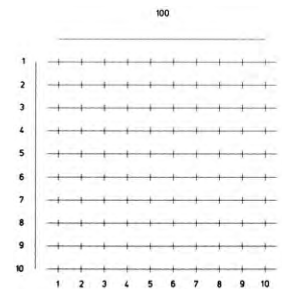
Pattern	Description	Dia.	Cat.#
G45	ASTM Grain sizing E19-46 Glass sandwich.	19mm 21mm	68069-19 68069-21



G45

► Integrating EyePiece, G50

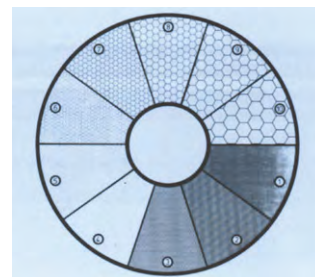
Pattern	Description	Dia.	Cat. #
G50	Integrated EyePiece (Simplified)	19mm 21mm 23mm 24mm Any Custom Size	68005-19 68005-21 68005-23 68005-24 68005-50



G50

► ASTM E19-46 Grain Sizing Disc Root 2 – G46

Pattern	Description.	Dia.	Cat.#
G46	ASTM Grain sizing E19-46 Root 2 Glass sandwich.	19mm 21mm	68070-19 68070-21



G46

► Circular Grid ASTM 24 Points – G54

Reference: ASTM G562

Pattern	Description	Dia.	Cat.#
G54	ASTM 24 Point Circular Grid Glass sandwich.	16mm 19mm 21mm	68084-16 68084-19 68084-21

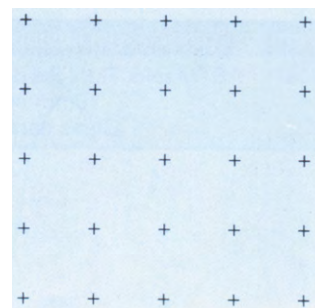


G54

► Square Grid ASTM 25 Points – G55

Reference: ASTM G562

Pattern	Description	Dia.	Cat.#
G55	ASTM 25 Point Square Grid Glass sandwich.	16mm 19mm 21mm	68085-16 68085-19 68085-21



G55

continued >>>>

► Stage Micrometer/ Graticules

These stage graticules are intended for the routine calibration of eyepiece patterns, particularly when alternating between objectives on one microscope or when using the same graticule in different microscopes. Their robust construction makes them ideal for student use and for instructional purposes. The scale or grid is centered on a glass disc mounted in a black anodized aluminum slide 75mm x 24mm x 2mm thick. For applications requiring traceable standards, see page 648-649.

Two types are available:

- Transmitted light
- Reflected light, as is used with metallurgical microscopes.

► A. SCALES AND MICROMETER

► For Transmitted Light

► New PS52P & PS52N Dual Scale Calibration Slides

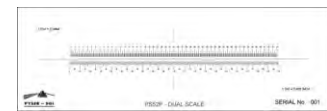
Key Features

- New Dual-Scale Calibration Slides
- 2" Imperial (English) and 50mm Metric Scales on a Single Slide
- Positive and Negative Versions
- Unique Serial Number for Traceability
- Available with Internationally Traceable Certificates of Calibration

Description

EMS has introduced two new calibration slides that have the benefit of dual imperial/metric scales. The PS52P is for transmitted light applications and has a bright chrome positive image. The PS52N has a negative pattern, formed in low reflective chrome for incident light applications to give excellent contrast. Both are ideal for calibrating optical products with a large field of view, such as stereo microscopes or imaging systems.

Pattern	Description	Cat.#
PS52P	Dual Micrometer Calibration Slide, 76mm x 25mm, positive image, 50mm in 0.1mm divisions and 2" in 0.005" divisions, serial numbered, supplied in wooden case	68040-05
	PS52P with UKAS certificate	68040-06
PS52N	Dual Micrometer Calibration Slide, 76mm x 25mm, negative image, 50mm in 0.1mm divisions and 2" in 0.005" divisions, serial numbered, supplied in wooden case	68040-07
	PS52N with UKAS Certificate	68040-08



PS52P

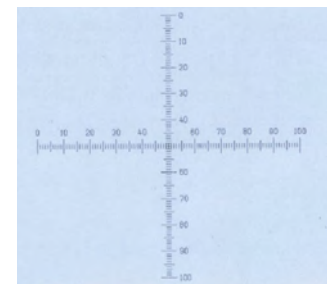


PS52N

► Standard and Crossed Patterns – S1, S2, S4, S5, S8, S11, S12, S16, S18, S20, S21, S22, S48

Pattern	Type, Length	Nos. Div.	Div. Size	Cat.#
S1	Horizontal, 10 mm	100	0.1mm	68040-01
S2	Horizontal, 5.0 mm	100	0.05mm	68039-02
S4	Horizontal, 0.1 inch	100	0.001"	68039-04
S5	Horizontal, 20 mm	200	0.01 mm	68039-05
S8	Horizontal, 1 mm	100	0.01 mm	68042-08
S18	Dual Scale	See description on page 917		68043-30, -35, -40
S11	Horizontal, 0.005 inch	50	0.0001"	68039-11
S12	Horizontal, 0.1 mm	50	0.002mm	68044-12
S16	Crossed Scale, 1mm	200	0.01mm	68039-16
S20	Double micrometer scale	10	0.01mm	68043-20
S21	Micrometer scale	100	0.5mm	68043-21
S22	Vertical Scale, 2mm	200	0.01mm	68039-22
S48	No coverglass, 1mm	100	0.01mm	68041-48

NEW



S16

Table 1: Accuracy and Line Widths of Stage Micrometers.

Pattern	Line Width	Accuracy (overall)	Pattern	Line Width	Accuracy (overall)
S1 or PS1	0.005 mm	Within 0.002 mm	S16 or PS16	0.0015 mm	Within 0.001 mm
S2	0.005 mm	Within 0.00015 mm	S18	0.0025 mm	Within 0.002 mm
S4 or PS4, S5 or PS5	0.002 mm	Within 0.0001 inch	S20 or 21	0.0025 mm	Within 0.0015 mm
S8 or PS8	0.002 mm	Within 0.001 mm	S22	0.0025 mm	Within 0.0015 mm
S11	0.001 mm	Within 0.00005 inch	S48	0.0027 mm	Within 0.001 mm
S12 or PS12	0.001 mm	Within 0.001 mm	S78 or PS78	0.003 mm	Within 0.001 mm

continued >>>>>

➤ Stage Micrometer/ Graticules

➤ S18 Brightfield Stage Micrometer

EMS is proud to introduce the S18 Brightfield Stage Micrometer: Graduated Metric and English Scales for the calibration of measurement instruments across a wide range of magnifications

This flexible graduated scale stage micrometer is suitable for low magnification, stereo inspection microscopes to higher magnification compound microscopes.

KEY FEATURES:

- Dual Scales: 25mm or 1 Inch
- Graduated Divisions, fine for low magnifications, mid for medium magnifications and large for high magnifications
- High Definition, chrome on glass image
- Ideal for you if you use both metric and English measurements

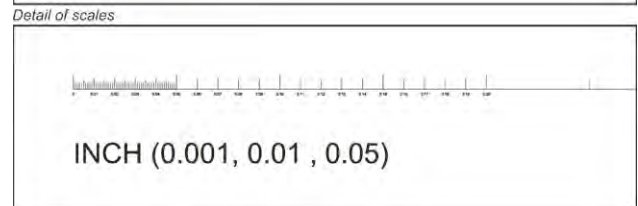
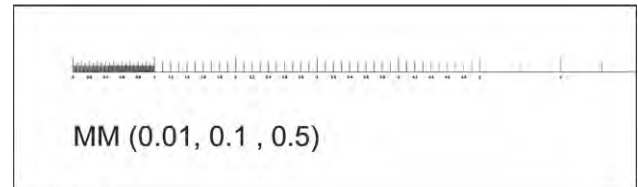
The scales are centered on all glass slide 76mm x 25mm x 1.5mm thick.

Line Width:0.0025mm (2.5 micron)

Accuracy (Overall):0.002mm

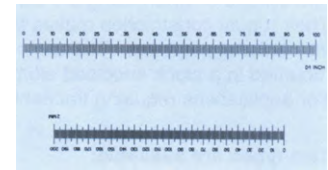
Image Type:Low reflective chrome surface

Cat. #	Description	Qty.
68043-30	S18 with Graticules Certificate	each
68043-35	S18 with UKAS Certificate	each
68043-40	S18 with NPL Certificate	each



➤ Combined Metric/Imperial Pattern – S20

Pattern	Description	Cat. #
S20	Double micrometer scale 2mm in 0.01mm divisions and 0.1 inch in 0.005 inch divisions	68043-20



➤ Grouped Graduation Pattern – S21

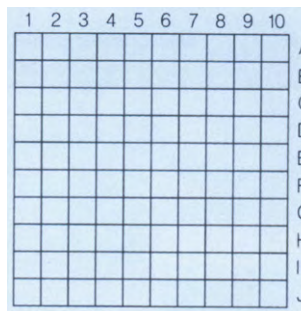
For speedy determination of a range of featured sizes within a given specimen.

Pattern	Description	Cat.#
S21	Micrometer scale 5mm in 0.5mm divisions, 2mm in 0.1 mm divisions, and 0.2mm in 0.01mm divisions	68043-21

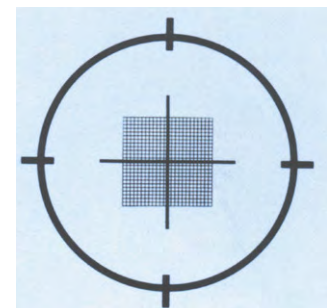
S21

➤ Counting Grids – S9, S10, S28, S29

Pattern	Description	Cat.#
S9	Counting Slide 0.01mm squares.	68045-09
S10	Counting Slide 0.05mm squares	68045-10
S28	0.01mm grid / 0.2 x 0.2mm overall	68045-28
S29	0.01mm grid / 1.5 x 1.5mm overall	68045-29



S9/S10



S28/S29

► Stage Micrometer/ Graticules

► Diamond Ruled Stage Micrometer—S91

A stage micrometer with very well defined lines. These reference scales offer substantial improvements in definition over the standard types when used under the highest magnification. This is made possible by the use of diamond cutting tools and a special ruling engine.

The S91 has clear lines ruled through a semi opaque metal film, which with transmitted light, appear as bright lines on a dark background.

The micrometer is made on a glass substrate 76mm x 26mm x 1.2mm thick. The lines are 1 micron wide or less and 3.5mm long. The metric rulings provide a scale of 1mm divided into 0.01mm parts, with one part being subdivided into 0.001mm parts.

Pattern	Description	Cat.#
S91	Diamond ruled stage micrometer	68046-91

► For Reflected Light

This scale is etched through highly reflective vacuum coated metal. When viewed under vertical illumination, as with a metallurgical microscope, the scale appears black against a bright background.

► PS25 Hardness Tester Calibration Slides - Vickers/Rockwell

Key Features

Reflected light calibration slide with diamond shapes and scales for calibrating Vickers and Rockwell hardness testers

Description

For Vickers and Rockwell methods we offer the PS25 which has a series of diamond shapes of varying size and x-y scales. Each of the markings on the slide is clearly identified with its size. The PS25 has a glass disc with the image precision marked in vacuum deposited chrome and this is cemented into a stainless steel slide mount, making the item very durable. The slide has a unique serial number indelibly marked on the slide mount and can be supplied with an Internationally traceable certificate of calibration.

PS25 Pattern Detail:

Diamonds: (Point to point, mm's) 0.5, 0.3, 0.2, 0.1, 0.05, 0.02

Scales: Horizontal & vertical, 2mm in 0.1mm divisions

This product is supplied in a polished wooden box

Pattern	Description	Cat.#
PS25 - NEW	Calibration Slide for Hardness Testers - Vickers/Rockwell	68049-05
	PS25 with UKAS certificate	68049-06

► PS26 Hardness Tester Calibration Slides – Brinell

Key Features

Reflected light calibration slide with circle shapes and scales for calibrating Brinell hardness testers

Description

For Brinell methods we offer the PS26 which has a series of circles, to represent the ball indentation shape, of varying size and x-y scales. The PS26 has a precision marked chrome deposition image on a glass slide. Each of the markings on the slide is clearly identified with its size. The slide can be supplied with an Internationally traceable certificate of calibration. This product is supplied in a polished wooden case.

PS26 Pattern Detail:

Circles: (Diameter, mm's) 5.0, 2.5, 1.0, 0.7, 0.3

Scales: Horizontal & vertical, 2mm in 0.1mm divisions

Pattern	Description	Cat.#
PS26 - NEW	Calibration Slide for Hardness Testers - Brinell	68049-15
	PS26 with UKAS certificate	68049-18

► S4R Reflected Light Stage Micrometer, 0.1inch/0.001inch

Key Features

Reflected light stage micrometer with 0.1" scale subdivided into 0.001" divisions

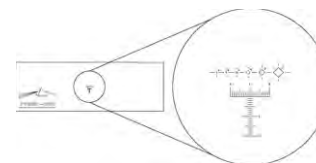
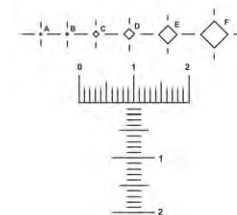
Description

Line width: 0.002mm, Accuracy (overall): <0.0001"

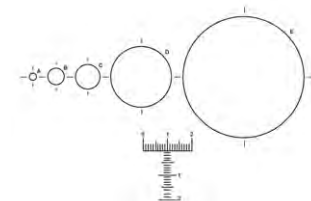
Pattern	Description	Cat.#
S4R	Micrometer Scale 0.1inch in 0.001inch divisions for reflected light	
	S4R with Graticule certificate	68047-4R-GR
	S4R with UKAS certificate	68047-4R-NA
	S4R with NPL Certificate	68047-4R-NP



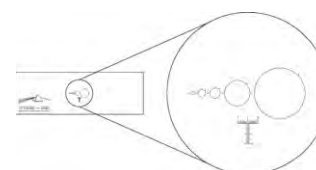
S91



PS25



PS26



S4R — shown in box

continued >>>>>

► Stage Micrometer/ Graticules

► PS4R Reflected Light Micrometer Scale, 0.1inch/0.001 inch

Key Features

Reflected light calibration slide with 0.1" length scale subdivided into 0.001" divisions

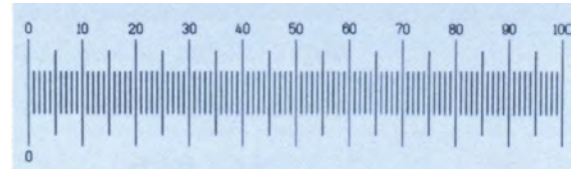
Pattern	Description	Cat.#
PS4R - NEW	Micrometer Scale 0.1inch in 0.001inch divisions for reflected light	68047-PS4R
	PS4R with Grats certificate	68047-PS4R-GR
	PS4R with UKAS certificate	68047-PS4R-NA
	PS4R with NPL Certificate	68047-PS4R-NP



PS4R — shown in box

► Reflected Light – S78

Pattern	Description	Cat.#
S78	Micrometer scale 1mm in 0.01mm divisions	68043-78



S78

► The Grid Dot Array

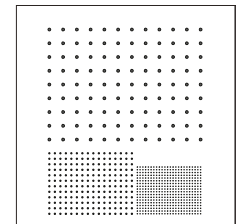
Green Float glass, high reflective Chrome image. The ideal product for testing image area, distortion, field flatness and other parameters in optical and imaging systems. The three array areas give options for different magnifications or field size. The R76, a unique product with three dot arrays to suit different magnification or image areas.

Features

3 image areas, Dot size and pitch different in each area

- 12 x 9 array of 1mm dots at 5mm pitch
- 16 x 12 array of 0.5mm dots at 2mm pitch
- 24 x 18 array of 0.2mm dots at 1mm pitch

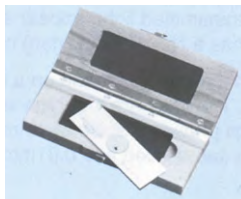
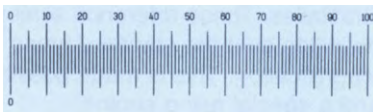
68073-R76	Grid Dot Array, 3 image areas	101x101x2.2mm	each
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► B. STAGE CALIBRATION STANDARDS

These stage micrometers differ from the standard stage micrometers due to the fact they are being available with a certificate giving precise details about their accuracy. These calibrated standards provide traceability for the precise calibration and confirmation of accuracy of optical measuring instruments, which is necessary under ISO provisions.

► Micrometer Standards – PS1, PS4, PS4R, PS5, PS8, PS12, PS16, PS78



These standards are differ from the stage micrometers listed on page 646. The glass discs are mounted in stainless steel slides with engraved serial numbers. Each slide is supplied in a polished wooden storage case to distinguish it as a traceable standard of high value.

We can arrange for the calibration of its scales and grids to be carried out by the most appropriate laboratory to suit the customers requirements – the choice of laboratory is normally dependent on the nature of the calibration and the accuracy required.

1. Calibration by NPL: The National Physical Laboratory carries out measurements at selected points on the scale and grids and issues a certificate of calibration. Order Code NP. The NPL is the English equivalent of NIST.

2. Calibration by UKAS accredited laboratory: A UKAS accredited laboratory carries out measurements at selected points on the scales and grids and issues a calibration certificate. Order Code: NA

3. Measurement by Us: For applications, which do not require the accuracy provided by calibrations carried out by NPL or a UKAS accredited laboratory, We can provide a Certificate of Comparison. The scale or grid is compared with NPL calibrated in-house standards and a statement is provided on the accuracy of the item with respect to these standards. Order Code GR

Cat.#	Pattern	Description	Pack
68047-1GR	PS1 (S1)	S1 with Graticules Certificate	each
68047-1NA		S1 with UKAS Certificate	
68047-1NP		S1 with NPL Certificate	
68047-4GR	PS4 (S4)	S4 with Graticules Certificate	each
68047-4NA		S4 with UKAS Certificate	
68047-4NP		S4 with NPL Certificate	
68047-PS4R	PS4R (NEW)	Micrometer Scale 0.1inch in 0.001inch divisions for reflected light	each
68047-PS4R-GR		PS4R with Grats Certificate	
68047-PS4R-NA		PS4R with UKAS Certificate	
68047-PS4R-NP		PS4R with NPL Certificate	
68047-5GR	PS5 (S5)	S5 with Graticules Certificate	each
68047-5NA		S5 with UKAS Certificate	
68047-5NP		S5 with NPL Certificate	
68047-8GR	PS8 (S8)	S8 with Graticules Certificate	each
68047-8NA		S8 with UKAS Certificate	
68047-8NP		S8 with NPL Certificate	
68047-12GR	PS12 (S12)	S12 with Graticules Certificate	each
68047-12NA		S12 with UKAS Certificate	
68047-12NP		S12 with NPL Certificate	
68047-16GR	PS16 (S16)	S16 with Graticules Certificate	each
68047-16NA		S16 with UKAS Certificate	
68047-16NP		S16 with NPL Certificate	
68047-78GR	PS78 (S78)	S78 with Graticules Certificate	each
68047-78NA		S78 with UKAS Certificate	
68047-78NP		S78 with NPL Certificate	

Certification

68047-C	NAMAS Certification for SI - S70
68047-Cert	NPL Certification for SI - S70

➤ Stage Micrometer/Graticules

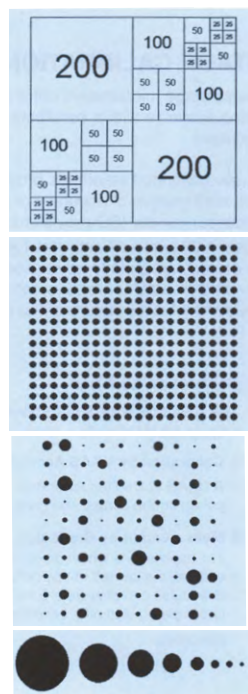
➤ Image Analysis Standard (Reference Stage Graticule)

This high precision image analysis standard provides four test areas designed for calibrating image analysis systems and identifying deviations and distortions in optical imaging systems.

The standard, which can also be used as a high precision stage micrometer, is supplied with recommendations for its use and an individual certificate of calibration.

It is produced on a 75mm x 25mm slide and has a square grid accuracy of $\pm 0.1\mu\text{m}$ and a dot accuracy of $\pm 0.3\mu\text{m}$ (except for the smallest and largest two dots on the root-2 array, where accuracy is $\pm 0.5\mu\text{m}$). The four test areas are:

- A 400 μm x 400 μm square grid which is subdivided into 200, 100, 50 and 25 micron squares provides a means of detecting gross image distortions, and can be used as an accurate two dimensional stage micrometer.
- A 20 x 17 array of nominally 15 μm diameter dots can be used to identify lens distortions. i.e. to set the field of view to eliminate edge distortion.
- A root-2 array of spots from 3 μm to 48 μm diameter is used for determining the threshold levels of cameras and microscope systems.
- A log-normal distribution array of 100 spots ranging from 4.5 μm to 27 μm diameter enables the mean and standard deviation to be determined and compared with the certified values. This is an idealized distribution of maximum dynamic range for a full screen.



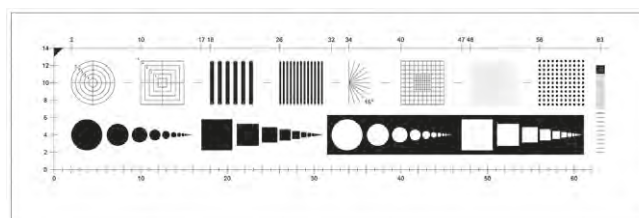
➤ Universal Calibration Slide- PS20

Calibration of microscopes and image analysis systems is becoming more sophisticated, with the requirement being for a variety of image patterns to satisfy the numerous parameters. We're now introducing a new multi-function calibration standard specifically for these applications.

Multiple images on a slide provide the most cost-effective solution to calibration and resolution checking of microscopes and image analysis systems. The combination of scales, dots, circles, squares, rulings, grids and angles can be supplied with an internationally traceable certificate of calibration for those who require ISO conformity.

Each glass slide has a permanent serial number and can be supplied with full or partial UKAS certificate of accuracy.

Starting from a fixed 'Datum Point' mark, each individual pattern or array can be located using X, Y, coordinates.



General tolerance (microns)

Feature size	Tolerance
≤ 10	0.5
10 - 50	1.0
50 - 127	1.3
127 - 250	1.9
>250	2.54

Coating	Enduring evaporated chrome image
Optical density	>2.5
Substrate	Soda lime glass
Size	76 mm x 25 mm x 1.5 mm
Package	Polished wooden case

Cat.#	Description
68049	Reference stage graticule 75mm x 25mm slide each

EMS #	Description	Qty
68053-20	Universal Calibration Slide PS20	each

PS20 Universal Calibration Slide Image Details

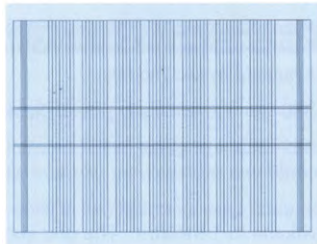
ID	Pattern Name	Location	Description
A	Concentric Circles	X =2; Y = 10	1, 2, 3, 4, 5 mm Circles with Cross Line & circle identifier. Line width 20 μm
B	Concentric Squares	X=10; Y=10	1, 2, 3, 4, 5 mm Squares with Cross Line & circle identifier. Line width 20 nm
C	Line Grating,	X=18; Y=10	12.5 Line Pairs per mm (40 μm 25 lines/mm line 40 μm space)
D	Line Grating,	X=26; Y=10	50 Line Pairs per mm (10 μm 100 lines/mm line 10 μm space)
E	Half Protractor	X=34; Y=10	15 Spacing, Line width 20 μm
F	Grid Array Coarse	X=40; Y=10	5 mm square array with 0.5 mm divisions and central 2 mm square with 0.25 mm divisions. Line width 20 μm
G	Grid Array Fine	X=48; Y=10	5 mm square array with 0.1 mm divisions and central 2 mm square with 0.05 mm divisions. Line width 8 μm
H	Dot Array	X=56; Y=10	Dot diameter 0.25 mm, dot centre to centre spacing 0.050 mm – 11x11 grid = 121 dots
I	Geometric Opaque Dots	X=2; Y=4	Line array of dots or square progression of shapes, of either clear or opaque. Reducing in size in a Root 2 progression for the purposes of edge threshold detection to enable an image analyzer to measure the size correctly, or general shape size comparison.
J	Geometric	X=17; Y=4	Root 2 progression of 21 dots or square shapes, from 3.5 μm to 3.5 μm .
K	Geometric progression of Clear Dots	X=32; Y=4	Nominal size in mm
L	Geometric progression of Clear Squares	X=47; Y=4	Dot/square size – Large to small in mm 3.5833; 2.5338; 1.7917; 1.2669; 0.8959; 0.6335; 0.4479; 0.3167; 0.2240; 0.1584; 0.1120; 0.0792; 0.0560; 0.0396; 0.0280; 0.0198; 0.0140; 0.0099; 0.0070; 0.0049; 0.0035
M	Vertical Scale Fine Variable	X=63 Y=2	Overall Scale length 10 mm. 5 mm in 0.5 mm divisions. Line width 20 μm 4 mm in 0.1 mm divisions. Line width 10 μm 1 mm in 0.01 mm divisions. Line width 3 μm
N	Horizontal Scale Coarse	X=0; Y=0	Scale length 62 mm in 2 mm divisions, subdivided in 1 mm divisions with a 20 μm line width.

► Stage Micrometer/Graticules

► H.S.E./N.P.L. Test Slide for Phase Contrast Microscopy - S84

This test slide is made in the UK and is under license from the National Physical Laboratory. It is an epoxy replica of a master slide produced and certified by that laboratory. The replicas are mounted on microscope slides of 1.2mm thickness with cover glass of 0.17mm thickness. This information is transferred to the accompanying table, which indicates the maximum phase change passing through test objects to test slide. A satisfactory system will detect block 5. Full details are supplied with the slide.

Block No.	Ridge Width (Micrometers)	Maximum Calculated Phase Change (in degrees) for light rays (wavelength = 530 nanometers) passing through test objects.
1	1.08	6.6
2	0.77	4.7
3	0.64	3.9
4	0.53	3.2
5	0.44	2.7
6	0.36	2.2
7	0.25	1.5



Also see Walton Beckett graticules G22, G24, G25, page 909 <<<<<

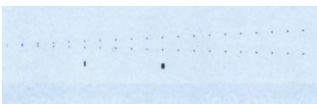
Cat.#	Pattern	Description	
68038-84H	S84	HSE Test Slide for Calibration in Asbestos Analysis	each

To ensure worldwide consistency of measurements, all the National Metrology Institutes (NMI's) in the world work in harmony. This is carried out under the auspices of the international diplomatic treaty, the Treaty of the Metre, signed in 1875 whereby Nations agreed, amongst other things, to the setting up of the International Committee of Weights and Measures (CIPM). Besides establishing the worldwide definitions of physical units, the CIPM organizes an ongoing series of key comparisons between NMI's to support the mutual recognition of measurement standards and calibration certificates. These key comparisons also involve regional metrology organization, such as EUROMET (EU + EFTA + European Commission), APMP (Asia Pacific Metrology Programme) and SIM (Canada, USA, Mexico, plus most Latin, South American and Caribbean states), which act as regional focuses for the growing number of NMI's throughout the world.

► C. VIBRATION

► FOE PPL Dot – S25

The pair of dots, which appear to merge into a single dot, determines the amount of vibration of the slide in the appropriate axis. The pattern on the S25 is an array of 20 pairs of dots converging on a single dot. The distance between each dot pair increases by 0.001 inch to a maximum of 0.02 inch, pairs being equispaced 0.25 inch.



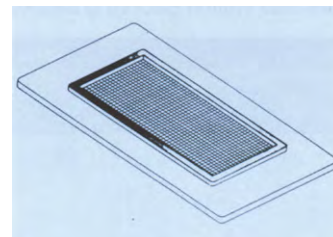
Cat.#	Pattern	Description	
68038-25	S25	FOE PPL Dot vibration test pattern	each

► D. VOLUME/COUNTING CELL

These are used to create precise volumes of liquid to enable counting of particles in a specified volume of liquid. A thick slide (glass or plastic) has an area cut into its surface that will hold precise volumes of bathing fluid. The shallow well, facilitating easy counting of contained particles. In use, a single drop of liquid is placed on the slide and a coverglass is placed on the platform providing equal and accurate subdivisions of the fluid each of which can be observed for particle counting.

► Sedgewick Rafter and Cover Gass – S50, S51, S52

For use in water analysis, culture inspection, and any fluid where particles per unit volume need to be determined.



Available in two versions:

S50 is an economically priced plastic cell.

S52 is made from glass, with a chromium surface image. This is intended for professional use and when using phase contrast.

In each type, a central cell is filled with fluid and a coverglass limits the volume to 1 milliliter. The grid subdivides this into micro-liters.

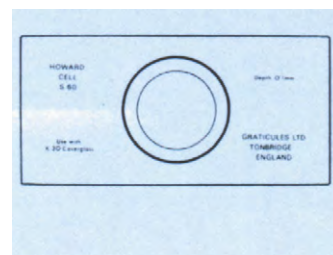
S51 is the spare cover glass for S50 and S52. Each cell is supplied with one cover glass.

Cat.#	Pattern	Description	
68050-50	S50	Sedgewick Rafter Counting Chamber (plastic)	each
68050-52	S52	Sedgewick Rafter Counting Chamber (glass)	each
68050-51	S51	Cover glass for Sedgewick Rafter S50 & S52	each

► Howard Cell and Cover Glass – S60, K20

The Howard cell is a glass slide 76mm x 35mm with a central circular island and is used for counting mold fibers and spores in fruit juices, especially from tomatoes.

With the K20 coverglass in place a 0.1mm thickness of liquid is contained over the central island. The coverglass has 25 calibrated fields of 1.382mm diameter through which to view the particles. This coverglass removes the necessity of precise adjustment of the microscope and eyepiece graticule in the original Howard method.



Howard cell & Coverglass

Cat.#	Pattern	Description	
68051-60	S60	Howard Cell for Fruit Juices	each
68051-20	K20	K20 Calibrated Cover Glass	each

► Stage Micrometer/Graticules

► E. FINDER GRATICULES

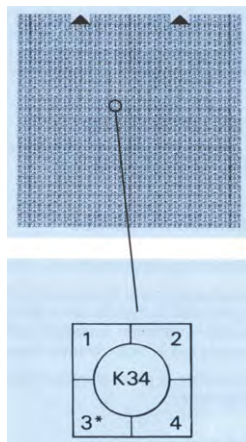
Finder graticules are used to swiftly and accurately give a position of reference to an area of interest on a specimen.

► The England Finder – S7

S7 is a glass slide 75mm x 26mm (3x1") marked over the top surface in a way that a referenced position can be directly read relative to the locating edges. That means it is marked with a square grid at 1mm intervals. Each square contains a center ring bearing reference letters and numbers, the remainder of the square being subdivided into four segments numbered 1 to 4. Reference numbers run horizontally 1 to 75 and letters vertically A to Z (omitting I). The main locating edge is the bottom of the slide, which is used in conjunction with either the left or right vertical edge of the slide.

All England Finders produced for over 40 years are identical. The purpose of the finder is to give the microscopist an easy method of recording the position of a particular field of interest, so that another person in another laboratory can relocate at a later date, or the same position, or when using any other England Finder on any other microscope.

The location of the arrows is identical for all England Finder slides. Mark a label on the left hand side of the specimen slide, indicating the orientation to be repeated. By replacing the specimen slide with England Finder, taking care not to disturb the position, feature of interest can be noted. The feature can also be re-located at another place or time by reversing the procedure. A total of 100 positions on a slide can be accurately located.



► Makler Counting Chamber

For Rapid Semen Analysis – The Makler counting chamber is only 10 microns deep, which is one tenth the depth of other hemacytometers, making it the shallowest of known chambers. This quality chamber is constructed from two pieces of optically flat glass: the first is the chamber, the second is the cover glass, which has a fine grid pattern of 1mm squares and a center area further subdivided into 0.1mm squares. Four quartz pins of precise height hold the cover glass to give an exact trapped specimen depth of 10 microns.

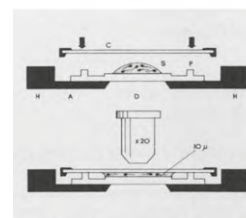


Diagram showing the coverglass being placed on the chamber to trap a 10µm depth of semen

Cat.#	Pattern	Description	
68048-07	S7	The England Finder	each

Cat.#	Description	
68052-01	Makler Counting Chamber	each

► Combination Eyepiece Graticule and Stage Micrometer Sets

We have now simplified the way in which you order The Eyepiece Graticule/Stage Micrometer Sets to suit your application, Simply select the objective magnification on the microscope, and then look in the next column to find the measurement size range that suits you best. You then find the set order reference and the description for your calibration set.

Please state the eyepiece graticule diameter on your order.

Cat.#	Cat. # with	Objective	Measured	Eyepiece	Stage (Object)
Standard	UKAS Cert.	Magnification	Size Range	Graticule	Micrometer
Transmitted Light					
68060-05A	68061-05A	0.5	0.1mm to 10mm	NE5, 5mm in 0.05mm	S1, 10mm in 0.1mm
68060-05B	68061-05B	0.5	0.01mm to 1mm	NE28, 1mm in 0.01mm	S8, 1mm in 0.01mm
68060-1A	68061-1A	1	0.1mm to 10mm	NE1, 10mm in 0.1mm	S1, 10mm in 0.1mm
68060-1B	68061-1B	1	0.01mm to 1mm	NE28, 1mm in 0.01mm	S8, 1mm in 0.01mm
68060-2A	68061-2A	2	0.1mm to 10mm	NE5, 5mm in 0.05mm	S1, 10mm in 0.1mm
68060-2B	68061-2B	2	0.01mm to 1mm	NE5, 5mm in 0.05mm	S8, 1mm in 0.01mm
68060-4	68061-4	4	0.01 to 1mm	NE5, 5mm in 0.05mm	S8, 1mm in 0.01mm
68060-10A	68061-10A	10	0.01mm to 1mm	NE1, 10mm in 0.1mm	S8, 1mm in 0.01mm
68060-10B	68061-10B	10	0.002mm to 0.1mm	NE28, 1mm in 0.01mm	S12, 0.1mm in 0.002mm
68060-16A	68061-16A	16	0.01mm to 1mm	NE1, 10mm in 0.1mm	S8, 1mm in 0.01mm
68060-16B	68061-16B	16	0.002mm to 0.1mm	NE5, 5mm in 0.05mm	S12, 0.1mm in 0.002mm
68060-20A	68061-20A	20	0.01mm to 1mm	NE1, 10mm in 0.1mm	S8, 1mm in 0.01mm
68060-20B	68061-20b	20	0.002mm to 0.1mm	NE5, 5mm in 0.05mm	S12, 0.1mm in 0.002mm
68060-40A	68061-40A	40	0.01mm to 1mm	NE1, 10mm in 0.1mm	S8, 1mm in 0.01mm
68060-40B	68061-40B	40	0.002mm to 0.1mm	NE5, 5mm in 0.05mm	S12, 0.1mm in 0.002mm
68060-60	68061-60	60	0.002mm to 0.1mm	NE1, 10mm in 0.1mm	S12, 0.1mm in 0.002mm
68060-100	68061-100	100	0.002mm to 0.1mm	NE1, 10mm in 0.1mm	S12, 0.1mm in 0.002mm
For Reflected Light					
68062-10	68063-10	10	0.01mm to 1mm	NE1, 10mm in 0.1mm	S78, 1mm in 0.001mm

► Special Application Sets

68065-B	Asbestos (at X40)	Basic Kit—Comprises S12 stage micrometer (1mm in 0.01mm) + Walton & Beckett graticule with UKAS Certificate of Calibration.	each
68065-S	Super Kit	As per Basic Kit #68065 but with S84 phase contrast test slide.	each

► Universal Set

68066	Designed for use with multiple objective microscopes. Comprises NE1 Eyepiece graticule + S1 stage micrometer + S12 stage micrometer	each
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You must state which type of Walton & Beckett pattern is required and diameter.

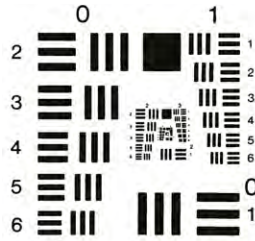
continued >>>>>

► Optical Resolution Charts, Ronchi Rulings and Grids

The optical resolution charts are used to test characteristics such as resolution, contrast, distortion and modulation transfer function (MTF) of lenses, cameras and optical systems. Ronchi rulings and grids are used to create interference patterns, to measure distortion and for MTF measurements.

EMS offers a range of charts on glass and in metal foil. Customers often require special charts for specific applications and these can be made to your exact requirements.

In addition to these products, we also supply a specialist NPL/HSE test slide for checking the resolving power of phase contrast microscopes – see Page 828 ref S84 in stage micrometers catalogue.



► USAF 1951 Test Chart

USAF resolution charts are recognized the world over as a universal standard for testing the vertical and horizontal resolution of imaging systems. Each element on the chart comprises three vertical bars and three horizontal bars, and the detail on these slides is as fine as 0.78microns (644 line-pairs per mm). The resolution of the imaging system is normally specified as the Group and Element of the finest bars that can be clearly defined

Cat.#	Description	Pattern	
68098-01	USAF Test Chart Groups 0 to 7	R70	each

► R71 USAF Test Chart Groups -2 to 7

Key Features

USAF Test Chart. positive image. Group -2 to Group 7, element 6.

Description

Large Positive Image ~ group -2 to 7
B270 glass, size 75mm x 75mm

Cat.#	Description	Pattern	
68098-02	USAF Test Chart Groups -2 to 7	R71	each

► R75P High Resolution Positive Image

Key Features

USAF Test Chart Group 0 to Group 9, Element 3

■ Sub micron minimum feature size

Description

High Resolution Positive Image
Soda Lime Glass,
50mm x 50mm x 2mm
Sub Micron smallest feature size - bar width 0.00078mm [0.78µm]

Cat.#	Description	Pattern	
68098-03	USAF Test Chart, positive image, groups 0/1 to 9/3	R75P	each

► R75N High Resolution Negative Image

Key Features

USAF Test Chart Group 0 to Group 9, Element 3

■ Sub micron minimum feature size

Description

High Resolution Negative Image
Soda Lime Glass,
50mm x 50mm x 2mm
Sub Micron smallest feature size - bar width 0.00078mm [0.78µm]

Cat.#	Description	Pattern	
68098-04	USAF Test Chart, negative image, groups 0/1 to 9/3	R75N	each

► PS75N Slide Format, High Resolution Negative Image

Key Features

USAF Test Chart Group 2 to group 9, element 3

• Microscope Slide format

• Sub micron minimum feature size

Description

High Resolution Negative Image
Soda Lime glass mounted in Stainless Steel Microscope Slide
Engraved with unique serial number for traceability (75mm x 26mm)
Supplied in Polished Wooden Box
Sub Micron smallest feature size - bar width 0.00078mm [0.78µm]

Cat.#	Description	Pattern	
68098-06	USAF Test Chart, positive image, groups 2/1 to 9/3 on stainless steel slide with engraved serial number.	PS75N	each

► PS75P Slide Format, High Resolution Positive Image

Key Features

USAF Test Chart Group 2 to group 9, element 3

• Microscope Slide format

• Sub micron minimum feature size

Description

High Resolution Positive Image
Soda Lime glass mounted in Stainless Steel Microscope Slide
Engraved with unique serial number for traceability (75mm x 26mm)
Supplied in Polished Wooden Box
Sub Micron smallest feature size - bar width 0.00078mm [0.78µm]

Cat.#	Description	Pattern	
68098-05	USAF Test Chart, positive image, groups 2/1 to 9/3 on stainless steel slide with engraved serial number.	PS75P	each

► Star Test Target:

► 1. R65 Star Test Target

Key Features

Siemens Star or Sunburst Pattern 36
Sectors 10 degree pitch

Description

Pattern	R66	Unresolved center core	0.2mm
Sector pitch	10°	Normal substrate	B270 Glass
Number of sectors	36	Overall size	50mm x 50mm
Outside diameter of image	25mm	Image type	Vacuum deposited chrome

Cat.#	Description	Pattern	
68098-08	Star Test Chart Sector Pitch 10	R65	each

► 2. R66 Star Test Target

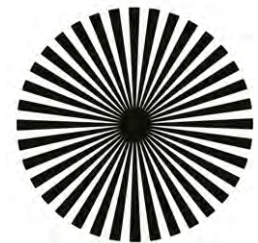
Key Features

Siemens Star or Sunburst Pattern 72 Sectors 5 degree pitch

Description

Pattern	R66	Unresolved center core	0.4mm
Sector pitch	5°	Normal substrate	B270 Glass
Number of sectors	72	Overall size	50mm x 50mm
Outside diameter of image	25mm	Image type	Vacuum deposited chrome

Cat.#	Description	Pattern	
68098-09	Star Test Chart Sector Pitch 5	R66.....each	



► NBS 25 Resolution Chart:

► R60 NBS 25 Test Chart:

Key Features

3-30 Lines per mm Chrome surface image B270 Glass 50mm x 50mm

Description

A series of gratings diminishing in size as they go towards the central target. Lines range from 3 lines per mm to 20 lines per mm. Supplied as a positive high contrast chrome image on glass substrate 50mm x 50mm. Also available in low contrast and negative form.

Cat.#	Description	Pattern	
68098-10	NBS 25 Chart 20 Lines per mm	R60	each

► NBS5 Bar Test (BS4657):

Key Features

1-18 lines per mm Chrome Surface Image B270 Glass 75mm x 75mm

Description

This consists of elements of 5 bars ranging from 1 line per mm to 18 lines per mm, with adjacent numbers indicating the number of lines per mm. Produced as a vacuum deposited chrome image on 75mm x 75mm glass.

Cat.#	Description	Pattern	
68098-11	NBS 5 Bar Test Ref 1963A BS 4657, Chrome on Glass	R67	each

► Grids:

Consists of elements of 5 bars ranging from 1 line per mm to 18 lines per mm, with adjacent numbers indicating the number of lines per mm. Produced as a vacuum deposited chrome image on 75mm x 75mm glass.

Cat.#	Description	Pattern	
68098-20	Grid with line pitch of 2mm	R1	each
68098-21	Grid with line pitch of 1mm	R2	each
68098-22	Grid with line pitch of 0.5mm	R3	each
68098-23	Grid with line pitch of 0.25mm	R4	each
68098-24	Grid with line pitch of 0.1mm	R10	each

► Gratings-Ronchi Rulings

Metallic grating pattern on glass squares with opaque lines approximately 50% of the pitch. Stock items are on 50mm x 50mm squares of glass 1.5mm thick. The grating covers the entire plate with the exception of R25, R26 and R27 where the grating occupies a 30mm wide central strip. The glass is B270 with refractive index of 1.52.

Uses:

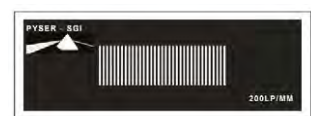
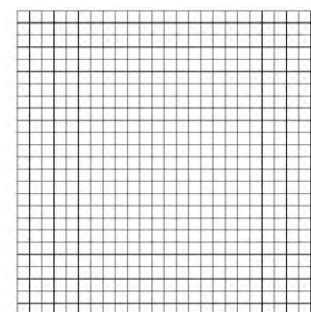
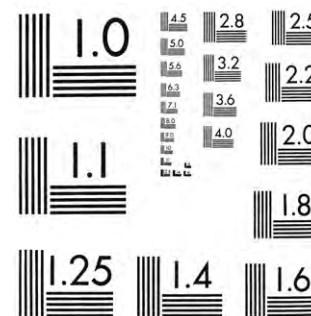
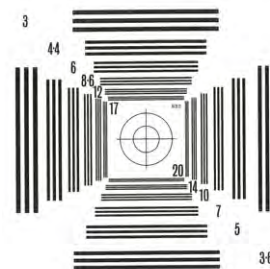
- Paired as light gates.
- Demonstrate interference patterns.
- Produce optical gradients.

Mutually perpendicular pairs produce a screen of square apertures.

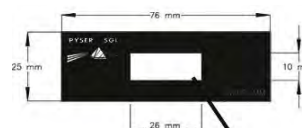
Vacuum deposited chrome gratings on glass substrate. Typically used for testing of resolution, field distortion and parfocal stability, but may be paired to provide interference patterns (fringe patterns) and as light gates.

R12 - 2 lines/mm	R17 - 40 lines/mm	R27 - 125 line/mm
R15 - 8 lines/mm	R25 - 50 lines/mm	R28 - 200 line/mm
R16 - 20 lines/mm	R26 - 100lines/mm	(High Resolution)

Cat.#	Description	Pattern	
68098-25	Grating – Ronchi ruling 2 lines per mm. — 50mm x 50mm B270 glass, 1.5mm thick, ruled over full area	R12	each
68098-26	Grating – Ronchi ruling 8 lines per mm. — 50mm x 50mm B270 glass, 1.5mm thick, ruled over full area	R15	each
68098-27	Grating – Ronchi ruling 20 lines per mm. — 50mm x 50mm B270 glass, 1.5mm thick, ruled over full area	R16	each
68098-28	Grating – Ronchi ruling 40 lines per mm. — 50mm x 50mm B270 glass, 1.5mm thick, ruled over full area	R17	each
68098-29	Grating – Ronchi ruling 50 lines per mm. — 50mm x 50mm B270 glass, 1.5mm thick, ruled over 30mm wide central strip	R25	each
68098-30	Grating – Ronchi ruling 100 lines per mm. — 50mm x 50mm B270 glass, 1.5mm thick, ruled over 30mm wide central strip	R26	each
68098-31	Grating – Ronchi ruling 125 lines per mm. — 50mm x 50mm B270 glass, 1.5mm thick, ruled over 30mm wide central strip	R27	each
68098-32	Grating – Ronchi ruling 200 lines per mm. — 26mm x 10mm soda lime glass grating mounted in anodised aluminium slide mount 76mm x 25mm. Supplied in a polished wooden box	R28	each



This is R28 only



R12 Pattern

▶ Counting Chambers from Hauser

These chambers are the finest quality, optically ground, and polished milled glass chambers available. The chamber is diamond etched and has a double improved Neubauer Ruling, which has a worldwide reputation in hospitals and laboratories for unmatched reliability, meeting the most demanding of standards.

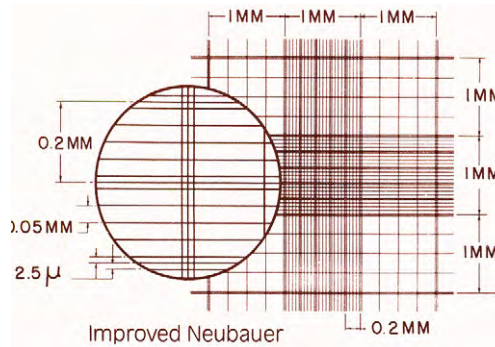
The standard Hauser blood counting chambers are one piece construction (measuring 75mmx32mmx4.5mm) ensuring long term durability and absolute accuracy in measurement and count. We offer both the standard (incline) and the new "V-Load" counting chambers for different charging methods. The tolerances are (2% of the volume).

Cell Depth: 0.100 mm (+/-2%); Volume: 0.1 Microliter Ruling; Pattern: Improved Neubauer, 1/400 Square mm

Rulings cover 9 square millimeters. Boundary lines of the Neubauer rulings are the center lines of the groups of three. (These are indicated in the illustration). The central square millimeter is ruled into 25 groups of 16 small squares, each group separated by triple lines, the middle one of which is the boundary. The ruled surface is 0.10 mm below the cover glass, so that the volume over each of 16 small squares is 0.00025 cubic mm.

Made to Last

In addition to the standard ruling patterns which are etched permanently onto the polished surface, we offer the popular "Bright-Line" counting chamber. This bright-line counting chamber allows the ruling to appear brightly illuminated providing sharp contrast to the bright lines and cells, helping the user with accurate counts and less eyestrain. The triple

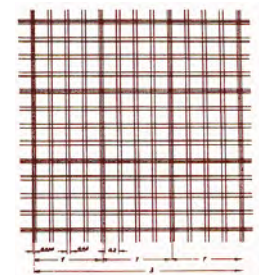


lines show clearly which cells lie within the counting area and eliminate guesswork. We guarantee that all marks are permanent, and can not be removed even after repeated washings.

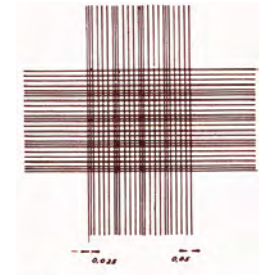
Other Chambers and Accessories

In addition to the blood counting chambers, we also offer a variety of other counting chambers and accessories which compliment our discipline.

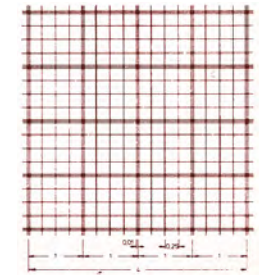
- **The Phase Hemacytometer:** used for phase microscopy; it is a one piece brightlined hemacytometer with a reduced thickness.
- **The Petroff Hauser Counting Chamber:** used for bacteria counting.
- **The Sperm Counting Chambers:** used primarily in fertility testing; it is offered in a series of depths (10, 20, 40 microns).
- **The Howard Mold Counter and the Sedgewick Rafter Counting Chamber** are also available as well as a series of hemacytometer and counting chamber cover glasses.



Buerker



Thoma

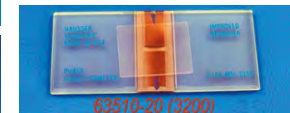
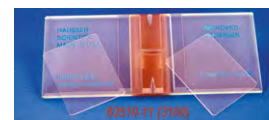
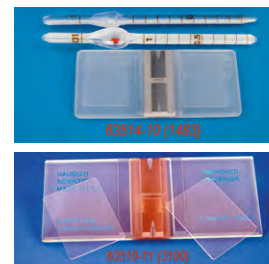


Fuchs-Rosenthal

▶ 1. Double Neubauer Ruled Metallized Counting Chamber Hemacytometer.

An "H" shape moat which forms 2 counting areas are metal plated and double Neubauer ruled providing sharp bright line contrast for consistent cell counts. A "V" cut on each area is used to control the possibility of overflow. Triple dividing lines clearly show cells within the counting area. The ruled surface is 0.1mm below the cover glass; liquid capacity is 0.1mm³/mm² and 0.00025mm³/grid square.

Ordering: The complete set includes one counting chamber, two 0.5mm cover glasses, one red cell pipette, one white blood cell pipette, tubing, mouthpieces and carrying case.



Cat.#	Description	Hauser No.	Cat.#	Description	Hauser No.
63510-10	Complete Chamber Set	3120	63510-13	Chamber only	3110
63510-11	Chamber with 2 Cover Glasses	3100	63510-20	Phase Counting Chamber	3200

▶ 2. Etched - Transparent Field with Opaque Pattern Levy Double Neubauer Ruled Hemacytometer

Double improved Neubauer rulings are diamond etched directly into a polished recess to reduce damage from scratches. Opaque surfaces above and below the counting area offer an easy focal reference. The chamber comes with a quick orientation mark for the microscope. 0.1mm cell depth.

Ordering: The complete set includes one counting chamber, two 0.5mm cover glasses, pipettes, and carrying case.

Cat.#	Description	Hauser No.
63511-10	Complete Set	3520
63511-11	Chamber with Two Cover Glasses	3500
63511-13	Chamber only	3510



► Counting Chambers

► 3. Other Counting Chambers

Fuchs-Rosenthal Counting Chamber: Designed for counting leukocytes, eosinophils and cells in cerebrospinal fluid. Grid pattern is etched directly onto the glass surface. The chamber is 0.2mm deep.

Ordering: Chamber set includes: one chamber and 2 octagonal cover glasses.

Cat.#	Description	Model #	Qty
63512-10	Fuchs Resenthal Counting Chamber	3720	each

Petroff-Hausser Counting Chamber: New improved Neubauer ruling pattern with 1/400 sq. mm of ruling. Designed for the counting of bacteria, sperm, blood platelets, and the content of vaccines. Cell is 0.2mm deep with 1.5mm thick glass slide allows the use off dark field microscopy.

Cat.#	Description	Model #	Qty
63512-20	Petroff-Hausser Chamber with Coverglasses, 1 Counting Area	3900	each
63512-21	Petroff-Hausser Chamber with Coverglasses & Case	3920	each
63512-22	Petroff-Hausser Chamber no grid with Case	3900SP	each
63512-23	Petroff-Hausser Chamber, 10 µm with Grid, 2 Counting Area	3901	each
63512-24	Petroff-Hausser Chamber, 20 µm with Grid, 2 Counting Area	3902	each
63512-25	Petroff-Hausser Chamber, 10 micron without Grid	3951	each
63512-26	Petroff-Hausser Chamber, 20 micron without Grid	3952	each

Nageotte Counting Chamber: Bright-Line double ruling , 0.5mm cell depth.

Cat.#	Description	Model #	Qty
63512-30	Nageotte Chamber with Coverglasses	4000	each

Palmer, McMaster, Speirs-Levy, and Howard Chambers

Cat.#	Description	Model #	Qty
63512-50	Palmer Chamber (Nannoplankton)	3850	each
63512-75	McMaster Egg Slide Chamber	3875	each
63512-56	Speirs-Levy Eosinophil Counting Chamber	3556	each
63512-55	Howard Mold Counter with two Cover Slips	3820	each

► 4. Leica Bright-Line Counting Chamber

Designed by Leica for accurate counting of blood cells platelets, dust/yeast cluster and specimen samples. Sharp contrast from rhodium plated on "V-Load". Triple dividing lines clearly delineate counting area for accurate and precise results. Molded from a single piece of thermal and shock resistant glass with a polished chamber and cover glass assuring precise capillary loading and even cell distribution. Fluid volume is 0.1 mm³/mm² and 0.00025mm² per each square.

Ordering: The complete set includes: one counting chamber, two 0.4mm cover glass, one red cell pipette, one white cell pipette, tubing, mouthpieces, and storage case.

Cat.#	Description	Model #	Qty
63514-10	Bright-Line Chamber Set	1483	each
63514-11	Bright-Line Chamber w two 0.4mm Cover Glass	1492	each
63514-12	Bright-Line Chamber Only	1490	each
63514-20	Bright-Line Phase Chamber Set w/o Cover Glass	1475	each
63514-30	Hemacytometer Cover Glass, 0.4mm	1461	each
63514-31	Red Cell Pipette (Thoma)	1456	each
63514-32	White Cell Pipette (Thoma)	1458	each
63514-34	Plastic Case for Hemacytometer	1505	each

► 5. Accessories for Counting Chambers

Cat.#	Description	Model #	Qty	Cat.#	Description	Model #	Qty
63516-10	Cover Glass 20x26x0.5mm	5000	each	63516-40	Whipple Eyepiece Micrometer	5060	each
63516-11	Cover Glass 25x28x0.5mm	5010	each	63516-42	Howard Eyepiece Micrometer	5070	each
63516-12	Cover Glass 25x33x0.5mm	5020	each	63516-50	Nageotte Cover Glass, 30x33x0.5mm	5400	each
63516-13	Cover Glass 27x37x0.5mm	5030	each	63516-61	Nageotte Cover Glass 30x33x1.5mm	5411	each
63516-20	Sedgewick Rafter Cover Glass	5040	each	63516-10	Cover Glass 20 x 26 x 0.5mm	5000	each
63516-30	Petroff-Hausser Reinforced Cover Glass	5050	each	63516-45	Howard Thin Cover Glass 28 x 33 x 0.5mm Thick	5080	each
63516-31	Petroff-Hausser Cover Glass 20x26x0.2mm	5051	each	63516-46	Howard Thick Cover Glass 28 x 33 x1mm Thick	5090	each



► C-Chip Disposable Hemacytometer

The world's first truly disposable Hemacytometer, the C-Chip offers precise volume control and is easy to use.

Features

- Quartz grade optical plastic
- Precise design leads to highly reproducible results
- Two counting chambers fitted with clearest grid pattern rich in contrast
- Exposure to infectious material is reduced due to its closed system
- Continuous sample containment
- Light and unbreakable compared to glass
- No need for cover slips
- Time and cost saving
- For single use

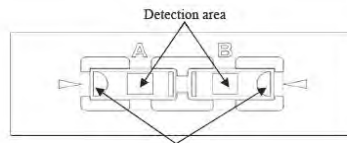
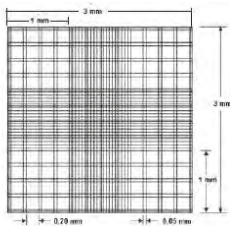
Applications

Blood Analysis: Blood Cell Counting

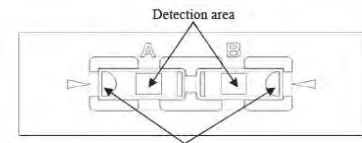
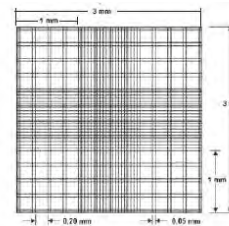
Cell Culture: Cell Concentration measurement / Cell Viability Test

Microbiology: Bacteria and Fungal Spore Counting

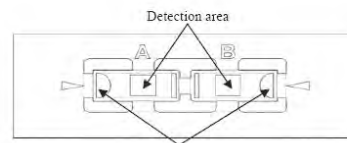
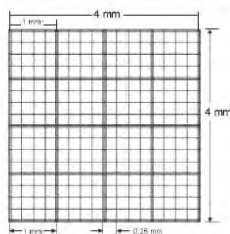
IVF, IUI: Sperm Counting



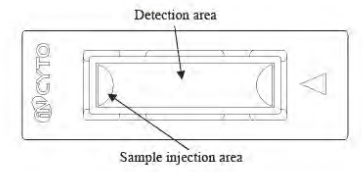
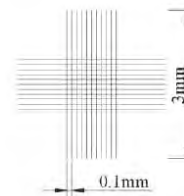
Neubauer Improved



Neubauer Improved



Fuchs Rosenthal



Semen Test

Specifications

Measurements	25(W) x 75(L) x 1.6(T) mm
Chamber Volume	10 micro liters
Chamber Depth	100, 200 or 10 Micron (Depends on model)

Ordering Information:

63508-01	Neubauer Improved, 100 tests	2 tests/slide	50 slidesrt
63508-03	Fuchs Rosenthal	2 tests/slide	50 slides
63508-04	Semen Test	2 tests/slide	50 slides
63508-07	Burker Turk	2 tests/slide	50 slides



➤ Counting Chambers

➤ Cellometer™ – The Disposable Cell Counting Chamber

Cell Counting Made Easy

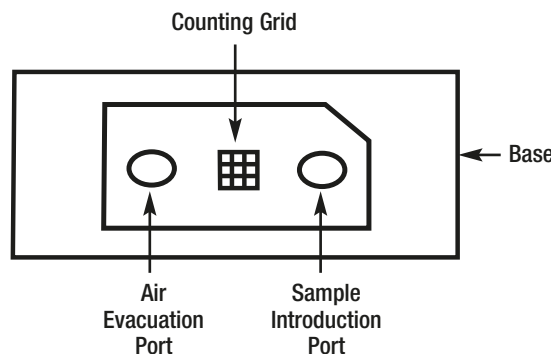
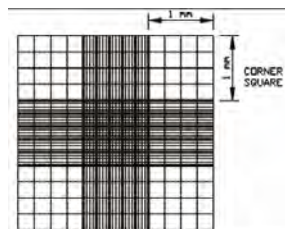
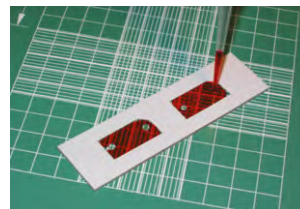
These Disposable Cell Counters are an enclosed chamber with two ports for sample introduction. The chamber contains precisely spaced lines in a grid pattern.

There are two counting chambers per slide for replicates.

The counting grid pattern is the Improved Neubauer, as in a common Hemacytometer. The consistent pattern design allows the standard cell counting procedure to be followed.

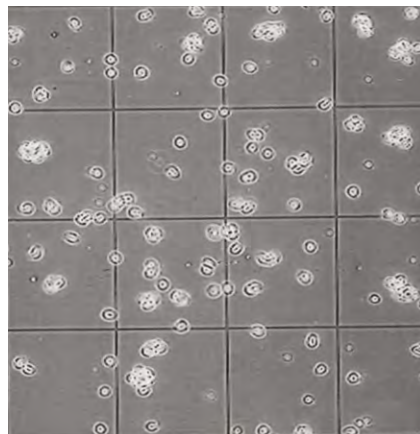
With a pipettor, 15 to 20 microliter cell-containing sample is introduced into the counting chamber through one of the ports. Liquid spreads inside the chamber, replaces air, which escapes through the opposing port.

The cell counting chamber is placed under a phase contrast optical microscope with a typical magnification of 100. The microscope is focused both onto the grid pattern and the cell particles. Standard protocols are followed for cell counting.



Cell counting principle using Cellometer™:

1. Count the total number of cells found in 4 large corner squares (C_{total})
2. Cell concentration = $\text{Dilution} \times \text{C}_{\text{total}} / \text{Volume}$



Let the Cellometer™ replace your Hemacytometers, which are traditionally used for cell counting!!

Benefits of the Cellometer™:

1. No washing after counting (Extremely important for people whom work with infectious samples)
2. No need to place the cover slide
3. Easy sample introduction (By integrating the cover slide into the counting chamber, The Cellometer™ eliminates the mistakes that may be caused by misplacement of the cover slide or misleading of the sample—two major sources for counting errors when using the Hemacytometer.)
4. Made from plastic (Ideal for BioSafety level 3)

Technical Data

Comparisons of Counting Protocols

Step	Cellometer™	Hemacytometer
1	Mix cell suspension	Mix cell suspension
2	Pipette 15 to 20 microliter into sample port	Carefully load with 10 microliter solution
3	Count cells in 4 corner squares (C _{total})	Count cells in 4 corner squares (C _{total})
4	Cell Concentration = $\text{Dilution} \times (\text{C}_{\text{total}}/4.0) \times 10^4$	Cell Concentration = $\text{Dilution} \times (\text{C}_{\text{total}}/4.0) \times 10^4$
5	Dispose used Cellometer	Wash and dry cover slide and base

Description of the experiment:

1. Cell Type: Human Tlymphocyte
2. Counting Devices: Cellometer™ with glass base (CG2), all plastic Cellometer™ (CP2) and a standard bright line Hemacytometer.
3. Cell counting performed alternating between Cellometer™ and Hemacytometer.
4. Statistical data analysis using Two-Sample T test.

Results:

	CP2-test 1	CP2-test 2	CG2
# of test (Cellometer™)	15	19	17
# of test (Hemacytometer)	8	17	17
Mean (Cellometer™)	1.78×10^5	1.83×10^5	1.87×10^5
Mean (Hemacytometer)	1.85×10^5	1.82×10^5	1.82×10^5
p-value	0.325	0.908	0.505

Conclusions:

1. Cell counts obtained using Cellometer™ and Hemacytometer are consistent.
2. With Cellometer™, sample loading is simple and consistent.
3. There is no washing and drying after using Cellometer™, which Eliminates liquid waste and Saves time and effort.

Ordering Information:

Catalog #	Description	Pack
63561-25	Cellometer™ Disposable Cell Counting Chamber Plastic Base	25/bx
63561-100	Cellometer™ Disposable Cell Counting Chamber Plastic Base	100/bx

► EMS Specialty Counting Chambers

Sedgewick Rafter Cell

Howard Cell

Makler Chamber

Haemocytometry

Parasitology, Cytology & Others

Chamber Cover Glasses

This range of quality counting chambers are available in a wide range of types for Haemocytometry, Parasitology, Cytology and other applications

Chambers with inside markings have rulings applied using engraving techniques to give a permanent image, clearly visible through the glass without sacrificing light transmission.

Chambers with ruled cover glass have robust image applied using chrome deposition.

Volume Cell

These are used to create precise volumes of liquid to enable counting of particles in a specified volume of liquid. A thick slide (glass or plastic) has an area cut into its surface that will hold precise volumes of bathing fluid. The shallow well, facilitating easy counting of contained particles. In use, a single drop of liquid is placed on the slide and a coverglass is placed on the platform providing equal and accurate subdivisions of the fluid each of which can be observed for particle counting.

► 1. Sedgewick Rafter and Cover Gass – S50, S51, S52

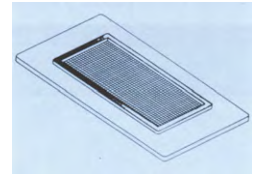
For use in water analysis, culture inspection, and any fluid where particles per unit volume need to be determined.

Available in two versions: S50 is an economically priced plastic cell.

S52 is made from glass, with a chromium surface image. This is intended for professional use and when using phase contrast. In each type, a central cell is filled with fluid and a coverglass limits the volume to 1 milliliter. The grid subdivides this into micro-liters.

S51 is the spare cover glass for S50 and S52. Each cell is supplied with one cover glass.

Cat.#	Pattern	Description	
68050-50	S50	Sedgewick Rafter Counting Chamber (plastic)	each
68050-52	S52	Sedgewick Rafter Counting Chamber (glass)	each
68050-51	S51	Cover glass for Sedgewick Rafter S50 & S52	each



► 2. Howard Cell and Cover Glass – S60, K20

The Howard cell is a glass slide 76mm x 35mm with a central circular island used for counting mold fibers and spores in fruit juices, especially from tomatoes.

With the K20 coverglass in place a 0.1mm thickness of liquid is contained over the central island. The coverglass has 25 calibrated fields of 1.382mm diameter through which to view the particles. This coverglass removes the necessity of precise adjustment of the microscope and eyepiece graticule in the original Howard method.

Cat.#	Pattern	Description	
68051-60	S60	Howard Cell for Fruit Juices	each
68051-20	K20	K20 Calibrated Cover Glass	each



► 3. Makler Counting Chamber

For Rapid Semen Analysis – The Makler counting chamber is only 10 microns deep, which is one tenth the depth of other hemacytometers, making it the shallowest of known chambers. This quality chamber is constructed from two pieces of optically flat glass: the first is the chamber, the second is the cover glass, which has a fine grid pattern of 1mm squares and a center area further subdivided into 0.1mm squares. Four quartz pins of precise height hold the cover glass to give an exact trapped specimen depth of 10 microns.

Cat.#	Description	
68052-01	Makler Counting Chamber	each

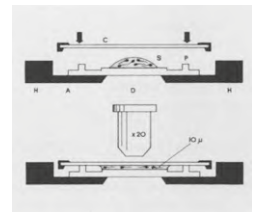
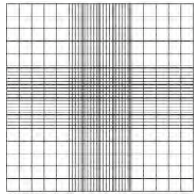
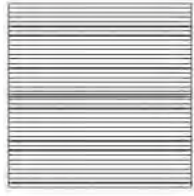



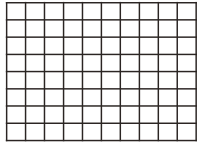
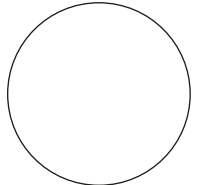
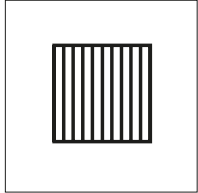

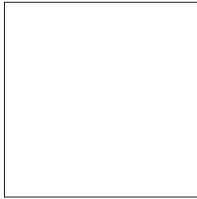
Diagram showing the coverglass being placed on the chamber to trap a 10µm depth of semen

Order No.	Name	Description	Pattern	Application	Qty.
Haemocytometry					
68052-10	Malassez	Double Cell 0.2mm Standard French Rule		Hemoglobin and Leucocyte Counts	Each
68052-11		Single Cell 0.2mm, Standard French Rule		Hemoglobin and Leucocyte Counts	Each
68052-12	Thoma	Double Cell 0.1mm Standard German Rule		Hemoglobin and Leucocyte Counts	Each
68052-13		Single Cell 0.1mm Standard German Rule		Hemoglobin and Leucocyte Counts	Each
68052-14	Neubauer	Double Cell 0.1mm Modified Thoma Rule		Hemoglobin and Leucocyte Counts	Each
68052-15		Single Cell 0.1mm Modified Thoma Rule		Hemoglobin and Leucocyte Counts	Each

► EMS Specialty Counting Chambers (continued)

Order No.	Name	Description	Pattern	Application	Qty.
Haemocytometry (continued)					
68052-16	Improved Neubauer	Double Cell 0.1mm, Ruling allows full use central squares		Hemoglobin and Leucocyte Counts	Each
68052-17	Burker	Double Cell 0.1mm, For counts in bands		Hemoglobin and Leucocyte Counts	Each
68052-18	Agasse-LeFont R	Single Cell 0.001mm, Completely Decomal		Hemoglobin and Leucocyte Counts	Each
68052-19	Turk	Double Cell 0.1mm Combination of Burker and Thoma Rulings		Hemoglobin and Leucocyte Counts	Each
Parasitology, Cytology & Others					
68052-20	Nagoette	Double Cell 0.5mm, For Liquids in Poor content		Urinary, Cytology, Cephalo-rachidien fluid analysis	Each
68052-21		Single Cell 0.5mm, For Liquids in Poor content		Urinary, Cytology, Cephalo-rachidien fluid analysis	Each
68052-22	Lemaure	Single Cell 0.4mm, Improved Nagoette with smaller volume		Urinary, Cytology, Cephalo-rachidien fluid analysis	Each
68052-23	McMaster	Double Cell 1.5mm; Worm Egg counting		Bacteria	Each

► EMS Specialty Counting Chambers (continued)

Order No.	Name	Description	Pattern	Application	Qty.
Parasitology, Cytology & Others (continued)					
68052-24	Helber	Single Round Cell; 0.02 mm; Slide 1mm thick with Thoma Ruling		Bacteria	Each
68052-26	Agasse- LeFont B	Dingle Cell 0.003mm; Completely Decimal		Other	Each
68052-30	Evaluation	Single Round Cell 0.02mm; Slide 1mm thick without Thoma ruling		Bacteria	Each
Chamber Cover Glasses					
68052-27	McMaster, Old	Cover Glass		Parasitology	Each
68052-28	Cover Glass	24x24		Suitable for all counting chambers	10/Pack
68052-29	Cover Glass	30x28 mm		Suitable for larger counting chambers	10/Pack

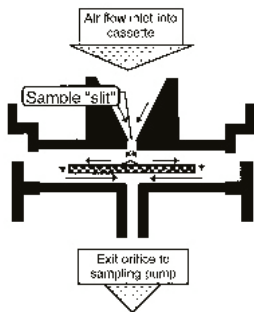
Air and Environmental Sampling Tools

Sampling Cassettes
Samplers, Pumps, and Accessories
Flow Calibration
Acetone Vaporizer Kit



**Electron
Microscopy
Sciences**

EMS introduces this new disposable sampling equipment which is used to monitor indoor environmental, occupational health and safety conditions.



► Air-O-Cell® Sampling Cassette

This is a unique air sampling cassette specially designed for quick collection of a wide range of airborne aerosols including mold spores, pollen, insect parts, skin cell fragments, fibers (e.g. asbestos, fiberglass, cellulose, clothing fibers, etc.) and organic particulate e.g. ceramic, fly ash, copy toner, etc. The Air-O-Cell® collects both viable and non-viable sample specimens, providing a much broader overview of potential allergens and contaminants than conventional sampling techniques.

After sampling is completed, the cassettes are sent to a laboratory, where the slides are removed and direct microscopic analysis can be immediately performed. The collection media is compatible with a wide range of biological stains and refractive index oils, allowing direct quantitative analysis of organic and inorganic particulate.

The Air-O-Cell® can be used with any standard off-the-shelf area sampling pump capable of drawing 15 LPM open flow. The small compact size makes Air-O-Cell® suitable for use in confined or restrictive area.

EMS #	Description	Qty.
65210-10	Air-O-Cell® Cassette	10/pk
65210-50	Air-O-Cell® Cassette	50/pk

► Via-Cell Bioaerosol Sampling Cassette

The first disposable cassette impactor that brings simplicity and reliability to viable sampling combined with multiple analysis options

The Via-Cell® bioaerosol sampling cassette is designed to collect both viable and non-viable bioaerosols, maintain viability of the viable mold spores and prevent growth during transport to the laboratory. Sampling with the Via-Cell® is very similar to its sister product Air-O-Cell®. Simply connect it to any pump calibrated to 15 LPM and run your sample. The key to the Via-Cell® is that the media used for collection maintains viability of spores and allows several analysis options.

- Provided ready-to-use
- No refrigeration – only room temperature required
- No electricity or heavy equipment required
- 1 year shelf life is 4 times as long as traditional methods
- Multiple analysis options – compatible with culture plates, PCR and direct microscopy screening
- Independently validated and compared to current industry standard methods by both universities and laboratories.

Culturable Sampling: The Via-Cell® sampler is the perfect tool for collecting viable organism and culturing them on agar plates. Simply dilute the media in sterile water and transfer to a culture plate

PCR Analysis: The Via-Cell® utilizes a water soluble collection media which is ideal for PCR and other chemical types of analysis. Once the sample is diluted in water, it can be transferred most anywhere.

Direct Microscopy: Sample collected using the Via-Cell® sampler may be “pre-screened” using direct microscopy methods, which allow the analyst to decide if additional analysis techniques are needed, which may include culturing or standard direct microscopy analysis

EMS #	Description	Qty.
65212-10	Via-Cell® Cassette	10/pk

► 25 mm Asbestos PCM and TEM Cassettes

These PCM and TEM 25mm air sampling cassettes are designed and manufactured to conform to all NIOSH, OSHA, and EPA standards. The cassette housings are injection molded in-house and are individually assembled and preloaded under stringent quality control standards. Once assembled, each cassette is individually tested prior to packaging for shipment. Random lot sample testing is performed daily by an independent laboratory to ensure low background fiber counts. Laboratory results are available upon request

- Quality 0.8µm MCE filter material
- 2" Static conductive extension cowl
- Meets NIOSH 7400 specifications
- Preloaded – ready-to-use

EMS #	Description	Qty.
65213-50	25mm Asbestos PCM Cassette	50/pk
65214-50	25mm Asbestos PCM Cassette with Gridded Filter	50/pk
65215-50	25mm Asbestos PCM Cassette with Green Gridded Filter	50/pk

25 mm Asbestos TEM Cassette

- Quality 0.45µm MCE filter material
- 5.0µm filter is placed under the 0.45µm filter as a diffuser
- Meets NIOSH 7402 specifications
- Meets AEHRA requirements

EMS #	Description	Qty.
65216-50	25mm Asbestos TEM Cassette	50/pk



► 37mm Cassette with MCE Filters

The 37mm Air Sampling Cassette w/MCE Filters are designed to meet all NIOSH, OSHA, and EPA requirements for air sampling standards. All 37mm cassette housings are manufactured in house and are available in both two and three piece configurations. All 37mm cassettes are individually assembled and preloaded under stringent quality assurance standards with only the finest quality membrane and support pads.

- Polystyrene housing, 2 or 3 piece
- 3 piece model suitable for lead sampling
- Preloaded, ready-to-use
- Leak-free design.



Cat No.	Description	Pore Size	Housing Style	Qty
37mm Cassettes with MCE Filters				
65218-28	37mm Cassette, MCE Filters	0.8µm	2 –Piece	50/pk
65218-29	37mm Cassette, MCE Filters	0.8µm	2 –Piece Banded	50/pk
65218-38	37mm Cassette, MCE Filters	0.8µm	3 –Piece	50/pk
65218-39	37mm Cassette, MCE Filters	0.8µm	3 –Piece Banded	50/pk
65218-45	37mm Cassette, MCE Filters	0.45µm	3 –Piece	50/pk
37mm Cassette with PVC Filters				
65219-25	37mm Cassette, PVC Filters	5.0µm	2 –Piece	50/pk
65219-35	37mm Cassette, PVC Filters	5.0µm	3 –Piece	50/pk
37mm Cassette with Polycarbonate Filters				
65220-24	37mm Cassette, PC Filters	0.4µm	2 –Piece	50/pk
65220-34	37mm Cassette, PC Filters	0.4µm	3 –Piece	50/pk
65220-28	37mm Cassette, PC Filters	0.8µm	2 –Piece	50/pk
65220-38	37mm Cassette, PC Filters	0.8µm	3 –Piece	50/pk
37mm Cassette with Glass Fiber Filters				
65221-21	37mm Cassette, GF Filters	1.0µm	2 –Piece	50/pk
65221-31	37mm Cassette, GF Filters	1.0µm	3 –Piece	50/pk
37mm Cassette with PTFE Filters				
65222-21	37mm Cassette, PTFE Filters w/pp support (Type TF)	1.0µm	2-Piece	50/pk
65222-32	37mm Cassette, PTFE Filters w/pp support (Type TF)	1.0µm	3-Piece	50/pk
65222-45	37mm Cassette, PTFE Filters w/pp support (Type TF)	0.45µm	3-Piece	50/pk
65222-22	37mm Cassette, PTFE Filters w/PTFE support (Zefluor)	2.0µm	2-Piece	50/pk
65222-23*	37mm Cassette, PTFE Filters w/PTFE support (Zefluor)	2.0µm	2-Piece	50/pk
65222-35	37mm Cassette, PTFE Filters Unsupport, (Zylon)	5.0µm	3-Piece	50/pk

* This product 65222-23 comes in opaque colored styrene housing and also uses a cellulose support ring as specified in the NIOSH 5506/5515 standard.



► 37mm Cassette with Quartz Filters

The 37mm Air Sampling Cassette w/0.45µm Quartz Filters are designed to be used for diesel particulate matter sampling. All 37mm cassette housings are manufactured in house and are available in three piece configuration. All 37mm cassettes are individually assembled and preloaded under stringent quality assurance standards with only the finest quality membrane and support pads.

- Polystyrene housing, 3 piece
- Meets NIOSH method 5040 specifications
- Preloaded, ready-to-use
- Leak-free design.

Cat No.	Description	Pore Size	Housing Style	Qty
65223-34	37mm Cassette, Quartz Filters	0.45µm	3 –Piece	50/pk



► Zefon Bio-Pump® Plus

The Zefon Bio-Pump Plus® is the smallest and lightest portable battery powered IAD sampling pump available. It provides the simplest and most convenient way to sample with Air-O-Cell® and Via-Cell® cassettes at a flow rate of 15 LBM

FEATURES:

- New “quick Sample” feature makes sampling a breeze
- Extra long battery life – take over 100 samples on a single charge.
- Very small in size and weight – Over 40% less than the standard Zefon Bio-Pump
- Very quiet operation
- Programmable timer allows unattended operation
- Quick-charge battery charger included (approx. 3 hours)
- Uses Air-O-Cell® cassettes – the only industry proven and standardized sampling cassettes
- Uses Via-Cell® cassettes – the only cassette style sampler offering both viable and non-vialbe analysis options
- Nothing to prepare or clean. Just place the cassette on the pump, set the time and go
- Each pump come complete with both an Air-O-Cell® and Via-Cell® flow indicator, quick charger, 10 free Air-O-Cell® cassettes and a handy carrying case.

Specifications:

Flow Rate:	15 LPM
Housing:	ABS – Color Black
Battery:	Nickel Metal Hydride
Sampler size:	4.375” W x 8” Deep x 2.75” Height
Weight:	1.6 lbs

EMS #	Description	Qty
65211-12	Zefon Bio-Pump® Plus	each

➤ Accessories and Replacement Part for the Zefon Bio-Pump® Plus

➤ 1. Replacement Flow Indicators

A convenient, easy to use flow indicator used for calibration of the Zefon Bio-Pump® and Bio-Pump® Plus



EMS #	Description	Qty
65211-20	Replacement Air-O-Cell Flow® Indicator	each
65211-25	Via-Cell Flow Indicator	each

➤ 2. Bio-Pump Tripod Stand

A heavy duty stand, offering quick and easy attachment of the Bio-Pump



EMS #	Description	Qty
65211-30	Bio-Pump Tripod Stand	each

➤ 3. Zefon Bio-Pump Bubble Tube

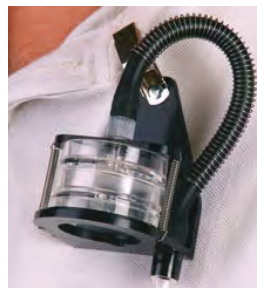
This Bubble Tube is used as a primary standard in calibrating the Bio-Pump®. Attach the bubble tube to the pump as shown (tubing provided with the bubble tube). Then run the pump in calibration mode while inserting the end of the tube in soapy water so that bubbles travel up the tube. Timing the bubbles between the indicator lines will indicate your flow rate.



EMS #	Description	Qty
65211-35	Bio-Pump Bubble Tube	each

➤ Universal Cassette and Cyclone Holder

This Universal Cassette & Cyclone Holder allows cassettes and cyclones to be attached onto a workers collar. Compatible with 37mm and 25mm cassettes, and aluminum cyclone manufactured by Zefon and SKC. Weighs only 73 g or 2.5 oz. Comes with 3' of tubing attached



EMS #	Description	Qty
65230-01	25mm Asbestos TEM Cassette	each

➤ Cassette Sampling Stand

Sampling stand used to support sampling cassettes at elevated levels. Two models are available to choose from:

- **ZA0042 Economy Sampling Stand:** very nice stand, made from black anodized aluminum
- **ABS-1 Deluxe Sampling Stand:** very similar to the economy stand but made in the USA from aluminum. Better durability and stability than the economy one.



EMS #	Description	Qty
65232-42	Cassette Sampling Stand, Economy	each
65232-ABS	Cassette Sampling Stand, ABS-1	each

➤ Cassette Opener

Heavy duty stainless steel cassette opener. Works with 25mm, 37mm and Air-O-Cell cassettes. No need to remove labels, this opener cuts right through and effortlessly pries cassettes open.



EMS #	Description	Qty
65231-01	Cassette Opener	each

➤ 37mm Cassette Tubing Adapter

This Adapter is for connecting the 37mm cassettes to 1/4" ID tubing



EMS #	Description	Qty
65233-10	37mm Cassette Tubing Adapters	10/pk

➤ Via-Cell Blue Stain Solution

Via-Cell blue stain solution is a sterile liquid used during laboratory preparation when direct microscope will be performed.

EMS #	Description	Qty
65234-15	Via-Cell Blue Stain solution	15ml



➤ Via-Cell Linking Solution

Via-Cell linking solution is a sterile liquid used during laboratory preparation when direct microscope will be performed and further culturing may be desirable.

EMS #	Description	Qty
65235-15	Via-Cell Linking Solution	15ml



► BioCulture Microbial Air Sampler

The BioCulture™ air sampler is the smallest, most cost effective and easiest to use sampler available on the market. This BioCulture™ features a selectable, continuous, constant sample flowrate and is simple to operate, quiet operation, sampling in a variety of applications. No tools are needed.

Features

- Flow rate: 30 – 120 LPM
- Uses standard 90 mm petri dishes
- Sampling head design of 380 1mm diameter holes
- Battery powered—runs for 6.8 hours (depending on flow rate, battery maintenance and back-pressure)
- Tripod mounting threads on bottom of unit – allows 90 degree sampling
- Sampling head may be sterilized by autoclave or gas torch
- Built-in timers of 1, 2, 5, 10 minutes
- Optional calibration head allows field calibration of flow rate with a NIST traceable calibrator

(Note: a calibration head is required to calibrate the Bio-Pump, however it can be used to calibrate multiple pumps)



Applications:

- IAQ Surveys
- Mold sampling
- Building diagnostics
- Clean room sampling
- Hospital operating rooms
- Pharmaceutical compounding labs
- USP <797> active air sampling compliance
- Any location that you may need to verify and quantify microorganism presence

SPECIFICATIONS

Flow rate:30 – 120 LPM
 Accuracy of Flow Rate:.....±5%
 Battery Run Time:8 hours @100 LPM
 Battery Type:NiCAD
 Charging Time:12 – 16 hours
with standard charger.
 Optional 1 hour charger available
 Size:4.5" x 6" x 5.25"
 Weight:2.6 lbs
 Media Compatibility:90 mm petri dishes

Cat No.	Description	Qty
65224-12	BioCulture Pump, 120V Includes pump, standard 120V charger, pencil torch, carrying case & manual	each
65224-20	BioCulture Pump & Calibration Kit Includes pump, calibration head, standard 120V charger, pencil torch, carrying case & manual)	each
65224-55	Spare Sampling Head for BioCulture Sampler	each
65224-60	Fast One Hour Charger	each

► BioCulture™ Calibration Head

The BioCulture Calibration Head is A NIST traceable venture calibrator with 1% accuracy that allow users to calibrate the flow of the BioCulture pump themselves without having to send the pump out for service of calibration

- Allows flow calibration at flow rates between 30 – 120 LPM
- Designed for use with impeller fan type pumps like the BioCulture™, which require calibration devices with very little backpressure resistance
- Provided with a certificate of calibration traceable to NIST standards,



EMS #	Description	Qty
65224-50	BioCulture Calibration Head	each



► LIBRA™ Personal Sampling Pump

The Buck LIBRA™ is a low cost, high performance, constant flow personal sampling pump. Suitable for use in asbestos abatement, lead sampling and industrial hygiene sampling. Designed for use with asbestos and lead abatement, the LIBRA™ provides full constant flow compensation using 25mm and 37 mm cassettes

- Flow rate – 0.8 – 4 LPM
 - Rechargeable NiCAD battery pack system
 - Built-in washable stainless steel filter
 - Compact, lightweight and quiet
 - Intrinsic Safe Approval Pending
 - Full one year warranty
- LIBRA Pump comes with standard NiCAD battery, AC charger, luer adapter, 36" tubing, shirt's hose clip and manual.

EMS #	Description	Qty
65240-12	LIBRA Pump, 120volt Charger	each
65240-24	LIBRA Pump, 240volt Charger	each
65240-50	Buck FastOne Single Station Charger, 120/240 VAC	each
65240-51	Buck Standard Single Station Charger, 120 VAC	each

► Sensidyne Gilian BDX II Sampling Pump

The Gilian BDX II Abatement Air Sampler from Sensidyne is a dependable, low cost personal sampling pump. It is a "no-frills" model designed for use with asbestos and lead sampling. Meets NIOSH 7400, 7082, 7105 and 7300 specifications

- Flow rates – 500 – 3000 cc/min (0.50-3 LPM)
- Rechargeable battery pack system
- Built-in rotameter & flow adjust
- Compact, lightweight, quiet
- Full one year warranty

The Gilian BDX II includes a Pump with battery pack, battery charger, tool kit, 36" tubing, clip assembly and manual.



EMS #	Description	Qty
65241-12	Sensidyne Gilian BDXII Pump	each
65241-40	Gilian BDXII Pump Battery Pack	each
65241-50	Gilian BDXII Pump Charger	each

► mini Buck Primary Flow Calibrator

The mini-BUCK™ Primary Flow Calibrator is the industry standard for day-to-day flow verification and calibration of your personal and environmental sampling pumps. It is also suitable for verifying rotameters, setting instrument panels, and calibrating laboratory instruments. No more lugging oversized calibration panels. No more rotameter inaccuracies. The mini BUCK™ is accurate at any attitude and can be used for flow measurements with sampling media.



FEATURES:

- True Primary Standard
- Compact, lightweight and easy to use
- Work at any altitude without correction
- Instant readout of volumetric flow
- NIST traceable with $\pm 0.5\%$ accuracy
- Microprocessor controlled to provide fast, accurate, repeatable measurements
- Available with variety flow ranges

ORDERING:

EMS #	Description	Qty
65240-60	mini-Buck™ Low Flow 0.1 - 300cc/min, 120 V	each
65240-61	mini-Buck™ Medium Flow 1 - 6000cc/min, 120 V	each
65240-63	mini-Buck™ High Flow 100cc/min – 30LPM, 120 V	each
65240-64	mini-Buck™ High Flow 100cc/min – 30LPM, with ½" port, 120 V	each

► Acetone Vaporizer Kit

A small wonder Acetone Vaporizer Kit includes everything needed to clear slides for PCM analysis.



FEATURES:

- Heat control and thermometer built into vaporizer unit
- Padded carrying case protects equipment and supplies
- Enough supplies for the analysis of ½ gross of slides
- Lightweight but sturdy built
- Designed in strict compliance with the NIOSH 7400, 7402 or ORM requirement for preparation of microscope slides for PCM analysis

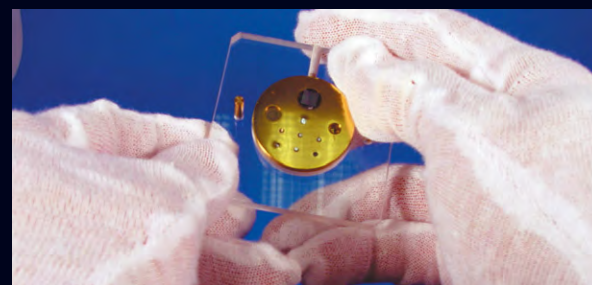
SPECIFICATION:

- Small wonder Acetone vaporizer with built-in heat control, temperature gauge, and cool cover; 2 oz acetone; ½ oz triacetin; ½ gross microscope slides; cover slips; tweezers; micro-dropper; syringe; #10 scalpel blade,; pre-cut foam padding; durable plastic carrying case with handle; instruction manual.
- Dimensions: 34⅞" L x 4½" W x 2¾" H (Vaporizer)
13" L x 11" W x 4" H (Kit Box)
- Material: Plastic case, ABS plastic cover on vaporizer, clear plastic bottles, metal and plastic tools.
- Weight: 2½ lbs. (Vaporizer), 8lbs (complete kit)
- Finish: Black Vaporizer cover with gray cord. Case color may vary
- Replacement items available separately.

EMS #	Description	Qty
65245-10	Small Wonder Acetone Vaporizer Kit	each
10015	Acetone, Glass Distilled	100ml
22060	Triacetin Reagent	½ oz

Cleaning Accessories and Supplies

LAB-AIR* System; Electronic Air Purifiers
 Laboratory Cleaning Solutions and Supplies
 Ultrasonic Benchtop Cleaners
 Duster Products and Pressure Sprayers
 Static Eliminators
 Laboratory Gloves
 Cloths, Tissue, Mini-Vac, Metal Polish,
 and Applicators



**Electron
 Microscopy
 Sciences**



▶ LAB-AIR* System; Electronic Air Purifiers

A system which complies with OSHA Regulations and minimizes Occupational Exposure To Toxic Vapors.

The System that destroys the odors and fumes and doesn't just mask them. Toxic vapors are reduced as well!

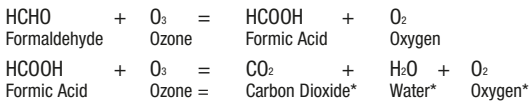
Lab-Air Units are designed to eliminate harmful fumes and annoying odors from the laboratory workplace.

How do they work ?

Electronic Air Purifiers produce a controlled level of Ozone electrically by converting molecules of Oxygen (O₂) into molecules of Ozone (O₃). Ozone, sometimes called activated oxygen, as part of the process of returning to oxygen, casts off its extra atom. That extra atom combines with the molecule of the odor's source and thereby destroys the odor by oxidation. Once Ozone's extra atom is consumed fresh air is left behind which was created by a natural process.

Lab-Air Units produce a safe unsaturated level of activated oxygen that neutralizes harmful fumes and eliminates problem odors from organic materials as well as some commonly used chemicals such as: Formaldehyde, Xylene, Toluene, Glutaraldehyde, Alcohol, Acetone.

For instance:



* All Harmless Gases (American Institute of Technology)

What is the best location for our LAB-AIR* System?

- ▶ **Histology/Pathology/EM Labs** - There are common odors and toxic vapors which are generated by fixing fluids, staining and embedding materials, autopsy samples, body odors, remains of dead animals and fumes which can exceed the capacity of the fume hood. In these cases these fumes may spread to other areas of the building.
- ▶ **Other Labs with Odors** - There are other locations within the hospital or research lab where people are using chemicals such as xylene, glutaraldehyde, formaldehyde, etc. where the LAB-AIR* SYSTEM would be very beneficial.
- ▶ **Animal Necropsy** - These are odors and fumes associated with the remains of dead animals. These odors can spread, especially in the warmer months, throughout an entire building. The LAB-AIR SYSTEM eliminates this totally.

Features and Specifications:

Lab-Air's Electronic Air Purifiers are CSA approved and come with a two year warranty. Powered by 110 VAC, 60 Hz or 220 VAC, 50 Hz.

▶ Model PA 2500

Features:

- ▶ Programmed timer
- ▶ 2,500 milligrams ozone per hr
- ▶ 120Volts, 75 Watts
- ▶ 14" L x 15" W x 5.5" H
- ▶ Weight: 22 lbs



Model PA 2500

▶ Model PA 1200

Features:

- ▶ Has an adjustable ozone output; provides up to 980 mg/hr.
- ▶ Multiple option timer: 15 min, 30 min, 1 hr, 2 hr, 4 hr, and continuous operation settings.
- ▶ It comes with non-slip feet and power cord.
- ▶ It measures 14"(L)x10"(W)x7"(H). Weight: 13 lbs
- ▶ High output—has a 220 CFM fan



Model PA 1200

▶ For 110 VAC:

64490-56	Lab-Air Model PA 2500	each
64490-98	Lab-Air Model PA 1200	each

▶ For 220 VAC:

64491-56	Lab-Air Model PA 2500	each
64491-98	Lab-Air Model PA 1200	each

▶ Accessories for Lab-Air

64492-25	Cleaning Kit for Model PA 2500	kit
64492-30	Cleaning Kit for Model PA 1200	kit
64492-20	Wall Mounting Bracket	each

AREA x ODOR FACTOR = MG/HR required

Cubic Feet

Measure the Cubic Footage (L x W x H) of the AREA being treated

Estimate the ODOR FACTOR as follows:

- Light Odor Factor = 0.005
- Medium Odor Factor = 0.018
- Strong Odor Factor = 0.036

Multiply the AREA by the ODOR FACTOR to determine the MG/HR on the chart below. Set OZONE on the machine to the setting nearest the required MG/HR and adjust as required.

Cubic Meters

Measure the Cubic Footage (L x W x H) of the AREA being treated

Estimate the ODOR FACTOR as follows:

- Light Odor Factor = 0.18
- Medium Odor Factor = 0.65
- Strong Odor Factor = 1.29

Multiply the AREA by the ODOR FACTOR to determine the MG/HR on the chart below. Set OZONE on the machine to the setting nearest the required MG/HR and adjust as required.

Lab-Air 9.8

MG/HR (Milligrams per hour in dry air)

340	431	522	613	704	795	886	977	1068	1159	1250
L0	1	2	3	4	5	6	7	8	9	H

➤ **Decon 90**

The leading surface active cleaning agent/radioactive decontaminant, for laboratory, medical and specialised industrial applications.

Description: Surface active cleaning agent, and/or radioactive decontaminant, for laboratory, medical and specialised industrial applications. NOT suitable for domestic applications. Supplied as a liquid concentrate, for dilution with water. For 'manual' cleaning, or for use in an ultrasonic cleaning bath.

Properties: Biodegradable *, phosphate-free, Bactericidal **, non-flammable and totally rinsable.

Appearance: Milky white, non-viscous liquid, having faint odor.

Ph: DECON 90 is alkaline. The concentrate having a ph in excess of ph 13.

Applications: For cleaning and/or decontaminating glassware, ceramics, rubbers, plastics, stainless steel and ferrous metals. Being alkaline, DECON 90 is NOT suitable for use on non-ferrous metals, notably aluminium and zinc, or on polycarbonate.

Formulation: An emulsion of anionic and non-ionic surface active agents, stabilising agents, non-phosphate detergent builders, alkalis and sequestering agents, in an aqueous base. Decon 90 does NOT contain Phosphates, Enzymes, EDTA/NTA or Chlorine Bleaches.

** Decon 90 satisfies the criteria in BS EN 1040 1997 for bacterial activity.

* Ready Biodegradability by OECD 301E (ISO method 7827 - 1986 (E))



60505-01 Decon 90 1 liter

➤ **Cutemol Cream; Protective Hand Cream**

Contains five skin softening compounds, plus allantoin to relieve dry, fissuring, peeling, chapped, or irritated skin.



70550 Cutemol Cream 50g

➤ **Amberclens Foam Cleanser**

A multipurpose anti-static foaming cleaner. Ideal for general cleaning on a wide variety of Laboratory, industrial, aerospace and commercial equipment.

Removes tough, stubborn stains such as grease, grime, and dirt

Anti-static formulation, reduces the attraction of airborne dust



Cat. # Description Qty.
68551-13 Amberclens Foam Cleanser 400 ml

➤ **XENIT Cleaner and Remover**

This All Natural Cleaner Removes What Soap & Water Can't

XENIT contains more than five high-performance ingredients such as Citrus 66, an all natural, highly refined extract of citrus fruit. XENIT is specially formulated to break down the complex molecules found in sticky materials. With this unique character, XENIT may be used to quickly remove labels, decals, and adhesive from glass, wood, vinyl and metals. XENIT removes chewing gum from carpet and upholstery. It cleans permanent marker, crayon, and lipstick from walls, woodwork, and counter tops. XENIT also remove shoe scuffs and heel marks from vinyl and wood flooring, and grease and dirt from carpet, fabrics and upholstery. It even removes dried latex paint.



➤ **XENIT Degreaser**

XENIT Degreaser is a powerful, non-flammable solvent cleaner that quickly removes grease, oil, carbon deposits, gums, varnish, and dirt from metal surfaces. It is fast drying and evaporates completely and leaves no residue.

➤ **XENIT Foaming Cleaner**

This is the fast, easy way to remove dirt, grime, and food stains, pen ink, soda pop, soap scum. Cleaned surface dry quickly and leave no marks.

➤ **XENIT Citrus Cleaner/Remover**

XENIT all natural citrus cleaner is the fast, easy way to remove sticky stuff, stains and gunk. XENIT removes greasy, grimy soils that soap and water can't. Cleans most surfaces in seconds. It cleans crayons, dry latex paint, gum, heel mark, ink, permanent markers, lipstick, shoe polish, sticker, tape, tar and sap.

Cat. #	Description	Qty.
60810-20	XENIT Foaming Cleaner	13 oz.
60810-30	XENIT Citrus Cleaner/Remover	10 oz.

➤ **Glass Cleaner – Invisible Glass**

Specially formulated, Invisible Glass quickly and easily removes dust, dirt, oil, grease, fingerprints, smoke film, haze and more from glass surfaces, such as windows, mirrors, computer screens, display cabinets, and photocopiers. Invisible Glass contains no water and soaps, surfactants or foams so it will leave no residue that will either streak or haze.



Cat. #	Description	Qty.
60811-01	Invisible Glass	19 oz.

► CURITY® Cotton Prepping Balls

- 100% cotton.
- Soft and absorbent.
- Packed in convenient poly bags.
- Designed for a variety of uses throughout the laboratories.
- Non sterile.



Cat. #	Description	Pack
71001-10	Cotton Balls, Medium	500/pk
71001-12	Cotton Balls, Large	200/pk

► CURITY® Rayon Prepping Balls

- Made from high quality rayon fibers.
- Non sterile.
- Designed for a variety of uses throughout the laboratories.

Cat. #	Description	Pack
71003-01	Rayon Balls, Large	1000/pk

► WEBCOL® Alcohol Preps



- A premium pad material that provides maximum absorbency for scrubbing and cleaning.
- 70% Isopropyl Alcohol.
- Sterile, non-woven sponges designed for moderate cleaning.
- Economical.
- Available in convenient sizes for a variety of uses.

Cat. #	Description	Pack
71005-20	Alcohol Prep, Medium, 2-Ply	200/pk
71005-30	Alcohol Prep, Large, 2-Ply	200/pk

► Absorbent Bench Top Covers

A wide selection of bench top covers from economy layered to premium ultra absorbent.



Cat #	Size	Absorbency Rating	Pack
64456-05	17" x 24"	Moderate	50/pk
64456-30	17" x 24"	Moderate	300/pk
64457-05	23" x 24"	Heavy	50/pk
64457-20	23" x 24"	Heavy	200/pk
64458-05	23" x 36"	Moderate	50/pk
64458-15	23" x 36"	Moderate	150/pk

► Cleaning Solutions:

► (1) Alconox®

Alconox detergents safely clean glass, plastic, metal, rubber, and porcelain without leaving a film, residue, or any scratches. Very versatile and cost efficient.

5 different types to choose from:

► Alconox®

The original anionic powder detergent for manual and ultrasonic cleaning. An odorless, high sequestering powder. It helps to decontaminate radioactive surfaces. Dilute 1:100, pH 9.0.

60510	Alconox	4 lb/bx
60511	Alconox	9 X 4 lb/cs
60512	Alconox	50 X 1/2 oz/bx



► Alcojet® Low Foaming Powdered Detergent

Non-ionic, low foaming cleaner for use in labware washers, parts washers, power spray systems, manual and ultrasonic cleaning. Corrosion inhibited formula recommended for glassware, metals, plastic, ceramic, porcelain, rubber and fiberglass. Free rinsing for reliable results no interfering residues. USDA authorized. Dilute 1:200 and it has a pH 12.

60513-01	Alcojet Powdered Detergent	4 lb/box
60513-09	Alcojet Powdered Detergent	9 x 4lb/cs



► Luminox® Low Foaming Neutral Cleaner

Low foaming neutral pH detergent for use in manual, and machine cleaning. A safe-handling detergent used for non-corrosive cleaning without chelation or alkalinity waste treatment problems. Recommended for aluminum and soft metal, medical devices, pharmaceutical equipments, alkaline sensitive labwares, and medical instruments, aluminum trays. Free rinsing, eliminating interfering residues. Dilute 3:100 and it has a pH 7.0

60514-01	Luminox Liquid Detergent	1 gal
60514-04	Luminox Liquid Detergent	4x1 gal/cs



► Liqui-nox®

A phosphate free anionic and non-ionic liquid detergent for manual and ultrasonic cleaning. Dilute 1:100, pH 6.5.

60515	Liqui-nox	1 qt
60516	Liqui-nox	12 X 1 qt
60517	Liqui-nox	1 gal
60518	Liqui-nox	4 X 1 gal



► Terg-A-Zyme®

Combine Alconox powder with this protease enzyme to effectively remove proteinaceous soils. Ideal for pre-soaking. It also cleans reverse osmosis installations. Dilute 1:100, pH 9.5.

60520	Terg-A-Zyme	4 lb/bx
60521	Terg-A-Zyme	9 X 4 lb/cs



► Det-O-Jet®

A highly alkaline liquid detergent and wetting agent that is soluble in soft or hard water. It is extremely effective on porcelain, metals, electronic parts, etc. It protects and lubricates the interior working parts of the washer. Dilute 1:100, pH 13

60525	Det-O-Jet	1 qt
60526	Det-O-Jet	12x1 qt



➤ (1) Alconox® (continued)

➤ Alcotabs®

Alconox detergent in an effervescent tablet form for use in syphon type washer rinsers for the cleaning of pipettes and test tubes. pH 6.5.

60529	Alcotabs	100 tab/bt
60530	Alcotabs	6 bt/ cs



➤ Citrajel® Low Foaming Liquid Acid Cleaner

Low foaming phosphate-free, concentrated, liquid cleaner and metal brightener, high performance removal of metal oxides, scale, salts and inorganic residues in lab-ware washers, parts washers, power-spray systems and manual and ultrasonic cleaning. Corrosion inhibited and free rinsing leaving no interfering residues. Ideal for acid washing and rinsing. Dilute 2:100 and it has a pH 2.5.

60532-01	Citrajel Liquid Detergent	1 gal
60532-04	Citrajel Liquid Detergent	4 x1 gal/cs



➤ Tergajet® Low Foaming Phosphate Free Powdered

Non-ionic, low foaming phosphate free powdered enzyme cleaner for use in labware washers, manual and ultrasonic cleaning. Corrosion inhibited formula recommended for glassware, metals, plastic, ceramic, porcelain, rubber and fiberglass. Free rinsing for reliable results and no interfering residues. Passes inhibitor residue test. Dilute 1:200 and it has a pH 11.5.

60534-01	Tergajet Powdered Detergent	4 lb/box
60534-09	Tergajet Powdered Detergent	9 x 4lb/cs



➤ Solujet® Low Foaming Phosphate Free Detergent

Low foaming phosphate free liquid cleaner for use in labware washers, manual and ultrasonic cleaning. Corrosion inhibited formula recommended for glassware, metals, plastic, porcelain, rubber and fiberglass. Free rinsing for reliable results and no interfering residues. This detergent passes the inhibitory residue test. Dilute 1:200 and it has a pH 11.5.

60536-01	Solujet Liquid Detergent	1 gal
60536-04	Solujet Liquid Detergent	4x 1gal/cs



➤ Detergent 8®

Low Foaming Phosphate Free Detergent Non-ionic, concentrated detergent for labware washers, PC board washers, power-spray systems, ultrasonic cleaning systems and manual cleaning. Specially formulated to remove oils, resin rosin and fluxes from printed circuit board, electronic part, phosphate sensitive labware and nuclear contaminated equipment with no interfering conductive residues. Excellent replacement for solvent cleaning. Dilute 3:100 and it has a pH 11.

60538-01	Detergent 8	1 gal
60538-04	Detergent 8	4x1gal/cs



➤ LQ9™ Critical-Cleaning Liquid Detergent

- Concentrated to save you money
- Replaces corrosive acids and hazardous solvents
- Phosphate free, biodegradable and readily disposable
- Free rinsing to give you reliable results and no interfering residues
- Use to pass your cleaning validation tests for lab accreditation and plant inspection approval



Used to clean: Healthcare instruments, laboratory ware, vacuum equipment, tissue culture ware, personal protective equipment, sampling apparatus, and more. Passes inhibitory residue test for water analysis. Used for phosphate sensitive analysis ware. FDAcertified.

60539-01	LQ9™ Critical-Cleaning Liquid Detergent	1 Gallon
60539-04	LQ9™ Critical-Cleaning Liquid Detergent	4 x 1 Gallon

➤ (2) Extran 300

A concentrated phosphate free surface cleaner used to clean equipment and apparatus, which is made from glass, quartz, porcelain, metal, rubber, and plastic.

60500	Extran-300	1 L
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➤ (3) Micro Cleaning Solution

Specially designed for ultrasonic cleaning machines. Cleans glass, most metals, plastics, and rubber. You can work with any concentration. Contains no phosphates and it is biodegradable. Even removes radioactive contaminants. Not to be used on zinc, magnesium, or aluminum.

71054	Micro Cleaning Solution	1 qt
71055	Micro Cleaning Solution	12 x 1qt/cs
71056	Micro Cleaning Solution	4 L
71057	Micro Cleaning Solution	4 x 4L/cs



➤ (4) General Purpose Cleaner

A concentrated solution, which is bio-degradable, phosphate and caustic-free alkaline cleaner formulated for general purpose and normal maintenance cleaning applications. General Purpose solution removes general soils, fingerprints, dust, packaging particulates, light oils, and greases. GP solution is safe for use with most base metals and alloys, thermoset and thermoplastic resins, and other synthetic materials. GP solution is easily mixed with water to form a concentration of 10-12% by volume, and can be used at temperatures ranging from ambient to 180°F (82°C)

71050	General Purpose Cleaner	1 qt
71051	General Purpose Cleaner	1 gal



➤ Oxide Remover (OR)

This cleaner may be used on brass, copper, steel and other metals to remove rust and metal-oxides. Comes as a concentrate. Dilute to 10 – 12% with water for use with ultrasonic machine.

71052	Oxide Remover (OR) Cleaner	1 qt
71053	Oxide Remover (OR) Cleaner	1 gal

ULTRASONIC BENCHTOP CLEANING

► Branson Ultrasonic Benchtop Cleaners

Branson's innovations include a signature elevated control panel, positioned above and behind the bath to avoid damage and increase operator safety. With a unique sweep frequency technology to eliminate standing waves, and a pioneering 40 kHz industrial transducers, Branson ultrasonic baths have been the industry standard for quality, reliability, and precision cleaning.

Digital Ultrasonic Baths

Advanced technology and digital performance in our most robust, versatile, ultrasonics baths.

Branson Baths Features

- Constant activity/power tracking automatically maintains the same ultrasonic power by adjusting for changes in liquid level and temperature caused by a light or heavy load. This helps ensure more uniform cleaning and consistent performance, even with multiple users or when bath conditions change.
- Assures uniform, precision cleaning over the entire surface, and consistent cavitation that reaches and cleans even tiny crevices on the parts.
- High/low power control adjusts the acoustic energy in the bath. It can be set at 100% power for normal to heavier loads, or at 70% power for lighter and more delicate applications, helping to protect delicate components from potential damage.
- Temperature settings are available up to 69°C/156.2°F, which can be set in either Celsius or Fahrenheit and programmed through the front panel for easy access and monitoring. This also allows for convenient re-calibration when needed onsite.
- High-temperature visual alarm/auto shut-off for added safety.
- Sleep mode provides energy savings automatically by shutting off unit if control keys are not touched within 15 minutes of cycle end. To restart, press any key.
- Degassing and conditioning of solutions through advanced wave modulation of up to 99 minutes also allow for a variety of sample prep applications.

Mechanical Ultrasonic Baths

The Branson MT Series includes two simple-to-use models: the M and MTH Series. Both series are designed for basic yet effective cleaning, with set-it-and-forget-it mechanical timers, which can be set up to 60 minutes or run continuously. MH Series units also offer a heating option. And both series are excellent for use in a variety of applications

Standard power requirements for all of our ultrasonic units are 120V, 50/60Hz. All units are available in 230/240 volt, 50/60Hz.

All of our units come with a tank cover.



► Model 1800

Tank size:	6"x5.5"x4"
(L,W,D)	150x140x100mm
Overall size:	9.9"x12"x11.9"
(L,W,D)	251x304x302mm
Weight:	7 lbs (3.2 kg)
Frequency:	40kHz
Tank Capacity:	.5 gal (1.9L)
Drain:	No



71020-MT	UltraSonic Bath Model 1800 MT	each
71020-MT-E	UltraSonic Bath Model 1800 MT, 220V	each
71020-MTH	UltraSonic Bath Model 1800 MTH	each
71020-MTH-E	UltraSonic Bath Model 1800 MTH, 220V	each
71020-DTH	UltraSonic Bath Model 1800 DTH	each
71020-DTH-E	UltraSonic Bath Model 1800 DTH, 220V	each
71022	Solid Tray	each
71023-P	Perforated Tray	each
71023-M	Mesh Basket	each
71024	Beaker Cover-600 ml	each
71024-R	Support Rack	each

► Model 2800 MT

Tank size:	9.5"x5.5"x4"
(L,W,D)	230x140x100mm
Overall size:	13.3"x12"x11.9"
(L,W,D)	337x304x302mm
Weight:	9 lbs (4.1kg)
Frequency:	40kHz
Tank Capacity:	.75 gal (2.8L)
Drain:	No



71025-MT	UltraSonic Bath Model 2800 MT	each
71025-MT-E	UltraSonic Bath Model 2800 MT, 220V	each
71025-MTH	UltraSonic Bath Model 2800 MTH	each
71025-MTH-E	UltraSonic Bath Model 2800 MTH, 220V	each
71025-DTH	UltraSonic Bath Model 2800 DTH	each
71025-DTH-E	UltraSonic Bath Model 2800 DTH, 220V	each
71027	Solid Tray	each
71028-P	Perforated Tray	each
71028-M	Mesh Basket	each
71029-R	Support Rack	each
71029	Beaker Cover 2x600 ml	each

► Model 3800 MT

Tank size:	11.5"x6"x6"
(L,W,D)	290x150x150mm
Overall size:	15.6"x12.5"x14.8"
(L,W,D)	397x317x377mm
Weight:	12 lbs (5.4kg)
Frequency:	40kHz
Tank Capacity:	1.5 gal (5.7L)
Drain:	Yes



71030-MT	UltraSonic Bath Model 3800 MT	each
71030-MT-E	UltraSonic Bath Model 3800 MT, 220V	each
71030-MTH	UltraSonic Bath Model 3800 MTH	each
71030-MTH-E	UltraSonic Bath Model 3800 MTH, 220V	each
71030-DTH	UltraSonic Bath Model 3800 DTH	each
71030-DTH-E	UltraSonic Bath Model 3800 DTH, 220V	each
71032	Solid Tray	each
71033-P	Perforated Tray	each
71033-M	Mesh Basket	each
71034-R	Support Rack	each
71034	Beaker Cover 2x600 ml	each

ULTRASONIC BENCHTOP CLEANING

► Model 5800 MT

Tank size:	11.5"x9.5"x6"
(L,W,D)	290x240x150mm
Overall size:	15.6"x15.8"x14.9"
(L,W,D)	397x401x378mm
Weight:	14 lbs (6.4kg)
Frequency:	40kHz
Tank Capacity:	2.5 gal (9.5L)
Drain:	Yes



71035-MT	UltraSonic Bath Model 5800 MT	each
71035-MT-E	UltraSonic Bath Model 5800 MT, 220V	each
71035-MTH	UltraSonic Bath Model 5800 MTH	each
71035-MTH-E	UltraSonic Bath Model 5800 MTH, 220V	each
71035-DTH	UltraSonic Bath Model 5800 DTH	each
71035-DTH-E	UltraSonic Bath Model 5800 DTH, 220V	each
71037	Solid Tray	each
71038-P	Perforated Tray	each
71039-R	Support Rack	each
71039	Beaker Cover-4x600 ml	each

► Model 8800

Tank size:	19.5"x11"x6"
(L,W,D)	495x290x150mm
Overall size:	23.5"x18.3"x15.4"
(L,W,D)	596x466x391mm
Weight:	26 lbs (11.8kg)
Frequency:	40kHz
Tank Capacity:	5½ gal (20.8L)
Drain:	Yes



71040-MT	UltraSonic Bath Model 8800 MT	each
71040-MT-E	UltraSonic Bath Model 8800 MT, 220V	each
71040-MTH	UltraSonic Bath Model 8800 MTH	each
71040-MTH-E	UltraSonic Bath Model 8800 MTH, 220V	each
71040-DTH	UltraSonic Bath Model 8800 DTH	each
71040-DTH-E	UltraSonic Bath Model 8800 DTH, 220V	each
71042	Solid Tray	each
71043-P	Perforated Tray	each
71044-R	Support Rack	each
71044	Beaker Cover 6x600 ml	each

► Accessories for Ultrasonic Benchtop Cleaners

Available accessories shown in the image to the right are the solid tray, perforated tray, mesh basket, and beaker cover. Also available is a support rack that is placed on the bottom of the cleaner.



Accessories	Model 1800	Model 2800	Model 3800	Model 5800	Model 8800
Solid Tray	71022	71027	71032	71037	71042
Perforated Tray	71023-P	71028-P	71033-P	71038-P	71043-P
Mesh Basket	71023-M	71028-M	71033-M	—	—
Beaker Cover	71024	71029	71034	71039	71044
Number/Capacity	1/-600ml	2x600ml	2x600ml	4x600ml	6x600ml
Support Rack	71024-R	71029-R	71034-R	71039-R	71044-R

► Model 200

A small economic unit for precise cleaning in a wide variety of applications in the lab. Comes with a 15 ounce stainless steel tank, basket and cover. It features a 5 minute timer which shuts off automatically. Comes complete with parts holder. 115 volt; 50/60V

Tank size:	6½" X 3½" X 2¼"
(L x W x D)	
Overall size:	8¾" X 4½" X 5"
(L x W x D)	
Weight:	3lbs



71048	UltraSonic Cleaner; Model 200, 115 volt	each
71048-22	UltraSonic Cleaner; Model 200, 220 volt	each

► W PC-620 Ultrasonic Cleaner

The PC-620 is offered in 2 frequencies to match cleaning capability to your application. At 40kHz it is ideal for cleaning pipettes, lab glassware, and other items requiring general cleaning.

Capacity:	2.75 gallons
Tank Size:	19½" x 5¾" x 6"
(L x W x D)	
Overall Size:	20¼" x 6¼" x 10"
(L x W x D)	



71046-R1	PC-620 Pipette Cleaner, Without Heat, 110V	each
71046-R2	PC-620 Pipettes Cleaner, With Heat, 110V	each
71046-E1	PC-620 Pipette Cleaner, Without Heat, 230/240V	each
71046-E2	PC-620 Pipettes Cleaner, With Heat, 230/240V	each
71046-C	Stainless Steel Cover for PC-620	each
71046-B	Stainless Steel Basket	each

► Retrieving Tweezers



A unique plastic coating on the tips of the tweezers insulates them and provides resistance to heat and chemicals. Ideal when cleaning with ultrasonics.

62112-06	Retrieving Tweezers, 6" Long	each
62112-08	Retrieving Tweezers, 8" Long	each
62112-10	Retrieving Tweezers, 10" Long	each
62112-12	Retrieving Tweezers, 12" Long	each

► Cleaning Basket

Made from stainless steel. Keeps small parts together when cleaning ultrasonically. A spring handle applies firm pressure to the basket to keep it closed when in use. Its overall length is 6". Spherical basket has a 1½" (38mm) diameter.



62110	Cleaning Basket	each
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► Electric Benchtop Dryers

Electric benchtop dryers offer a compact footprint and accelerate drying of labware with warm, circulating air.

Conserve benchtop space by placing single-sided models up against the wall. Double-sided models double your capacity with only a slightly larger footprint and can be turned perpendicular to the benchtop for easy access to both sides.

- 400 watts of drying power gently circulates heated air into and around items to decrease drying time.
- Heat selector knob with three temperature settings: high, medium and low.
- Power button illuminates when in use, and an 8-amp @ 120V (4-amp @ 230V) circuit breaker and independent thermo-fuse protects unit from overheating.
- Select from single and double sided models with up to 76 peg locations and 4 baskets.
- Electric drying efficiency is enhanced with a replaceable polyurethane foam filter that keeps warmed air dust free. Redirect air flow by inserting plugs instead of pegs into unused peg holes.
- Like the non-electric benchtop models these freestanding dryers have sturdy bases with excellent balance and can be placed on any flat surface.
- Removable polypropylene baskets serve as storage for small labware and extra pegs.



64400-02



64401-02



64400-03



64401-03



64402-10-S

Cat#	Description	Qty
64400-02	Single-Sided, 2 Tier (2 Baskets) 19 pegs	each
64400-03	Single-Sided, 3 Tier (2 Baskets) 38 pegs	each
64401-02	Double-Sided, 2 Tier (4 Baskets) 38 pegs	each
64401-03	Double-Sided, 3 Tier (4 Baskets) 76 Pegs	each
64402-10-S	Bag of 19 small pegs and 6 plugs	each
64402-15	Bag of 19 medium pegs and 6 plugs, 4 long	each
64402-20-S	Bag of 19 medium pegs and 6 plugs, 5 long	each
64402-30	Test Tube Basket, 5L x 4W x 4.25H	each

► Beaker-Store; Instrument Store

For the first time EMS introduces a unique beaker with a silicone bottom that allows you to store all of your tweezers and tools in cleaning solution and never damage the tips. Instruments may be placed in the beaker with the tips only immersed in distilled water and or cleaning solution. This allows the instruments to be kept clean and safe and ready to use. The Silicone bottom prevents the tips of the instruments from being damaged and the top of the beaker is compartmentalized and segmented allowing for each tool to be kept separate.

The beaker measures 10 cm in diameter and it is 8 cm in height.



Cat. #	Description	Qty.
68113-05	Beaker Store	each

► Apron; Disposable

A plastic, full length, bib-type apron. Handy protection in a compact envelope. Smooth finish, size 28"x46" (71cm x 112cm; 1½ mil thick).

60900 Apron 100/bx



► EMS Diamond Knife Wash

This new concept of washing the Diamond knives using magnetic stirring action (with special stirring bar) gives you a fast, clean and safe method to remove particles that are left on the knives edge after sectioning.

Since most of the EM labs already have stirring plates, the Diamond Knife Wash has been designed for use with your existing unit, saving you the need to purchase an extra one. It is universal and can be used for all type and brands of Diamond Knives, including the Diatome Histo Knife. Warning: Never use on a hot plate. If used on a combination Stirrer/Hot Plate, make sure the heat is off.



70605 Diamond Knife Wash each

► Diamond Knife Cleaning Kit

Consists of 5x5ml vials of cleaning solution, 4 rods for cleaning the knife edge, and 1 hair curl for the removal of sections from the knife edge and the trough.



70600	Kit	each
71180	Hair Curl Only	each
70610	Cleaning Solution	10x5ml
70970	Cleaning Rods	4/bx

► Triton X-100; Diamond Knife Soaking Solution (0.08% Solution)

Triton X-100 is a low concentration soaking solution in distilled water. It is a non-ionic (neu-tral pH) solution used to soften dried debris on the edge of the knife prior to recommended cleaning. Also used in whole ,cell preparations.

22146 Triton X-100, 0.08% Solution 500ml

► Hair Curl

Made from human hair; it is good for removing sections and cleaning the diamond knife.



71180 Hair Curl each

► Eyelash Manipulator; A Traditional EM Tool

For direct manipulation of sections and small tissue samples this tool is perfect for any occasion. May be used during ultramicrotomy to carefully tease sections that are in the Diamond Knife boat. The Eyelash comes on a Sable Brush handle made from the highest quality wood.



These Eyelashes may be cleaned and sterilized with alcohol and a tissue.

71182 Eyelash Manipulator each

➤ **Duster Products** *100% SAFE FOR THE OZONE!*

NO CFC'S. NO HCFC'S. NO PROPANE. NO BUTANE!!!

Here at Electron Microscopy Sciences we are proud to introduce a new line of 100% ozone-safe pressurized duster products. This new formulation, DIFLUOROETHANE, delivers pure, moisture-free blasts which removes all dust and dirt particles. This new formulation is considered non-flammable (Formula S), and completely safe for normal use, however this formula is considered flammable for shipping purposes and does contain some flammable elements. For special applications, where flammable elements are prohibited, we do have available a special application formula, Tetrafluoroethane, (Formula N) which has been specially formulated with no flammable elements. Unfortunately, the propellant cost of this formulation is significantly higher. However, all of our new gases are very low in pressure, so you get many more blasts per ounce. In fact, the new canisters will yield 20% more blasts than the old ones. This is true even though these new cans contain 8 ozs and the old ones contained 12 ozs.

➤ **Dust-Pro System**

100% Safe for the ozone! Dust-Pro for dusting and chilling.

The system has many features:

- 100% ozone-safe pressurized Tetrafluoroethane.
- Meets Canadian Government Regulations.
- Non-Flammable and triple filtered for maximum purity.
- New designed Techni-Valve™ with no mounting clip needed.
- High pressure 120 psi dusting spray.
- Comes in either refill or disposable cans.

For dusting use in upright position. For chilling a specimen invert the can and spray in short bursts.



➤ **Dust-Pro™ Kit**

The kit includes one 8 oz. can Dust-Pro and Peca Techni-Valve™. The one-piece-valve is made from solid brass and is chrome plated with an extra long nozzle (3½") for hard-to-reach areas. No mounting clip is required. The valve can be removed at any time without loss of pressure.

70845-00 Dust-Pro Kit kit

➤ **Dust-Pro™ Refill**

Use with Peca Techni-Valve; 8 oz. can, 12 cans/ case.

70845-01 Dust-Pro Refill can 8 oz.
70845-12 Dust-Pro Refill case 12x8 oz.

➤ **Dust-Pro™ Disposable**

An 8 oz. can containing non-flammable Tetrafluoroethane; 100% ozone safe. Comes with an Acc-u-sol™ trigger for pinpoint accuracy in cleaning as well as chilling procedures.

70847-01 Dust-Pro Disposable 8 oz
70847-12 Dust-Pro Disposable 12x8 oz.



➤ **Peca Techni-Valve™**

For use with our Dust-Pro Refill cans.

- Professionally designed with a long nozzle (3½",90mm).
- Smooth bell housing and no mounting clip is required.
- Made from solid brass, chrome plated.
- The valve can be removed at any time without the loss of pressure.
- Patented bell housing fits the contour of your hand.

70849-10 Peca Techni-Valve each



➤ **Pro-Techni-Valve™**

The "Pro" model has all of the features of Peca Techni-Valve plus a threaded nozzle for 3 different swivel extensions which affords you pinpoint dusting control in all directions. Pro-Techni-Valve comes with a 5" swivel attachment.

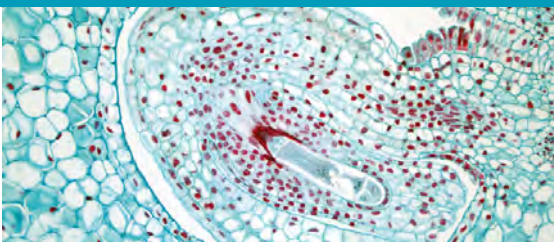
70849-20 Pro Techni-Valve each
70849-23 10.5" Swivel Attachment each



➤ **Cloths & Wipes, See pages 950-951 >>>>>**

NEW INFINITY 3-3UR Research-Grade Microscopy Camera

2.8 MP USB 3.0 Camera Offering Low Noise and High Sensitivity



For more information, see pages 750-754. >>>>>



► Dust-Off FGSA Model

Contains: Formula S (Difluoroethane) - 100% safe for the ozone. It uses the same chrome nozzle as the old FG Dust-Off. The nozzle is designed to prevent droplets from forming. It retains the same pressure until the can is empty. Its new concentrated formula will give you 57% more blasts per ounce, 17% more blasts per can. The kit consists of a 8 oz. can and a chrome nozzle. Refill is 8 oz can, 12 cans/case.



70705	Dust-Off FGSA Kit	each
70702	Chrome Nozzle Only	each
70810	Three Prong Valve Clip	each
70820	2ft Extension Nozzle	each
70706	Dust-Off FGSA Refill	each
70707	Dust-Off FGSA Refill	12/cs

► Dust-Off Plus Model (DPSA)

Contains: Formula S (Difluoroethane) - 100% safe for the ozone. It comes with a patented 360° Vector Valve. The multi-directional valve is used for easy blasting in hard to reach areas. The valve can be removed from the can anytime without any loss of gas. Its new concentrated formula will give you 57% more blasts per ounce, 17% more blasts per can. The kit consists of a 8 oz. can and a Vector Valve nozzle. Refill is 8 oz can, 12 cans/case.



70840	Dust-Off DPSA Kit	each
70834	Vector Valve Nozzle Only	each
70843	Dust-Off Plus Refill, DPSR	each
70844	Dust-Off Plus Refill, DPSR	12/cs

► Dust-Off Plus Model (DPN)

Contains: Formula N (Tetrafluoroethane) - 100% safe for the ozone. The same as DPSA above but this formula-as mentioned-contains no flammable elements.

70846	Dust-Off DPN Kit	each
70847	Dust-Off Plus Refill, DPNR	each
70848	Dust-Off Plus Refill, DPNR	12/cs

► Dust-Off XL Model (DPSXL)

Contains: Formula S (Difluoroethane) - 100% safe for the ozone. The first safe for the environment disposable pressurized duster. Removes dust and dirt with pure moisture free blasts. There is more product at less cost per ounce. Extension tube is included with the can. Its new concentrated formula will give you 57% more blasts per ounce, 17% more blasts per can. Weight per can: 10 oz disposable.



70837	Dust-Off XL (DPSXL)	each
70838	Dust-Off XL (DPSXL)	12/cs

► Dust-Off XL Model (DPNXL)

Contains: Formula N (Tetrafluoroethane) - 100% safe for the ozone. The same as DPXL above but this formula contains no flammable elements.

70827	Dust-Off XL (DPNXL)	each
70828	Dust-Off XL (DPNXL)	12/cs

► Sure Shot® Pressure Sprayers – ATOMIZER MODEL B

Model B sprayers are available in 16, 8 and 7 oz. Capacities. Anything that the aerosol can do, ATOMIZER can do safer. Refillable and Rechargeable. Eliminates aerosol disposal problems. All Model B sprayers come standard with Viton® seals, these seals are compatible with most products.

- Stainless Steel or Aluminum body
- Working pressure: 80 – 145 psi
- Measures are the same as aerosol cans (~2 3/4" dia)
- Liquid spray lighter than #10 Motor Oil

IMPORTANT: Sure Shot® Sprayers are not recommended for spraying any acids. Sure Shot® Sprayers will handle most chemicals, but are not designed to be used with products that are intended to etch or attack metal surfaces.

► 16 OUNCE CAPACITY ATOMIZER – MODEL B

Plated Aluminum Atomizer with a Brushed Finish

- 64186-10** Model 8500PL - Plastic Top. Comes with extra valve & nozzle assortment, including 2 fine, 2 regular, medium, 2 coarse and 1 pin stream
- 64186-12** Model 8500CB – Chrome-Plated Brass Top. Comes with extra valve & nozzle assortment, including 2 fine, 2 regular, 2 medium, 2 coarse and 1 pin stream



The model 8100 sure shot ATOMIZER features a Plated Aluminum canister. The plating is on both the inside and the outside of the canister, this gives the 16 oz capacity Plated Aluminum Atomizer a superior chemical resistance to plain aluminum, especially with chlorinated solvents:

Plated Aluminum Atomizer

- 64186-20** Model 8100PL - Plastic Top. Comes with extra valve & nozzle assortment, including 2 fine, 2 regular, 2 medium, 2 coarse and 1 pin stream
- 64186-22** Model 8100CB – Chrome-Plated Brass Top. Comes with extra valve & nozzle assortment, including 2 fine, 2 regular, 2 medium, 2 coarse and 1 pin stream



► Portable Air Compressor

Pressurize the Sure Shot® Sprayers with this rechargeable battery powered Air Compressor. The Compressor generates up to 220 PSI, the battery recharge unit by the AC 115V adapter or DC 12V adapter included. Completely portable, no trailing cords.

64195	Portable Air Compressor	each
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► Sure Shot® Pressure Sprayers – ATOMIZER MODEL B (cont.)

► 8 OUNCE CAPACITY ATOMIZER – MODEL B

Aluminum Atomizer

- 64190-10** Model 8300PL - Plastic Top. Comes with extra valve & nozzle assortment, including 2 fine, 2 regular, 2 medium, 2 coarse and 1 pin stream
- 64190-12** Model 8300CB – Chrome-Plated Brass Top. Comes with extra valve & nozzle assortment, including 2 fine, 2 regular, 2 medium, 2 coarse and 1 pin stream



Plated Aluminum Atomizer with a Brushed Finish

- 64190-20** Model 8700PL - Plastic Top. Comes with extra valve & nozzle assortment, including 2 fine, 2 regular, 2 medium, 2 coarse and 1 pin stream
- 64190-22** Model 8700CB – Chrome-Plated Brass Top. Comes with extra valve & nozzle assortment, including 2 fine, 2 regular, 2 medium, 2 coarse and 1 pin stream



► 7 OUNCE CAPACITY ATOMIZER – MODEL B

Aluminum Powder Coated Epoxy Finish

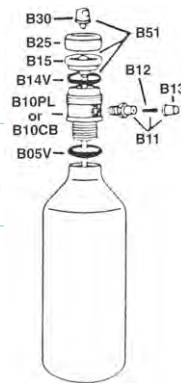
- Slim line design
- 7 oz capacity
- All Viton® seals
- Fits perfectly in your hand

- 64190-30** Model 8200PL - Plastic Top. Comes with extra valve & nozzle assortment, including 2 fine, 2 regular, 2 medium, 2 coarse and 1 pin stream



► Atomizer Repair Kits for Model B

Cat. #	Model	Description
64187	B51	6-Complete Valve Assemblies. Contains: 6 of each B15, B14 & B30
64189	BK50	Complete Repair Kit (For Aluminum Sprayers Only). Contains: B05, B11, B12, B13, B25, 6 each of B15, B30, and B14



► Static Eliminators:

► Anti-Static Spray

It stops static build-up on optics, disc drives, photographic materials, lenses, metal rollers any where that static may generate. 14 oz. can.

60615 Anti-static spray each



► Anti-Static Brushes

Eliminates static electric charges and removes dust, lint and other particles from negatives and lenses with one quick operation. This non-chemical, non-radioactive, synthetic brush uses the natural principal of resistance flow to obliterate dust and the static electricity that attracts it. It is absolutely safe on all photographic surfaces and emulsions, great for computer monitors and glass screens as well. It can be cleaned with soap and rinsed with water. It never needs "recharging" and will last a lifetime with proper care. Short: A 4" (10.5cm) long carbonized plastic handle, 4" brush. Weight 1oz. (28g).

60612-04 Short Anti-Static Brush each



► Techni-Stat® Clean Mat

Clean Mat is a one-layer 0.060" thick, solid vinyl tablemat designed to be used in a clean room as well as general laboratory areas, where static control is needed. It is resistant to heat and most oil, grease, and common solvents. This material provides a safe, non-carbon work surface to dissipate a static charge 6.1 x 108Ω/sq. at a workstation. All cut mats come with one snap and a 10 ft common point ground. The static dissipate rubber design meets EOS/ESD-54.1 @ 10V. (USA)

Cat. #	Description
60617-23	Techni-Stat® Clean Mat, size 2ft x 3ft (61x92cm)
60617-24	Techni-Stat® Clean Mat, size 2ft x 4ft (61x122cm)



► Static Control Adjustable Wrist Band

This Hook and Loop Wrist Strap is designed for those whom need to be static free in the working area. This Hook and Loop wrist trap has a quick and easy adjustment. With a 1" wide conductive material that is sewn in and has a 1MΩ resistor.

Cat. #	Description	
60622-06	Static Control Adjustable Wrist Band, 6ft Coil Cord	each
60622-12	Static Control Adjustable Wrist Band, 12ft Coil Cord	each
60622-30	6 ft Coil Ground Cord only, ¼" Molded Female Snap	each



► Non-Marking Heel Grinder
► Velcro® E.Z. Close™

E.Z. Close is your low cost logical choice heel grinder. They are made from premium grade non-marking conductive rubber that is highly abrasion and wear resistant. The Velcro® fastening system is adjustable and comfortable. Includes: 18" conductive tab and 1½", two-layer, rubber cup. Built in resistor. Charge decay: less than 0.01 sec.; 2.4x10⁸Ω. Meets DOD-263A standards (USA)

Cat. #	Description	
60619-10	Heel Grinder with 1MΩ Resistor, Blue	each
60619-20	Heel Grinder with 2MΩ Resistor, Blue	each
60619-30	Heel Grinder w/o Resistor, Black Stretch Strap	each



► Cotton Gloves



These well tailored, high quality gloves are made from 100% cotton. They offer softness and comfort. A perfect choice for handling photographs.

Cat. #	Size	Qty.
71118-01	Small	6prs/pk
71118-03	Medium	6prs/pk
71118-05	Large	6prs/pk

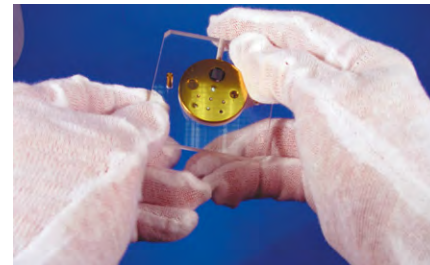
► Gloves; Lint Free, Clean-room



Finest quality, stretch nylon, one size fits all.

Cat. #	Size	Qty.
71090	Mens	6 pair/pk
71092	Womens	6 pair/pk

► Lightweight Cotton Inspector Gloves



These gloves are un-hemmed and lint-free. They are tailored cotton gloves which are ideal for inspection jobs. These gloves are available in one-size fits all for either men or women.

Cat. #	Size	Qty.
71119-01	Women	12/pk
71119-05	Men	12/pk

► Gloves; Latex Exam Gloves With Aloe Vera and Vitamin E

Made from 100% natural latex with the addition of Aloe Vera and Vitamin E, offering the softness, tactile sensitivity and skin protection. Economical ambidextrous style, beaded cuff, and are chemically resistant to acids, alcohols, ketones and alkalis. Packed in a convenient dispenser box, 100/box. Non-sterile. Available either with powdered (biologically cornstarch dusting, ~ 2mg/glove) or powder-free gloves.

Product specification

Mean Tensile		
Strength:	Before aging	24Mpa
	After aging	20Mpa
Elongation:	Before aging	750% min.
	After aging	700% min.
Thickness	Finger	0.15mm ± 0.01mm
	Palm	0.14mm ± 0.01mm
	Cuff	0.11mm ± 0.01mm



Latex Conform®

Cat. #	Size	Qty.
Light Powdered Latex Gloves		
71110-01	Small	100/bx
71110-20	Small	10bxs /cs
71111-01	Medium	100/bx
71111-20	Medium	10bxs/cs
71112-01	Large	100/bx
71112-20	Large	10bxs/cs

Cat. #	Size	Qty.
Powder-Free Latex Gloves		
71114-01	Small	100/bx
71114-20	Small	10bxs/cs
71115-01	Medium	100/bx
71115-20	Medium	10bxs/cs
71116-01	Large	100/bx
71116-20	Large	10bxs/cs

Cat. #	Size	Qty.
Powder-Free Latex Gloves with Aloe-Vera and Vitamin E		
71114-50	Small	100/bx
71114-51	Small	10bxs/cs
71115-50	Medium	100/bx
71115-51	Medium	10bxs/cs
71116-50	Large	100/bx
71116-51	Large	10bxs/cs



Latex Powder Free

► Nitrile Exam Textured Gloves

Powder-Free Green Gloves with Aloe Vera

Made from 100% synthetic nitrile, contains no latex. It is an extremely tough glove yet gentle on the hand. It offers superior textile strength and they are puncture resistant when compared to other similar thickness of latex or vinyl gloves. There are no natural rubber protein allergens as is present in natural latex rubber gloves. With the addition of Aloe Vera, the powder-free gloves will provide the user with superior comfort, excellent flexibility and dexterity. Textured gloves provide a positive grip on wet and or dry surfaces. The nitrile compound provides a broad range of hand protection against accidental chemical splashes.

Product specification

Type:	Nitrile exam gloves – non-sterile - Textured	
Color:	Blue (w/o Aloe Vera), Green (with Aloe Vera)	
Mean Tensile		
Strength:	Before aging	24Mpa
	After aging	20Mpa
Elongation:	Before aging	740% min.
	After aging	730% min.
Thickness	Finger	0.21mm ± 0.03mm
	Palm	0.14mm ± 0.03mm
	Cuff	0.11mm ± 0.03mm

Cat. #	Size	Qty.
Powder-Free Nitrile Gloves		
71106-20	Small	100/bx
71106-21	Small	10bxs/cs
71106-30	Medium	100/bx
71106-31	Medium	10bxs/cs
71106-40	Large	100/bx
71106-41	Large	10bxs/cs
71106-50	X-Large	100/bx
71106-51	X-Large	10bxs/cs

Cat. #	Size	Qty.
Powder-Free Nitrile Gloves with Aloe-Vera		
71107-20	Small	100/bx
71107-21	Small	10bxs /cs
71107-30	Medium	100/bx
71107-31	Medium	10bxs/cs
71107-40	Large	100/bx
71107-41	Large	10bxs/cs
71107-50	X-Large	10bxs/cs
71107-51	X-Large	100/bx



➤ Vinyl Exam White Gloves

Made from synthetic polyvinyl chloride, powder-free, ambidextrous, medical grade non-sterile gloves, Seamless, chemical resistant and excellent sensitivity, these vinyl gloves offer a unique balance of softness flexibility and strength.



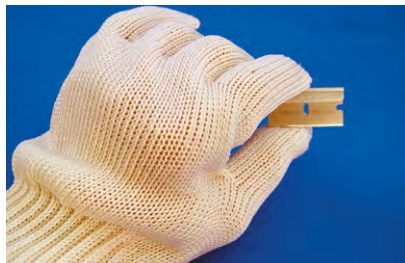
Product specification

Type:	Vinyl exam gloves – non-sterile – Ring Roll Bead Cuffs	
Color:	White	
Mean Tensile Strength:	9Mpa	
Elongation:	740% min.	
Thickness	Finger	0.10mm ± 0.01mm
	Palm	0.10mm ± 0.01mm
Overall Length, mm:	235 (Small & Medium), 245 (Large & x-Large)	

Cat. #	Size	Qty.
71108-10	Small	100/bx
71108-12	Small	10bxs /cs
71108-20	Medium	100/bx
71108-22	Medium	10bxs/cs
71108-30	Large	100/bx
71108-32	Large	10bxs/cs
71108-40	X-Large	100/bx
71108-42	X-Large	10bxs/cs

➤ Cut-Resistant Gloves; Safeknit™

The comfortable choice when choosing a high performance cut resistant glove. Safeknit is a blend of abrasion-resistant Spectra® fiber and other synthetics. The mix of these fibers form a rugged cut resistant barrier that offers the histologist sensitivity for manipulation but with extreme comfort and productivity.



NOTE: These gloves are neither puncture proof nor water resistant. They should not be used to protect against intentional cutting. Avoid use near moving blades. For applications which are related to fluids where a water resistant glove is required, we recommend either double gloving or using Nitrile Gloves, (Cat # 71106-71109 or 71068.)

Cat.#	Description	Pack
71065-07	Heavy Duty Safeknit™ Glove Size 7	each
71065-08	Heavy Duty Safeknit™ Glove Size 8	each
71065-09	Heavy Duty Safeknit™ Glove Size 9	each
71065-10	Heavy Duty Safeknit™ Glove Size 10	each
71065-11	Heavy Duty Safeknit™ Glove Size 11	each
71066-06	Medium Duty Safeknit™ Glove Size 6	each
71066-07	Medium Duty Safeknit™ Glove Size 7	each
71066-08	Medium Duty Safeknit™ Glove Size 8	each
71066-09	Medium Duty Safeknit™ Glove Size 9	each
71066-10	Medium Duty Safeknit™ Glove Size 10	each
71066-11	Medium Duty Safeknit™ Glove Size 11	each

➤ Gloves; Heavy Duty Neoprene

Protects hands from damaging solvents and chemicals. These gloves are heavy yet surprisingly sensitive.



71120	Neoprene Gloves, size 7-7½	12/pr/pk
71122	Neoprene Gloves, size 8-8½	12/pr/pk
71123	Neoprene Gloves, size 9-9½	12/pr/pk
71124	Neoprene Gloves, size 10	12/pr/pk
71125	Neoprene Gloves, size 11	12/pr/pk

➤ Polyethylene Disposable Gloves

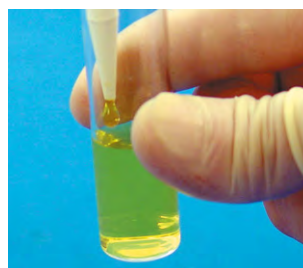
- Low Cost; offers good protection to hands from chemical contamination.
- Excellent Sensitivity.
- Powderless/Sulfur-Free.
- Ambidextrous.
- Comes in a Dispenser Box.
- 1¼ mil Thickness, 100 gloves/roll



71094	Polyethylene Gloves, Small	100/Roll
71095	Polyethylene Gloves, Medium	100/Roll
71096	Polyethylene Gloves, Large	100/Roll
71097	Polyethylene Gloves*	10Rolls/case

* Please specify Small, Medium or Large

➤ Finger Cots; Latex—Powder Free



Inexpensive, expandable finger cots. Seamless. Protective dexterity without covering the entire hand. Powderless, non-rolled. 3¼mil (0.0030"), 2¼" (40mm)L.



71130	Latex Finger Cots Small	1 gross/pk
71131	Latex Finger Cots Medium	1 gross/pk
71132	Latex Finger Cots Large	1 gross/pk

Marking Pens, See Specimen Preparation, pages 310-311 >>>>

Fro-Marker - A pen for use with frozen sections See Specimen Preparation, page 309 >>>>

Para-Marker - A pen for use with paraffin sections See Specimen Preparation, page 309 >>>>

▶ Ultra Brush

The ULTRA BRUSH is totally different than standard camel hairbrushes. Its unique fibers are ultra-soft for clean-ing the delicate surfaces of camera lenses, binoculars, telescopes and other fine optics. The ULTRA BRUSH fully retracts within the base to completely protect the brush ends. Guaranteed to be the softest lipstick style brush you can buy.

60611 Ultra Brush each



▶ Cloth; Lint Free, Twill Jean

For a complete description, see page 245. <<<<<

71750 Lint Free Cloth 9"X 9" 100/pk
71752 Lint Free Cloth 9"X 9" 300/pk
71753 Lint Free Cloth 12"X 12" 150/pk



▶ C3E Wipes

These wipes are made from 100% synthetic fiber and spunlaced to provide excellent sorptive capacity. These durable wipes are exceptionally clean and have excellent chemical resistance, making them ideal for use with solvents. Recommended for use in ISO Class 5 Cleanroom applications.

Features:

- Soft and non-abrasive; excellent for cleaning delicate optical surfaces such as lenses and mirrors.
- Low particle generation. Ideal for cleaning parts that are sensitive to particle contamination.
- Highly absorbent; excellent solvent carrier.
- Economical.

71762 C3E Wipes 9"X9" 300/pk
71764 C3E Wipes 12"X12" 150/pk



▶ Dust-Off®/Luminex™; Microfiber Cleaning Cloth

For superior cleaning of delicate surfaces. Based on advanced microfiber technology, the Dust-Off/Luminex Microfiber Cleaning Cloth is a superior cleaning product. It actually gets under dirt and oily films and lifts them away, leaving the surface clean, polished and lint free. Ideal for: Camera, Lenses/Filters, Microscopes, Computer, Eyeglasses, Plastic, Metal. Any smooth surface...



UNSURPASSED FEATURES:

- Environmentally responsible - Lifts away oily film and dirt with no chemicals.
 - Will not streak or smear surfaces.
 - Non-abrasive and 100% lint-free.
 - Reusable - Machine or hand washable - Long lasting.
- Size: 7½"x7½" (19x19cm).

71716-01 Luminex Cleaning Cloth each
71716-12 Luminex Cleaning Cloth 12/pk

▶ Kimwipes Push-Up Box

This holder is a molded one-piece, hard plastic with a center island. Once the Kimwipes box is placed inside of this holder, Kimwipes will maintain in an up position until the last one is pulled out. Very handy for laboratory work bench, desk top or any work place.



Ordering

Cat. #	Description	Qty.
71603-01	Kimwipes Push-Up Box	Each
71603-02	Kimwipes Push-Up Box	2/pk.

▶ Cheese Cloth

Cotton woven cloth in the pattern of 44x36 (44 lines/inch horizontally and 36 lines/inch vertically) which makes it suitable for cleaning and polishing. Supplied in 60 yard rolls (continuous) 36" in width; This configuration allows you to cut out the exact length you desire.



71748-00 Cheese Cloth Box

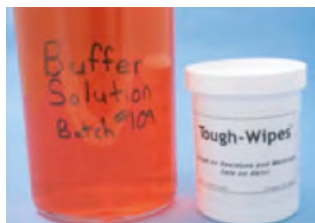
▶ Tough-Wipes™

Solvent Moistened Cleaning Pads

Powerful - Proprietary solvent solution easily removes markings and adhesive residue

Skin Safe - Solvent soaked pads are gentle to your skin

Convenient - Reclosable container ensures pads stay moist



Cat. No. 72611-50 Description Tough-Wipes Unit 50/bottle

▶ Towel; Disposable

Large size towel: 13.3"x23" they are suitable for a number of uses around the lab. High absorbency and they are strong even when wet.



72610 Towel 45/bx

► **Low Lint Wipes; Tissues**



A. All purpose wipes.

Soft, highly absorbent, non-abrasive, and economic. 300, 5"x8" wipes in each dispenser box.

71620	All Purpose Wipes	1 dozen/lot
71630	All Purpose Wipes	5 dozen/case

► **B. Kimwipes**

Same characteristics as above wipes. 280, 4 1/2"x8 1/2" wipes in each dispenser box.

71600	Kimwipes	1 dozen/lot
71601	Kimwipes	5 dozen/case

► **C. Kimwipes**

Same characteristics as above Kimwipes. Larger size for bigger applications. 140, 15" x 17" wipes in each dispenser box.

71604	Large Kimwipes	5bxs/lot
71605	Large Kimwipes	15bxs/case

► **D. Wipes Holder**

Clear plastic; holds the standard size wipes box. (Cat. #71600 or #71620). It can be mounted by a backing adhesive or by two screws. Measures 4 3/4"(L)x5"(W)x3"(H).



71602	Wipes Holder	each
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► **Micro Fiber Cleaning Cloth**



Chemical free. Safely and easily removes fingerprints and smudges from all glass and plastic lenses. The advanced technology of the Micro Fiber Cleaning Cloth makes it ideal for cleaning any high gloss surface such as:

- Camera Lenses
- Scopes & Binoculars
- Eye Glasses
- Jewelry
- Photographs
- Scanners
- Computers
- Copy Machines
- TV Screens
- Mirrors & Chrome
- Compact & Laser Discs
- Musical Instruments

Care of the Cloth: Machine or hand wash and dry. The unique properties will not change. May be ironed with cool iron, if desired.

Cat. #	Description	Pack
71717-01	Micro Fiber Cleaning Cloth	each
71717-12	Micro Fiber Cleaning Cloth	12/pk.

► **Disposable Bibulous Paper**

- Highly absorbent white fiber paper
- Lint and dust free
- Recommended for drying microscope slides and other small lab glass items
- Size: 4 x 6



70086-01	Disposable Bibulous Paper Book, each	50/pk.
70086-10	Disposable Bibulous Paper Book, 10 each	50/pk.

► **Thirsty Stix**

Sterile - Disposable - Absorbent filter paper sticks- great for absorbing, leaning, and lubricating.

- Highly absorbent
- Adhesive, residue free
- Extremely low lint content
- Ideally to be used with the microtome to remove excess water from the boat
- Multiple uses
- Excellent to remove excess water or solution from tubes and plates
- Size: 6" long x 0.20" thick



70996	Thirsty Stix	250/pk
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► **Opto-Wipes™; Precision Lens Cleaning Wipes**

A strong hydro-entangled mixture of polyester and cellulose fiber; designed for clean room environments. This special material offers softness, is lint-free, and traps particles and residue quite easily.



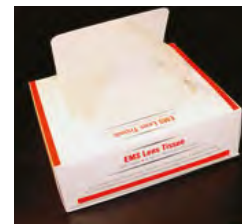
FEATURES:

- Soft: Super-soft fibers prevent the scratching of precision surfaces.
- Durable: Strong fiber matrix maintains integrity when wet.
- Highly Absorbent: Retains and withstands solvents such as MEK, methylene chloride, acetone, and alcohol.
- Efficient: Particle trapping matrix lifts particles and residue away from the surface. They are washable and reusable.

71755-01	Opto-Wipes, Size 4"x4"	200/pk
71755-02	Opto-Wipes, Size 6"x6"	150/pk
71755-03	Opto-Wipes, Size 6"x12"	100/pk
71755-04	Opto-Wipes, Size 12"x12"	100/pk

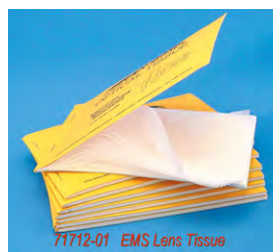
► **Lens Tissue – EMS (Ross)**

EMS (Ross) Lens tissue does not lint or scratch and it is free from mineral or vegetable filler.



71700	Lens Tissue, 4 1/2" x 5"	1000 sheets/box
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► **EMS Lens Tissue**



EMS Lens Tissue is the world's finest optical tissue. It's extremely soft and virtually lint-free. Safe for any optical surface such as camera lenses, microscopes, tele-scopes, and eye-glasses. Each tissue is perforated for easy removal from the booklet. Tissue size: 4"x6", 50 sheets/bk

71712-01	EMS Booklet Lens Tissue	50/bk
71712-10	EMS Booklet Lens Tissue	10 bk/lot



► EMS ROR (Residual Oil Remover)

EMS is proud to introduce the ROR-It is not a lens cleaner in the usual sense-it goes far beyond what a routine cleaner does. ROR is specifically designed to emulsify and remove microscopic oil residues- a by product of environmental pollution –from the surface and pores of glass and plastic.

When you clean an optical surface with ROR you will observe a measurable difference in brightness and clarity. For the first time, you will experience pollution free, unimpeded vision. Because ROR removes microscopic oil residues, dust has nothing to adhere to allowing the surface to remain cleaner longer.

ROR is safe and versatile for all delicate surfaces. It has been tested and used on everything from multicoated lenses to beryllium surfaced contacts and has proven time and again to be the finest and safest optical cleaning treatment on the market today.

Invented 25 years ago with professional and amateur photographers in mind, ROR is used today by the military, NASA, astronomers, scientists, hospitals, laboratories and universities.

Protect your investment through regular ROR cleaning and maintenance and your equipment will endure and perform excellently for years to come.

The cleanser is available in either a Dropper bottle or a Pump style bottle

Instructions for Use:

The most likely source of damage to glass surfaces and sensitive optical coatings is abrasion caused by rubbing the fine particles that are resting on the surface. Never “dry clean” a lens because that will guarantee scratching and abrading of the coating.

ROR recommends:

- Use a can of compressed air or a camel hair blower brush to remove any particles that may be resting on the surface.
- Place a few drops or spray a little ROR on the surface, let the solution settle for a few moments then wipe gently with a lens cleaning cloth or tissue making sure that you use as much of the clean area of cloth or tissue, each time you wipe. If you are working on a small surface, squeeze a few drops or spray some ROR onto the applicator that you are using and commence the cleaning as described above.
- Apply enough pressure to effectively clean the optical surface.
- Use a clean cloth or tissue to do a final wipe of the surface, again using sufficient pressure for each additional motion.
- Use a professional task wiper to apply and remove ROR with. These soft, chemical free, non abrasive tissues offer great absorbency and streak free cleaning on sensitive surfaces. If you have to use a generic variety of tissues, make sure it is untreated.
- Untreated micro-fiber cloths also work well as long as you wash them frequently and keep them dust free in a pouch or container. Be sure to check the make-up of your micro-fiber cloth before using with ROR. Treated micro fiber cloths can integrate poorly with ROR, leaving a residue on the surface. We recommend you wash and dry the cloth before proceeding with your application.

Applications:

ROR has many uses for your business, home and hobbies.

It is one of the most versatile cleaning agents available. We are constantly amazed to hear from our customers about yet another use for our product. Just recently we were contacted by a church pipe organ technician who told us that nothing cleans keyboards and organ parts better than ROR! The list goes on and on.

- Camera Lenses
- Filters
- Camera Surfaces
- Video Camera Lenses
- Video Camera surfaces
- Microscope Lenses
- Touch-screen Surfaces
- Multi-touch Optical Surfaces
- Projection Lenses
- Telescopes
- LCD Displays
- Television, Computer and Studio Monitors
- Security and Surveillance Cameras
- Flat Screen TVs
- Binoculars
- Spotting Scopes
- Night Vision Optics
- Transits
- Eyeglasses
- Gun Scopes
- Medical Lenses
- Scanners
- Cell Phone Screens
- CDs and DVDs
- VCR Heads
- Museum Acrylic Optical Surfaces

Ordering Information

Cat. #	Description	Qty.
74319-30	ROR Lens Cleaner 1 oz. Dropper Style	each
74319-35	ROR Lens Cleaner 2 oz. Pump Style	each

Meet the LatticeAx™

the small, accurate, fast, low-cost cleaving solution, suitable for any lab.



For more information, see pages 432-435. >>>>



► **Mini-Cleaner Vacuum System**

A powerful, lightweight, and compact cleaning system. Instead of blowing dust around with a freon duster, this high performance vacuum collects dust efficiently and removes it from delicate areas. The mini-cleaner comes with a crevice tool, 2 dusting brushes and 2 filters, weighs 8 oz. and provides 115 volts of cleaning power.



71910	Vacuum Kit	each
71912	Additional Filters	5/pk

► **Label And Adhesive Remover**



The first label and adhesive remover to really work. To use, gently rub the label, wipe away the excess material from the surface, wait for 30 seconds then simply peel off the label, leaving a clean surface.

71827-01	Label and Adhesive Remover	each
71827-06	Label and Adhesive Remover	6/pk

► **Plastisolve; Methylene Chloride**

Good for removing cured or uncured epoxy resins.

19600	Plastisolve	1 qt
19610	Plastisolve	4x1 qt



► **Wenol Metal Polish**

A metal polishing compound used to clean all metal surfaces.

Ingredients			
Turpentine	11%	Ammonium oxide	27%
Kerosene	11%	Fatty Acid Diethanolamide	1%
Ammonium Oleate	13%	Glycine	< 1%
71832	Wenol Polish		100ml

► **Metal Polish; Pinky**



Contains no silicone. Good for cleaning EM parts. A pink paste. Grit Distribution: Particles over 45µm diam = 0-5%; 45-10µm diam = 20-40%; 10-1.6µm diam = 10-30%; under 1.6µm diam = 40-60%.
 • Vook, R.W., Kothari, R. (1992). Wear, 157, 65-79.

71830	Metal Polish; Pinky	200g
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► **PEEK Polish**



EMS is proud to introduce PEEK a complete new line of cleaning materials that not only cleans but polishes and protects all metals as well as fiberglass surfaces as well. It is available in 5 different packaging configurations.

71833-10	PEEK Polish 100 ml Tube Blister Pack	each
71833-11	PEEK Polish 100 ml Tube Display Box	each
71833-12	PEEK Polish 250 ml Can	each
71833-13	PEEK Polish 1000 ml Can	each
71833-14	PEEK Polish 150 g Mousse (Foam)	each

► **EMS Bell Jar Shine**

This unique cleaning compound will not only clean but it polishes as well. Meant to be used on any surface which is either glass, metal, porcelain, ceramic and even chrome surfaces. Perfect for the cleaning of your bell jars from your Carbon and Sputter Coaters, as well as any surfaces in the lab that are metal, ceramic, steel etc.

Comes in a 1 lb container.



60540-01	EMS Bell Jar Shine	each
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▶ PTFE Surface Protectors

A thickness of 0.001" PTFE film bonded to 0.008" self-adhesive vinyl. It protects your work surface area and it is sanitary and attractive. Easy to use: cut to desired size, remove the backing and press into place.



72612 TSP size 25"x15ft roll each

▶ Silver Bioguard Anti-Microbial Mats Neutralize & Protect

— Nanoscale Silver particles bind with proteins to neutralize 99.9% of common microbes



Better Results —

Ensure consistent sample reproduction and results by significantly minimizing workspace contamination

Reliable — Silver is used extensively in medical applications where microbial contamination is a concern

Use Anywhere — Mats are less than 1mm thick and are backed with an anti-skid coating making them perfect for the benchtop or culture hood

Cat. #	Description	Qty.
77519-1	Silver Bioguard Mat, 10" x 8"	each
77519-2	Silver Bioguard Mat, 15" x 10"	each
77519-3	Silver Bioguard Mat, 24" x 20"	each
77519-4	Silver Bioguard Mat, 30" x 22"	each

▶ Wood Applicators

Designed for specimen transfer, as mixing rods, or general laboratory applicators.

72300	Wood Applicator, 6"x $\frac{1}{2}$ "	1000/bx
72303	Wood Applicator, 12"x $\frac{1}{4}$ "	500/bx

▶ Wooden Sticks; Tongue Depressors

These sticks are made from close-grained northern white birch because of its ability to provide a smooth and polished surface. Used for mixing, stirring, or scraping.

72322	Wooden Sticks, 4 $\frac{1}{2}$ "x $\frac{3}{8}$ "	1000/bx
72320	Wooden Sticks, 5 $\frac{1}{2}$ "x $\frac{5}{8}$ "	500/bx



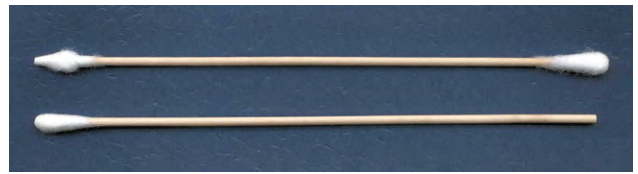
▶ Wooden Picks

They are round and double tapered; used for cleaning pole pieces and parts of the EM. Also used for orienting the specimen during the embedding stage.



72340 Wooden Picks 100/bx

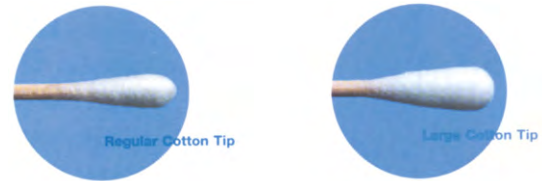
▶ Cotton Tipped Applicator; Single End



A lint-free, cotton-tipped applicator 6" in length, $\frac{1}{2}$ " in diameter on a wooden shaft. Head size is $\frac{3}{16}$ "(d) x $\frac{5}{8}$ "(L). Suitable for cleaning delicate parts.

72310	Cotton Tipped Applicator, Single End	100/pk
72310-10	Cotton Tipped Applicator, Single End	10 pk/lot

▶ Cotton Tipped Applicator; Double End

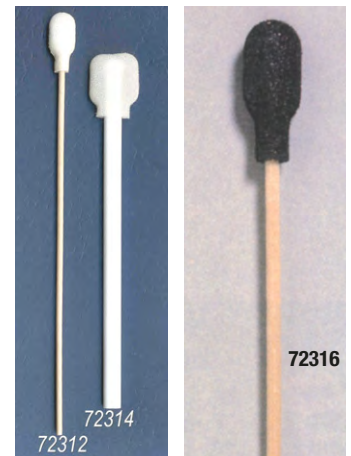


A lint-free, 6" double cotton tipped applicator with one pointed end and one regular end on a 1/12" wooden shaft. The pointed head size is $\frac{3}{16}$ "(d) tapering to $\frac{1}{32}$ "(d) x $\frac{3}{8}$ "(L). Regular head size $\frac{3}{16}$ "(d) x $\frac{3}{8}$ "(L). Packed 100 sticks in a sealed bag.

72308	Cotton Tipped Applicator, Double End	100/pk
72308-05	Cotton Tipped Applicator, Double End	5 bx/lot

▶ Foam Tipped Applicator; Foam Swabs

These foam tipped applicators are lint free, non-abrasive, and sized for precision cleaning with solvents. (Freon, Trichloro-ethane, Isopropyl Alcohol, and Acetone). The head is made from 100% urethane foam with 100 PPI porosity. Tips are shred resistant and bonded securely to the shaft.



▶ **72312** is round, foam-tip over regular-cotton tip on a 6" long wooden shaft. Head size: $\frac{3}{8}$ "(d) x $\frac{1}{16}$ "(L). Packed 50 sticks in a sealed bag.

72312	Round Foam Tipped Applicator	50/pk
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▶ **72314** is rectangular, foam-tip on a 5" polypropylene shaft. Head size: $\frac{1}{16}$ "(d) x 1"(L). Packed 50 sticks in a sealed bag.

72314	Rectangular Foam Tipped Applicator	50/pk
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▶ **72316** is an anti-static foam-tip over cotton tip on a 6" wooden shaft. Head size: $\frac{3}{8}$ "(d) x $\frac{1}{16}$ "(L). Packed 50 sticks in a sealed bag.

72316	Anti-Static Foam Tipped Applicator	50/pk
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SECTION 24

Vacuum Pumps, Accessories, & Evaporation Supplies

Vacuum Pumps

Metal Wire, Foils, Baskets, and Boats

Carbon and Graphite for Evaporation

Sputter Coater Targets



**Electron
Microscopy
Sciences**





► Edwards E2M1.5 Vacuum Pump

This miniature two stage pump features an alternative inlet connection position at the side of the pump so that overall installation height can be reduced to a minimum when required.

- 1.3 cfm (190L/min) displacement
- Ultimate vacuum (without gas ballast): 1.1x10⁻³ torr.
- Max. inlet pressure for water vapor: 11.3 torr
- Max. water vapor pumping rate: 0.035 lb/hr
- Oil capacity Max/Min: 0.28L/0.2L

Ultra Grade 19 oil is recommended for use with the E2M1.

Weight: 50 lbs (22kg)

Cat. #	Description	Qty.
91004	Vacuum Pump E2M1.5	each
91004-E	Vacuum Pump E2M1.5, 220 volts	each



► Edwards RV3 Vacuum Pump

Rotary Vacuum Pump, Double Stage

- Speed - (Pneurop 6602)
- 50 Hz operation - 2 ft 3min-1 (3.3 m3h-1)
- 60 Hz operation - 2.3 ft 3min-1 (3.9 m3h-1)
- Ultimate Vacuum (Total Pressure) - High Vacuum Mode - 2 x 10⁻³ mbar
- Inlet connection - NW25

In high vacuum mode it is ideal for backing turbo pumps, analytical instruments, and electron microscopes. Configurable for high throughput mode. Ultra Grade 19 oil is recommended for use with the RV3.

Cat. #	Description	Qty.
91003	Vacuum Pump RV3	each
91003-E	Vacuum Pump RV3, 220 volts	each



► Edwards RV5 Vacuum Pump

Rotary vacuum pump; Double stage.

- 4.1 cfm (117L/min) displacement
- Ultimate vacuum (without gas ballast) 1.5x10⁻³ torr.
- Max. inlet pressure for water vapor: 38 torr
- Max. water vapor pumping rate: 0.48 lb/h
- Motor: 1/2 hp
- Oil capacity Max/Min 0.7L/0.42L

Ultra Grade 19 oil is recommended for use with the RV5.

Weight 43 lbs. (19.6 kg)

Cat. #	Description	Qty.
91005	Vacuum Pump RV5	each
91005-E	Vacuum Pump RV5, 220volts	each



► Edwards RV8 Vacuum Pump

Rotary vacuum pump; Double stage.

- 6.9 cfm (195 L/min) displacement
- Ultimate vacuum (without gas ballast) 1.5x10⁻³ torr.
- Max. inlet water pressure vapor: 29 torr
- Max. water vapor pumping rate: .48 lb/h
- Motor: 3/4 hp
- Oil capacity Max/Min 0.75L/0.43

Ultra Grade 19 oil is recommended for use with the RV8.

Weight 50 lbs (24 kg)

Cat. #	Description	Qty.
91025	Vacuum Pump RV8	each
91025-E	Vacuum Pump RV8, 220 volts	each

➤ Vacuum Pump Exhaust Filters

Vacuum Pump Exhaust Filters for Vacuum Rotary Vane Pumps remove all visible oil mist and smoke from vacuum pump exhaust, even when it is saturated with oil. The high efficiency filter cartridge continuously drains the collected liquid, allowing the user to recover expensive lubricating fluid. Filters are for pumps with flow ratings ranging of 3 cfm and non-hazardous/non-corrosive applications. Port size is 1/2" NPT.



Features

- Eliminate 99% oil mist and smoke from vacuum pump exhaust
- Prevent oil accumulation in ductwork
- Recover expensive lubricating oils, and automatically return filtered oil to pump
- Eliminate potential OSHA and EPA violations
- The filter assemblies are shipped with filter cartridges, pressure gage (20 cfm and larger), and final filter pad.

Specifications

Maximum Flow Rate: 3 CFM
Material: Nylon
Maximum Seals: None
Maximum Temperature: 250°F (121°C)

Shipping Pressure: 15PSIG
Dimensions: 2" Dia. x 3.7" H
Weight: .25lbs (0.1kg)
Port Size: 1/2" NPT

Cat. #	Description	Qty.
96000	Vacuum Pump Exhaust Filter including adapter (1/2" female NPT to 3/4" BSPT with 1/4" NPT plug)	each
96001	Vacuum Pump Exhaust Filter, no adapter	each

➤ Foreline Traps

These rechargeable in-line traps effectively block oil back-streaming from mechanical pumps. Any mechanically pumped system, even one with a turbo pump, should have a foreline trap. The trap is placed in the foreline between the roughing pump and the diffusion or turbo pump. It uses a disposable, oxygen-free copper maze absorbent which requires no liquid nitrogen and will not hold water. Typically the maze is replaced every 1-2 years. The seamless body is available in aluminum.



- Quick change clamp for replacement of maze
- Viton "O" ring end cap
- Recessed screen
- Available in five pipe diameters
- Replacement elements (Copper Maze) also available

Catalog Number	Pipe Diameter	Body* Material	Pump Capacity	Body Diameter
91050-10	1/2"	Aluminum	5 CFM	2 1/2"
91050-15	3/4"	Aluminum	5 CFM	2 1/2"
91050-20	1"	Aluminum	10 CFM	3"
91050-25	1 1/2"	Aluminum	10 CFM	3"
91050-30	1 3/4"	Aluminum	15 CFM	4"

* Available in stainless steel upon special request.

➤ Ultra Grade 19 Oil

Edwards Ultra Grade 19 Oil is specially recommended for use in clean pumping applications. The oil offers reduced maintenance costs, longer fluid life, and cooler running pumps.

60740	Edwards Ultra Grade 19 Oil	1 L
60742	Edwards Ultra Grade 19 Oil	4 L

➤ EMF Oil Mist Filters

We are pleased to offer not only the vacuum pumps but also the oil mist filters to help you deal with exhaust mist from the pump which sticks to any surface that it touches and becomes a dust magnet.



Mist filters capture oil mist from the outlet of pumps, which would otherwise be ejected into the atmosphere. This may happen when you use gas ballast or when you pump high gas throughputs. You can also return oil trapped in the mist filter back to the pump, although you must ensure that the process gases will not contaminate the pump or pump oil.

For the E2M1.5 use the EMF3. For the RV3, RV5, and RV8 use the EMF 10.

EMF3

Features

- Protection from oil mist emissions as required by COSHH and health and safety regulations
- Use of optional oil return kits results in reduced oil level maintenance and savings in pump oil
- If the oil element becomes blocked, an integral pressure relief valve opens

EMF 10

The EMF10 mist filter is suitable for use with RV3, RV5 and RV8 pumps. They are very efficient at 99.999% DOP test and are also azide proof. The white bottom half of the body is semi-transparent, allowing the oil level to be monitored. The EMF filters have a unique odor element which neutralizes the smell of oil mist.

Supplied with NW25 clamp, centering ring and 'O' ring, NW25 to 3/4 inch BSP adaptor

Features

- Protection from oil mist emissions as required by COSHH and health and safety regulations
- Use of optional oil return kits results in reduced oil level maintenance and savings in pump oil
- If the oil element becomes blocked, an integral pressure relief valve opens

91004-OMF	EMF3 Oil Mist Filter	each
91004-RMO	EMF3 Replacement Mist Element	each
91004-ROM	EMF3 Replacement Odor Element	each
91005-OMF	EMF 10 Oil Mist Filter	each
91005-RMO	EMF 10 Replacement Mist Element	each
91005-ROM	EMF 10 Replacement Odor Element	each

➤ Vacuum Monitor

This vacuum monitor allows you to monitor the vacuum level in the foreline between the roughing pump and the diffusion (or turbo) pump. A high value would indicate a leak in the system or possibly an inefficient roughing pump. Comprised of a thermocouple gauge control module and cable. The unit can mount directly to the Foreline Trap via a thermocouple (TC) port supplied at no charge when ordered with a Foreline Trap. The 3-station version of the Vacuum Monitor allows the vacuum levels of several pumps to be measured.



91052-01	Vacuum Monitor	each
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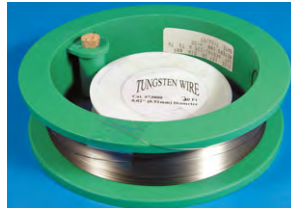
► Tungsten Metal Wire and Boats

Tungsten has the highest melting point and lowest vapor pressure of all metals, and at the temperatures over 1650°C has the highest tensile strength. It has excellent corrosion resistance and is attacked only slightly by most mineral acids.

Tungsten is the most useful material used in vacuum evaporation technique, due to its special properties and cost factor.

► 1. Tungsten Wire

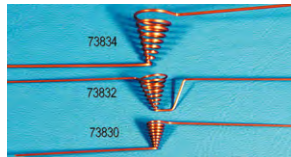
We are offering tungsten wire in 99.90% purity. Available in 0.025" (.64mm), 0.02" (.51mm), and 0.009" (0.23mm) diameters.



73800	Tungsten Wire, 0.020" (0.51mm) Diameter	20 ft
73801	Tungsten Wire, 0.020" (0.51mm) Diameter	100 ft
73802	Tungsten Wire, 0.025" (0.64mm) Diameter	20ft
73803	Tungsten Wire, 0.025" (0.64mm) Diameter	100ft
73804	Tungsten Wire, 0.009" (0.25mm) Diameter	20ft
73805	Tungsten Wire, 0.009" (0.25mm) Diameter	100ft

► 2. Tungsten Wire Baskets

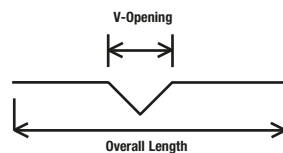
Clean, vacuum grade, tungsten wire.



Basket Type	Turns	I.D. mm	Height mm	Wire Lead cm	Wire Dia. inches
A	9	4	7	3.5	0.020
C	8	7	9	5.0	0.020
D	8	9	14	4.0	0.030

73830	Tungsten Wire basket A	50/pack
73832	Tungsten Wire basket C	50/pack
73834	Tungsten Wire basket D	50/pack

► 3. Tungsten Wire Filaments



V-Shaped Filaments

High purity, vacuum grade tungsten wire 0.02" (0.50mm) diameter, V-shaped filaments 1/2" (12.7mm) deep, with a bottom angle of 45°, either single wire or triple strand.

Cat. #	Overall Length	No. Strand	V-Opening	Qty
73840	3" (76.2mm)	Single	3/4" (19mm)	10/pk
73842	3" (76.2mm)	Triple	5/8" (16mm)	10/pk
73844	3 1/2" (88.9mm)	Triple	3/4" (19mm)	10/pk

Coiled Filaments

Single or 3-strand coiled tungsten filaments, 0.5mm (0.002") diameter wires.

Cat.#	Description	Qty
73938-1	4" long Horizontal Helix, Coil length 45mm (1 3/4") with 6 turns, 6.3mm(1/4") diameter coil. Single strand	5/pk
73938-3	4" long Horizontal Helix, Coil length 45mm (1 3/4") with 6 turns, 6.3mm(1/4") diameter coil. Triple strand	5/pk
73939-1	5" long Horizontal Helix, Coil length 51mm (2") with 12 turns, 9.5mm(3/8") diameter coil. Triple strand	5/pk

Properties of Tungsten

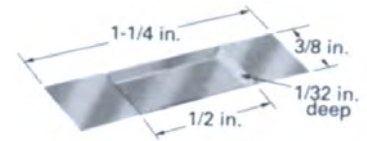
Chemical symbol:	W	Number of Electron (with no charge):	74
Atomic Radius:	2.02Å	Number of Neutrons (most common/stable nuclide):	110
Atomic Volume, cm³/mol:	9.53	Ionic Radius:	0.62Å
Covalent Radius:	1.3 Å	Gross Section:	18.5 barns ± 0.5
Crystal Structure:	Body centered cube		
Atomic Number of Protons:	74		

► Tungsten Foil Boats

Tungsten Boat B1:

Thickness of tungsten foil is 0.05mm (0.002"), overall length is 32mm (1 1/4").

The trough: 12.7mm(L) x 9.5mm(W) x 3.2mm Deep (1/2" x 3/8" x 1/8")

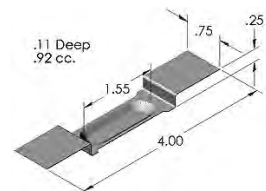


Cat.#	Description	Qty
73816	Tungsten Boat B1	5/pk

Tungsten Boat B2:

Thickness of tungsten foil is 0.25mm (0.010"). The overall length is 101.6mm x 19.05mm (4" x 3/4").

Trough: 39.37mm (L) x 2.79mm Deep, 0.92 ml

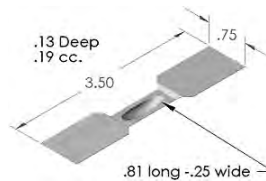


Cat.#	Description	Qty
73816-B2	Tungsten Boat B2	5/pk

Tungsten Boat B3:

Thickness of tungsten foil is 0.25mm (0.010"). The overall length is 101.6mm x 19.05mm (4" x 3/4").

Trough: 39.1mm(L) x 6.35mm(W) x 3.3mm Deep, 0.5ml

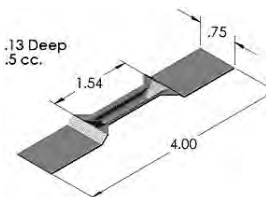


Cat.#	Description	Qty
73816-B3	Tungsten Boat B3	5/pk

Tungsten Boat B4:

Thickness of tungsten foil is 0.25mm (0.010") The overall length is 100.5mm x 19.05mm (3 1/2" x 3/4").

Trough: 28.19mm(L) x 15.87(W) x 3.3mm Deep, 0.99ml



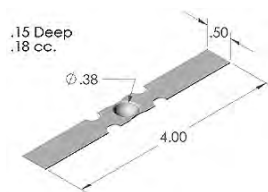
Cat.#	Description	Qty
73816-B4	Tungsten Boat B4	5/pk

► Tungsten Foil Boats (continued)

Tungsten Boat B5:

Thickness of tungsten foil is 0.25mm (0.010"). The overall length is 101.6mm x 12.7mm (4" x 1/2").

Trough: 9.65mm Diameter x 3.81mm Deep, 0.18ml

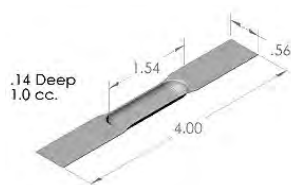


Cat.#	Description	Qty
73816-B5	Tungsten Boat B5	5/pk

Tungsten Boat B6:

Thickness of tungsten foil is 0.25mm (0.010"). The overall length is 101.6mm x 39.1mm(L) (4" x 1 1/2")

Trough: 39.1mm(L) x 12mm(W) x 3.55mm Deep, 1.0ml

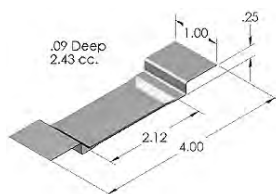


Cat.#	Description	Qty
73816-B6	Tungsten Boat B6	5/pk

Tungsten Boat B7:

Thickness of tungsten foil is 0.25mm (0.010"). The overall length is 101.6mm x 25.4mm(L) (4" x 1")

Trough: 53.84mm(L)x25mm(W) x2.28mm Deep, 2.43ml



Cat.#	Description	Qty
73816-B7	Tungsten Boat B7	5/pk

► Metal Foils

For aperture cleaning, vacuum evaporation.

Cat.#	Description	Qty
73820	Molybdenum Foil 0.002"(0.05mm) thick; size 6x6" (15.2x15.2cm)	each
73822	Tantalum Foil 0.003" (0.075mm) thick; size 6x6"(15.2x15.2cm)	each

► Pyrolytic Graphite Foil Boat

Boat dimensions:

Thickness of pyrolytic graphite foil is 0.20 mm (0.020") Overall length is 32mm (1.25") and width is 9.6mm (0.375")

Trough Dimension:

12.7 mm (L) x 9.0 mm (W) x 3.2 mm (D) (0.5 x 0.355 x 0.03")

Cat.#	Description	Qty
73808-B1	Pyrolytic Graphite Boat B1	each

For more technical information about Pyrolytic Graphite, see page 625 >>>>>

► Heavy Duty Wire Bending Pliers

These extra heavy-duty pliers are used for bending any metal wire at a 'V' shaped angle, allowing for the formation of filaments in accordance to your specification.



Cat.#	Description	Qty
62185	Wire Bending Pliers, 6 1/2" (165mm) Long	each

► Metal Boats

For disc aperture cleaning, vacuum evaporation. Thickness: 0.05mm (0.002"). Overall Length: 75mm (3"). Trough measures: 12mm (1/2") long x 5mm (3/16") wide x 1mm deep.



Cat.#	Description	Qty
73810	Molybdenum Boat	5/pack
73812	Platinum Boat	1/pack
73814	Tantalum boat	5/pack

► Precious Metal Wires

High purity, vacuum grade. These metal wires are suitable for scanning and electron microscopy techniques.



Aluminum Wire: Purity: 99.99%

73000	Aluminum Wire, Diameter: 0.010"(0.25mm)	10 ft
73001	Aluminum Wire, Diameter: 0.010"(0.25mm)	50 ft

Gold Wire: Purity: 99.99%

73100	Gold Wire, Diameter: 0.008"(0.20mm)	10 ft
73101	Gold Wire, Diameter: 0.008"(0.20mm)	50 ft

Molybdenum Wire: Purity: 99.95%

73200	Molybdenum Wire, Diameter: 0.008"(0.20mm)	10 ft
73201	Molybdenum Wire, Diameter: 0.008"(0.20mm)	50 ft

Palladium Wire: Purity: 99.90%

73300	Palladium Wire, Diameter: 0.008"(0.20mm)	10 ft
73301	Palladium Wire, Diameter: 0.008"(0.20mm)	50 ft

Palladium/Gold 40:60, Purity: 99.90%

73400	Palladium/Gold wire, Diameter: 0.008"(0.20mm)	10 ft
73401	Palladium/Gold wire, Diameter: 0.008"(0.20mm)	50 ft

Platinum Wire, Purity: 99.95%

73500	Platinum Wire, Diameter: 0.008"(0.20mm)	10 ft
73501	Platinum Wire, Diameter: 0.008"(0.20mm)	50 ft

Platinum/Palladium, 80:20. Purity 99.95%

73600	Platinum/Palladium, Diameter: 0.008"(0.2mm)	10 ft
73601	Platinum/Palladium, Diameter: 0.008"(0.2mm)	50 ft

Silver Wire, Purity: 99.99%

73700	Silver wire, Diameter: 0.008"(0.2mm)	10 ft
73701	Silver wire, Diameter: 0.008"(0.2mm)	50 ft

Tungsten Wire, Purity: 99.90%

73800	Tungsten wire, Diameter: 0.02" (0.51mm)	10 ft
73801	Tungsten wire, Diameter: 0.02" (0.51mm)	100 ft

► Carbon Rods/Graphite Rods

Graphite is the stable form of carbon. Graphite is one of the softest; diamond is one of the hardest minerals known to man. Carbon is harder than graphite. For TEM and SEM applications, graphite is recommended.

Carbon /graphite films are most usable in TEM and SEM due to its value characteristics: uniformity amorphous and high transparent to electron beams. Because of low molecular weight and their unique structure (graphite have a sheet like structure, where the atoms all lie in a plane), carbon/graphite films have excellent mechanical stability, and even film thickness is about 1 – 2 nm.

Our carbon/graphite rods are CVP™ (Chemical Vapor Process) purity and spectrographic grade, grade 1, produced to ASTM tolerances or even tighter as well we have a technical grade. The technical grade has a typical impurity level of 50ppm or greater. Technical grade may be used in applications of non critical SEM coating applications.

► A. Carbon Rods: Spectro-Grade

Carbon Rods (graphite) with an impurity level of 2ppm or less with a maximum level element of each of 1 ppm. These rods are ideal for all TEM, SEM and all other critical applications.

70200	Carbon Rods, Spectro Grade, 1/8"(3mm) x 12" (304mm)	12/pk
70231	Carbon Rods, Spectro-Grade, 3/16"(4.6mm) x 12" (304mm)	12/pk
70230	Carbon Rods, Spectro-Grade, 1/4"(6.2mm) x 12" (304mm)	12/pk

► B. Carbon Rods: Technical Grade

70301	Carbon Rods, Technical Grade, 1/8"(3mm) x 12" (304mm)	12/pk
70302	Carbon Rods, Technical Grade, 1/4"(6.2mm) x 12" (304mm)	12/pk

► C. Carbon Rods

70210	12" (304mm) L x 1/8" (3mm) Diameter	12/pk
70212	12" (304mm) L x 1/4" (6.2mm) Diameter	12/pk

► Pre-Sharpened and Pointed Carbon Rods



To make your work easier we invite you to order our pre-sharpened rods. All of our line of Pre Sharpened Carbon Rods are made from our Spectroscopically Pure Carbon (Graphite)

Single Point:

Rod Length: 2 3/4" (60.3mm)

Neck Length: 0.205" (5.2mm)

Neck Diameter: .045" (1.14 mm)

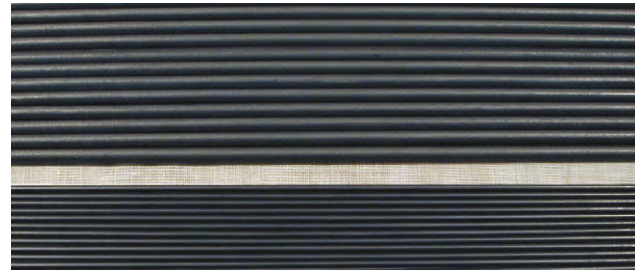
70220-01	Single Point Carbon Rods, 1/8" dia. x 2 3/4" L (3 x 60.3mm)	50/pack
70221-01	Single Point Carbon Rods, 1/4" dia. x 2 3/4" L (6.2 x 60.3mm)	50/pack

Double-Pointed Carbon Rods

70220-45	(1/8") dia. x 2 1/4" long (3.05 x 57.1mm) Tip: .039" dia. (1.0mm), neck type tips	10/pack
70220-50	(3/16") dia. x 2 1/2" long (4.6 x 63.5mm) Tip: .039" dia. (1.0mm), neck type tips	50/pack
70221-40	1/4" dia. x 2" long (6.4 x 50.8mm) Tip: .039" dia. (1.0mm), neck type tips	50/pack
70221-60	1/4" dia. x 1 1/2" long (6.4 x 38mm), Tip: .056" dia. (1.4mm), neck type tips	10/pack

Properties of Carbon

Symbol:	C	m. p. sublimes:	~3550°C
Atomic number:	6	Boiling point:	4200°C
Atomic weight:	12.0107	Evaporation Temp	2400°C
Group number:	:14	(at which a substance has a vapor pressure of 1.33 x 10 ⁻² mbar):	
Period number	2	Density:	1.85 g/cc
CAS I.D.:	7440-44-0	Shore Scleroscope	45
Block:	p-block	Hardness:	
Specific gravity :	2.2 g/cm ³	Resistivity Ohms-in:	4.0 x 10 ⁴
(graphite)		Ash Content	<2 ppm
Specific gravity:	3.51 g/cm ³	Flexural Strength:	8000 lb/in ²
(diamond)		Porosity:	16.5%
Specific gravity:	1.88 g/cm ³		
(amorphous)			



► Carbon Cord/Carbon Fiber

Sometimes referred to as 'braid', carbon fibre consists of eight separate strands of individual carbon fibre braided together. The fibre is manufactured so that, when cut, the ends resist unravelling. The fibre density is about 1.6g/m



Used With: Most carbon coaters where thick carbon cord is used

91047-1	Carbon Fibre Cord - high purity (1m)	each
91047-5	Carbon Fibre Cord - high purity (5m)	each

Convenient to use, giving thick coating using a single length. 1m length

91046-1	Carbon Fibre Cord - standard grade (1m)	each
91046-10	Carbon Fibre Cord - standard grade (10m)	each
91046-100	Carbon Fibre Cord - standard grade (100m)	each

Description: Convenient to use, giving thin to medium coating using a single strand or several lengths. 1m length

91045	Carbon Fibre - fine strands (1m)	each
91045-10	Carbon Fibre - fine strands (10m)	each
91045-100	Carbon Fibre - fine strands (100m)	each

➤ **Carbon Rod Sharpener**



Sharpens either 1/4 inch or 1/8th inch rods.

Simply insert the blunt carbon rod into the collet and push button on the side of housing. Rotate collet to produce 1 mm diameter tip in about three to four seconds.

To reduce the possibility of tip breakage, stop the motor before withdrawing the sharpened rod.

This sharpener produces straight sided tips. To make pencil form rods, use a regular pencil sharpener.

Cat. #	Description	Qty.
70305-10	Electric Carbon Rod Sharpener, 110V	each
70305-20	Electric Carbon Rod Sharpener, 220V	each

➤ **Hand Tool For Creating Two Step Carbon Rods.**



Comes complete with brass adjustment tool.

Cat. #	Description	Qty.
70305-40	Two Step Carbon Rod Sharpener, for 1/4" rods	each
70305-45	Replacement Blades for, for 1/4" rods	each

➤ **Manual Carbon Rod Sharpener**



Used to sharpen rods into 1 millimeter cylindrical tips

Cat. #	Description	Qty.
70305-60	Carbon Rod Sharpener (1/8" [3mm] rods)	each
70305-65	Carbon Rod Sharpener (1/4" [6.2mm] rods)	each
70305-70	Cutter Replacement for Carbon Rod Sharpener	each

➤ **Amberclens Foam Cleanser**



A multipurpose anti-static foaming cleaner. Ideal for general cleaning on a wide variety of Laboratory, industrial, aerospace and commercial equipment.

Removes tough, stubborn stains such as grease, grime, and dirt

Anti-static formulation, reduces the attraction of airborne dust

Cat. #	Description	Qty.
68551-13	Amberclens Foam Cleanser	400 ml

Safety Precautions in Electron Microscopy Laboratories

Chemicals

Treat all fixatives with respect, they will fix your tissue too.

Osmium Tetroxide

1. Handle ampoules with disposable gloves.
2. Use double bottles and seal with parafilm.
3. Open only in a fume hood, and well-ventilated room.
4. Do not hold your breath when using OsO₄. Your nose is a very sensitive detector of dangerous fumes.

Aldehydes

1. Handle in fume hood.
2. Acrolein-See Osmium precautions.

Buffers

Some buffers (e.g. Cacodylate and Veronal) contain toxic components, and must be handled with caution. Use gloves at all times.

Propylene Oxide

A very volatile solution. Must be opened and used at room temperature. Never heat, store cool.

Embedding Resins

Most embedding resins may cause dermatitis.

1. When preparing the mixtures and during embedding procedures, ALWAYS use disposable gloves.
2. Cover working areas with paper towel or diapers and wipe spills immediately with alcohol.
3. Do not use alcohol to remove resins from your skin, it increases penetration. Use soap & water.
4. Get medical attention for any suspicious skin rash.
5. Harden all waste resin before disposal, wrap discarded containers, beakers, vials, pipettes, etc. carefully.
6. Never pour any plastic containing solutions (e.g., propylene oxide-epon mixture) down the drain. They will harden.
7. Store in fume hood, until disposal, all hardened waste: RESINS, RESIN MIXTURE AND FILM MAKING SOLUTIONS (A coffee can or large bottle can be used).

Sharp Objects

Glass knives, razor blades and scalpel knives are still sharp after being used. Discard only in containers provided for that purpose, or well sealed, and labeled cardboard boxes, so cleaning personnel will not be injured.

Equipment

1. Most vacuum evaporators do not have a safety switch to turn off power before opening the bell jar. Follow the instructions on the equipment. Never observe metal evaporation without goggles. The intense brightness can burn your retina.
2. Critical Point Dryers are potentially lethal. Do not observe them in use unless you understand the danger.

Note: Never attempt to operate any equipment without prior instruction by other people in the lab or without reading the operation instructions carefully.

► Sputter Targets

EMS precious metal sputtering targets are made from high purity metals, starting 99.99% with most standard disc sizes, for use on most sputtering units from many manufacturers: Emitech, Emscope, Bio-Rad, Polaron, Edwards, Balzers, Plasma Sciences, Technics Hummers, Denton, Cressington, and much more.

Our targets comes in a standard thickness of 0.1mm (100µm). Other thickness, ranging from 0.05 to 6mm, are available upon request. Targets are available mounted or unmounted whichever you prefer. For mounting please always state the make and the model of the sputtering unit so we can tend to it for you. Targets in other materials such as Chromium, Iridium etc are available upon request. We also can manufacture targets with diameters from 4 mm to 304.8mm (12"). Call for pricing.

All other materials and sizes are available upon request for all other machines. The standard thickness for all targets is 0.1mm All other thicknesses are available on request The most commonly requested is 0.2, 0.3mm but all others can be made on special request

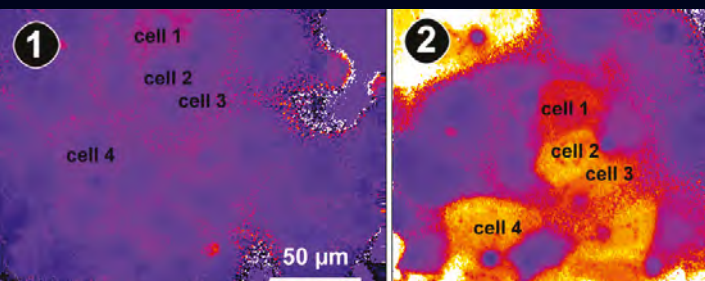
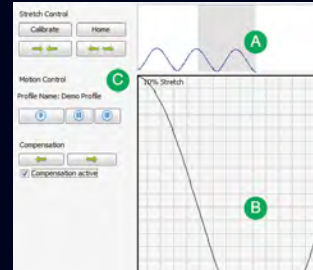
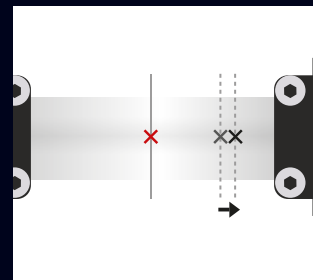
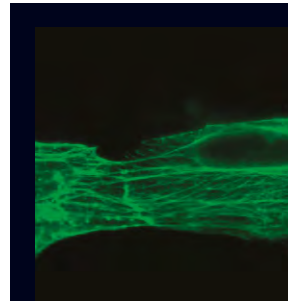
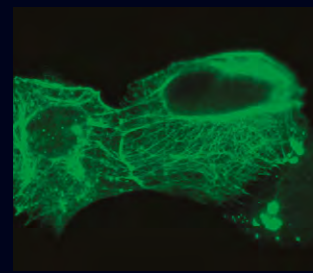


Target Diameter, mm	EMS Catalog Number								
	Gold (Au)	Platinum (Pt)	Palladium (Pd)	Au/Pd 60:40	Pt/Pd 80:20	Silver (Ag)	Nickel (Ni)	Iridium (Ir)	Copper (Cu)
20.0	91006-Au	91006-Pt	91006-Pd	91006-AP	91006-PP	91006-Ag	91006-Ni	91006-Ir	91006-Cu
20.4	91007-Au	91007-Pt	91007-Pd	91007-AP	91007-PP	91007-Ag	91007-Ni	91007-Ir	91007-Cu
32.0	91008-Au	91008-Pt	91008-Pd	91008-AP	91008-PP	91008-Ag	91008-Ni	91008-Ir	91008-Cu
39.0	91009-Au	91009-Pt	91009-Pd	91009-AP	91009-PP	91009-Ag	91009-Ni	91009-Ir	91009-Cu
42.0	91013-Au	91013-Pt	91013-Pd	91013-AP	91013-PP	91013-Ag	91013-Ni	91013-Ir	91013-Cu
50.0	91014-Au	91014-Pt	91014-Pd	91014-AP	91014-PP	91014-Ag	91014-Ni	91014-Ir	91014-Cu
50.8	91015-Au	91015-Pt	91015-Pd	91015-AP	91015-PP	91015-Ag	91015-Ni	91015-Ir	91015-Cu
54.0	91016-Au	91016-Pt	91016-Pd	91016-AP	91016-PP	91016-Ag	91016-Ni	91016-Ir	91016-Cu
57.0	91017-Au	91017-Pt	91017-Pd	91017-AP	91017-PP	91017-Ag	91017-Ni	91017-Ir	91017-Cu
60.0	91010	91012	91010-Pd	91011	91010-PP	91010-Ag	91010-Ni	91010-Ir	91010-Cu
63.5	91018-Au	91018-Pt	91018-Pd	91018-AP	91018-PP	91018-Ag	91018-Ni	91018-Ir	91018-Cu
75.0	91019-Au	91019-Pt	91019-Pd	91019-AP	91019-PP	91019-Ag	91019-Ni	91019-Ir	91019-Cu
76.0	91020-Au	91020-Pt	91020-Pd	91020-AP	91020-PP	91020-Ag	91020-Ni	91020-Ir	91020-Cu
Annular Targets (Outside Diameter x Inside Diameter, mm)									
1170D x 89 ID	91030-Au	91030-Pt	91030-Pd	91030-AP	91030-PP	91030-Ag	91030-Ni	91030-Ir	91030-Cu
87 OD x 57 ID	91031-Au	91031-Pt	91031-Pd	91031-AP	91031-PP	91031-Ag	91031-Ni	91031-Ir	91031-Cu
59 OD x 33 ID	91032-Au	91032-Pt	91032-Pd	91032-AP	91032-PP	91032-Ag	91032-Ni	91032-Ir	91032-Cu
57 OD x 40 ID	91033-Au	91033-Pt	91033-Pd	91033-AP	91033-PP	91033-Ag	91033-Ni	91033-Ir	91033-Cu

Target Diameter, mm	EMS Catalog Number								
	Chromium (Cr)	Tungsten (W)	Carbon (C)	Titanium (Ti)	Iron (Fe)	Cobalt (Co)	Molybdenum (Mo)	Magnesium (Mg)	Tantalum (Ta)
20.0	91006-Cr	91006-W	91006-C	91006-Ti	91006-Fe	91006-Co	91006-Mo	91006-Mg	91006-Ta
20.4	91007-Cr	91007-W	91007-C	91007-Ti	91007-Fe	91007-Co	91007-Mo	91007-Mg	91007-Ta
32.0	91008-Cr	91008-W	91008-C	91008-Ti	91008-Fe	91008-Co	91008-Mo	91008-Mg	91008-Ta
39.0	91009-Cr	91009-W	91009-C	91009-Ti	91009-Fe	91009-Co	91009-Mo	91009-Mg	91009-Ta
42.0	91013-Cr	91013-W	91013-C	91013-Ti	91013-Fe	91013-Co	91013-Mo	91013-Mg	91013-Ta
50.0	91014-Cr	91014-W	91014-C	91014-Ti	91014-Fe	91014-Co	91014-Mo	91014-Mg	91014-Ta
50.8	91015-Cr	91015-W	91015-C	91015-Ti	91015-Fe	91015-Co	91015-Mo	91015-Mg	91015-Ta
54.0	91016-Cr	91016-W	91016-C	91016-Ti	91016-Fe	91016-Co	91016-Mo	91016-Mg	91016-Ta
57.0	91017-Cr	91017-W	91017-C	91017-Ti	91017-Fe	91017-Co	91017-Mo	91017-Mg	91017-Ta
60.0	91010-Cr	91010-W	91010-C	91010-Ti	91010-Fe	91010-Co	91010-Mo	91010-Mg	91010-Ta
63.5	91018-Cr	91018-W	91018-C	91018-Ti	91018-Fe	91018-Co	91018-Mo	91018-Mg	91018-Ta
75.0	91019-Cr	91019-W	91019-C	91019-Ti	91019-Fe	91019-Co	91019-Mo	91019-Mg	91019-Ta
76.0	91020-Cr	91020-W	91020-C	91020-Ti	91020-Fe	91020-Co	91020-Mo	91020-Mg	91020-Ta
Annular Targets (Outside Diameter x Inside Diameter, mm)									
1170D x 89 ID	91030-Cr	91030-W	91030-C	91030-Ti	91030-Fe	91030-Co	91030-Mo	91030-Mg	91030-Ta
87 OD x 57 ID	91031-Cr	91031-W	91031-C	91031-Ti	91031-Fe	91031-Co	91031-Mo	91031-Mg	91031-Ta
59 OD x 33 ID	91032-Cr	91032-W	91032-C	91032-Ti	91032-Fe	91032-Co	91032-Mo	91032-Mg	91032-Ta
57 OD x 40 ID	91033-Cr	91033-W	91033-C	91033-Ti	91033-Fe	91033-Co	91033-Mo	91033-Mg	91033-Ta

Computer Controlled Cell Deforming — Cell Stretcher

Cell Stretcher CS-10 Series

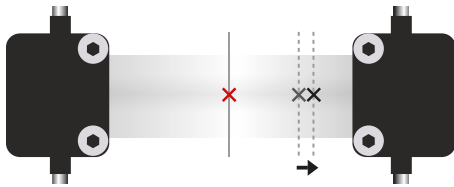


**Electron
Microscopy
Sciences**

► Cell Stretcher CS-10 Series

OVERVIEW:

Various different cell types in the body experience mechanical forces and the effect of cell stretch, compression or other mechanical stimuli has become a new and important scientific focus. Many devices have been developed to stretch cells. Usually the cells are cultivated on elastic membranes and the entire membrane is deformed to deform the attached cells. This approach has been proven useful but suffers one big disadvantage: If cells are to be imaged during or after the membrane is deformed, the cells are displaced relative to the optical axis of the microscope and a microscopic observation becomes virtually impossible. As shown in the figure below only the part in the center portion (red X) remains stable relative to the objective of the microscope, when the membrane is stretched.



Our dcCS10-compensation is moving the entire membrane during the stretch so that it counteracts this displacement. As a result the region of interest is still precisely positioned above the objective of the microscope during (and after) the stretch.

The benefit: **Cells can be imaged even during stretch!**

When cells are grown on an elastic membrane and strain is applied to the membrane, only the center portion of the membrane can be used for imaging because only this part remains at its initial position relative to the objective of the microscope. This is a serious disadvantage as only those cells are available for microscopical investigation that have grown in this center portion of the membrane. We developed a computer-controlled stretch device that overcomes this impediment by using active motion compensation. With our new stretcher cells can either be subject to uni-axial strain or strain relaxation (compression) and it allows to simultaneously image the cells at high optical resolution. This is possible at any position on the membrane while strain or compression is applied. Numerous other features have been implemented to ensure easy handling of cells — during prolonged cell culture in the incubator as well as on the microscope.

detailed description of the device:

summary

This compact cell strain device makes it possible to perform life cell imaging studies where a rapid image acquisition is required, such as observing changes of the intracellular Ca²⁺ concentration

when cells are mechanically stimulated. A big advantage of this cell strain device is its stretching chamber, which allows to use commercially available PDMS sheets. The sheets are transparent and as a consequence it is possible to perform regular bright field as well as epi-fluorescence microscopy with an inverted microscope. The commercially available PDMS substrates are thin enough to use even oil immersion objectives. The cell strain device is not operated by the microscope software but the program is running on a separate computer — a small laptop or even a net book with the appropriate interface is sufficient. This enables the scientist to use the stretcher on any microscope and regardless of the image acquisition software installed. Naturally the device can also be used without the microscope.

stretch/compression device

Figure 1 below shows a schematic of the device. The strain/compression device consists of two different components with different functions.

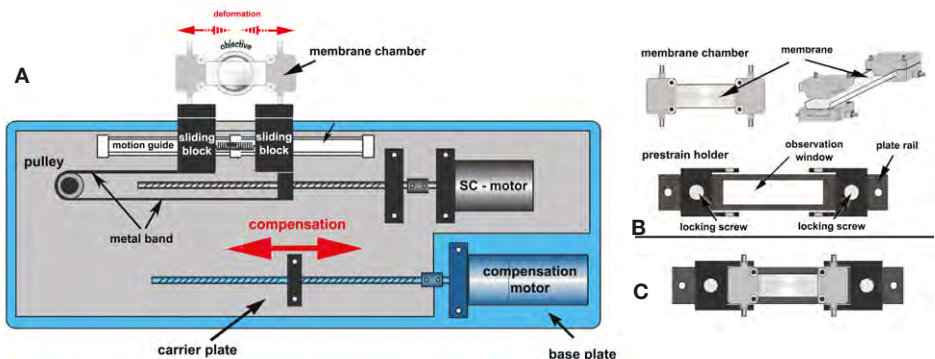


Figure 1. Schematic of the strain/compression (SC) device.

A: The SC-device with the membrane chamber attached is mounted on the microscope. The carrier plate is shown in gray with all attached components in matching colors. The SC motor is mounted on the carrier plate and deforms the mounted membrane chamber by moving the sliding blocks via a ball screw and a metal band (see also text). To compensate the stretch-induced lateral displacement the carrier plate is moved laterally with the ball screw driven by the compensation motor (both in blue). The red arrows show the movements of the membrane holders during deformation and the movement of the carrier plate to compensate the lateral displacement.

B: The membrane chamber shapes the elastic membrane into a tray that is used to cultivate the cells. In the view on the top right one of the holders is shown before assembly. Two double hooks of the prestrain holder (bottom) are holding the membrane chamber and can be moved freely along the plate rail and fastened at any position with two screws.

Observation of the membrane chamber with a regular cell culture microscope through the observation window allows inspection of the cells during cultivation of the cells without removing it from the prestrain holder.

C: Membrane chamber and prestrain holder are readily assembled. The next steps are usually autoclaving and coating of the membrane followed by seeding the cells into the tray.

► Cell Stretcher CS-10 Series (continued)

One component deforms the membrane, which allows the user to strain a mounted membrane chamber or to compress a prestretched membrane chamber. The other component compensates the undesirable lateral displacement by moving the entire carrier plate (see figure 1A) along the strain/compression axis. The synchronous interplay of these two components keeps any desired region of the membrane at the same position while applying strain or compression. The deformation component is made of two sliding blocks where the membrane chamber is mounted during the experiment. To stretch the membrane the two blocks slide in opposite directions on a linear motion guide thereby changing the length of the membrane chamber and deforming the cells. One sliding block is directly displaced by the SC motor via a ball screw whereas the other sliding block is pulled in the opposite direction by an attached metal band and a pulley mechanism (see also figure 1A). Any movement of the motor driven block leads to a displacement of the other block for the same amount by the pulley mechanism. A spring tethers both sliding blocks to provide a permanent pulling force. This provides the necessary counterforce keeping the metal band under tension. Increasing the distance between the two blocks requires the motors, whereas the passive, attractive force of the spring allows to decrease the distance (see arrows in figure 1A).

To compensate the lateral displacement of the membrane the carrier plate is laterally moved by the compensation motor along a linear motion guide (not shown in figure 1). As all parts of the deforming component are fixed to the carrier plate, this component is moved as a whole. The two DC servo motors (compensation and SC-motor) are connected to an external control unit and controlled by a computer with a custom written software (see also below). The software not only calculates how much the carrier plate has to be moved to compensate the stretch-induced displacement but also provides a



convenient graphical user interface to design to stretch protocol. It allows the user to do the following:

- 1) Any desired strain protocol, including cyclic protocols with different characteristics (linear, sinusoidal, sigmoidal) can be programmed. This includes pauses or loops to insert static phases or to repeat a specific sequence.
- 2) The position of the membrane chamber along the stretch axis can be changed independently from movements for motion compensation.
- 3) For mounting the membrane chambers the distance of the two sliding blocks of the SC component can be adjusted. Thus membrane chambers of any length (within the limits of the device) can be mounted which allows to also mount prestrained membranes and to compress cells.

membrane chamber including prestrain holder

The membrane chamber comprises the membrane holders and the transparent membrane (thickness 127 microns). The membrane holders clamp the membrane so that it assumes a flat bottom with two side walls (angle of ca. 60°). So a tray is formed which allows to use the chamber like a regular culture dish. In figure 1B (top right) a side view of the membrane chamber during assembly is shown. One of the two membrane holders is shown before clamping the membrane to illustrate the mounting process. Once the membrane chamber

is assembled it is hooked onto the prestrain holder where it typically remains during the entire remaining procedure (autoclaving, surface coating, seeding of the cells). The membrane chamber conveniently fits in a regular 15cm culture dish, which allows sterile handling outside a sterile work bench and even to monitor cell growth in a conventional cell culture microscope with a low magnification objective. Two metal rods in the membrane holders are used for mounting the membrane chamber onto the two sliding blocks of the SC component. The rods and the sliding blocks are designed to easily mount and unmount the membrane holder from the device and to perform all necessary steps without deformation of the membrane which might lead to an unwanted deformation of the cells before the actual stretch. The two membrane holders can slide along a plate rail (see figure 1B) and can be locked at any desired prestrain with two locking screws. Mounting the membranes with prestrain is not only necessary for a later compression of the cells in the SC-device but usually the membrane is mounted with a slight prestrain (ca. 20%) to flatten the bottom of the membrane. Naturally, if cells have to be compressed the prestrain needs to be high enough so that the membrane still remains under tension after relaxation. The upper limit for prestrain (and therefore compression) is ca. 100% and defined by the total strain that can mechanically be applied to a membrane and by the stretch resistance of the membrane.

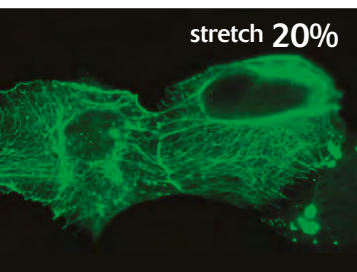


► Cell Stretcher CS-10 Series (continued)

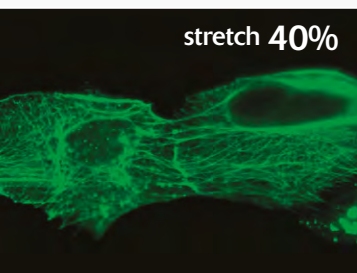
Realtime Observation:



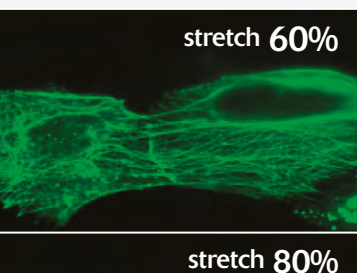
stretch 0%



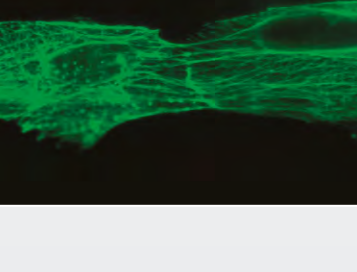
stretch 20%



stretch 40%



stretch 60%



stretch 80%

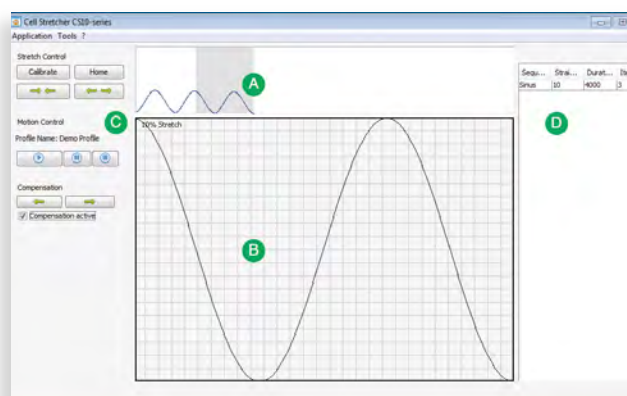
Cultivated cells respond to a mechanical stimulus in various different ways and visualization of these responses has become an important tool to investigate mechanotransduction. Microscopic techniques, especially fluorescence detection methods, are steadily improving and countless fluorescence dyes and labeling methods are available to address cell-biological questions related to mechanical stimulation of cell. Examples are Ca^{2+} -sensitive dyes for measuring

Ca^{2+} dynamics in alveolar cells of the lung in the course of the respiratory cycle and dyes that address topics like lipid trafficking, membrane stress failure and repair mechanisms. Besides fluorescence dyes also the broad spectrum of fluorescent proteins can be used for life cell imaging in mechanobiology. Techniques such as fluorescence resonance energy transfer (FRET), fluorescence recovery after photo bleaching (FRAP) and other methods can be used to address questions even on a molecular level. Unfortunately, it is difficult to combine fluorescence life cell imaging with mechanical stimulation of cells, especially when cells are deformed by globally deforming an elastic growth substrate, which is a widely used method to stretch cultivated cells. Only the center part of the stretched growth substrate remains in a constant position relative to the objective of the microscope and therefore only cells in this part can be visualized properly when the stretch is maintained or when cellular responses should be detected even during the stretch. For observing other cells the stage of the microscope has to be repositioned to recover the specimen after deformation. For many reasons this task is often impossible and even if the microscopist succeeds it takes up to several minutes to relocate the area of interest. The SC device was designed to overcome this problem by automatically compensating the stretch-induced lateral displacement. The figure on the left shows the cytokeratin network in keratinocytes that were stretched up to 80% of their initial length.

Computer Control:

As mentioned above the stretching software is not part of the image acquisition software. The figure below demonstrates the main features of the user interface: Stretch Control (left at top) to adjust the distance of the sliding blocks, Motion Control (left, below Stretch Control) to start/pause and stop the stretch protocol, Compensation (left, below Motion control) to activate the compensation, Profile Editor (right, upper window) and Segment Properties (right, lower window) to define the stretch protocol.

There are several basic elements to create a stretch protocol: Sinusoidal change, linear change, sigmoidal change and pause. All elements can be combined with each other and the specific properties of each element can be modified with the segment properties function.



- A** Shows an example for a stretch profile.
- B** A magnified view of any desired region in the profile (grey overlay in A) can be displayed.
- C** The user-friendly surface allows to calibrate the device and also to operate it manually.
- D** In a separate window the sequence of the single steps as well as the parameters for each individual single step can be programmed.

minimum requirements

Software based on "JAVA"	1024 MB RAM
Windows 2000 or above.	100 MB free space on disc
Pentium 4	1024 x 768 screen resolution

► Cell Stretcher CS-10 Series (continued)

Motion Compensation:



How does the motion compensation work?

The motion compensation is not based on a feedback mechanism that recalculates the position from new image data but it is entirely based on the distance of the area of interest from the center of the membrane. To keep the specimen in the field of view of the microscope during stretch or compression of the cells the SC-device simply has to “know” the position of the membrane. This is achieved by calibrating the device once before mounting the membrane chamber onto the device and using only the software of the SC-device afterwards when the membrane chamber has to be moved along the axis parallel to the stretch/compression. Our uni-directional stretch device produces a homogeneous strain field regardless of the distance to the holders where the membrane is clamped. Thus the displacement of any point is defined by a simple linear correlation that depends on the distance between the observed point from the center of the membrane. A point at the very center of the membrane is not moved out of the optical axis whereas the displacement becomes larger with increasing distance from the center. Using a simple algorithm it is possible to predict this displacement and to counteract it. The system is designed in a way that both motors — the SC-motor and the compensation motor — are operated simultaneously so that there is virtually no delay between cell stretch/compression and compensation.

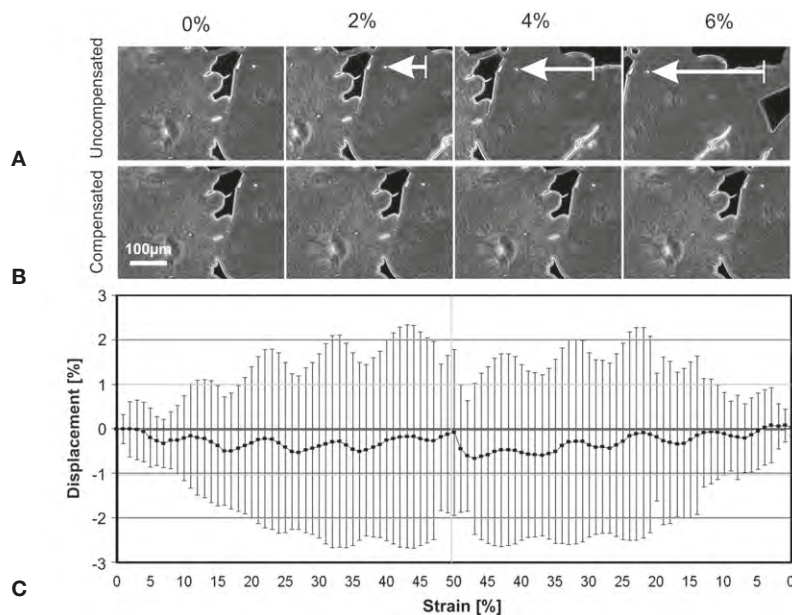


Figure 2

A: To demonstrate the displacement without motion compensation a membrane was stained with ink and a region 3mm away from the center of the membrane chamber was observed during stretch. A stretch of 6% was already moving most of the original area of interest out of the field of view.

B: With the motion compensation activated, the region of interest remains in the field of view of the microscope.

C: Measuring the relative displacement of 5 points on the membrane (all at a distance from the center between 2mm–4mm) we can show that even a stretch of 50% leads to only minor displacement with motion compensation. The mean relative displacements and the standard errors are shown.

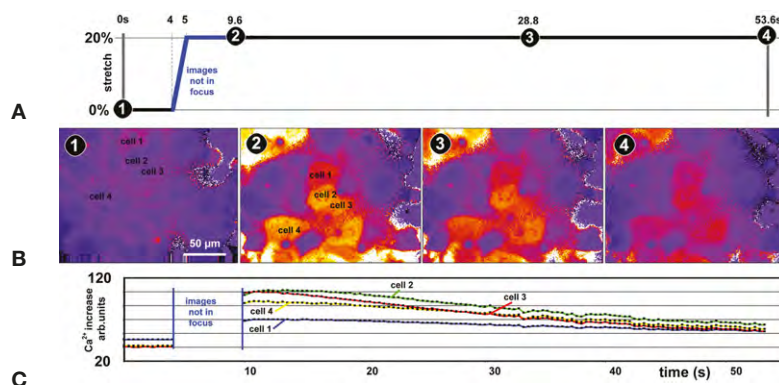


Figure 3. Image acquisition of ATI1 cells subject to one fast single stretch with motion compensation applied.

A: Cells were stretched with a simple protocol (20% stretch within 1s) and continuously imaged for 53.6s. The blue part of the time line illustrate the time where images were not in focus.

B: Four images of the sequence (numbers are shown in A) show ratiometric images of the Ca^{2+} dye Fura-2. The false color images (from low to high Ca^{2+} concentrations: blue-red-yellow-white) were calculated from 2 consecutive images acquired with different excitation wavelengths. Images were acquired with a 40x oil immersion objective. The position of the region was ca. 1mm off the center of the membrane parallel as well as perpendicular to the stretch axis. The vertical shift of the image between panels 1 and 2 is caused by the displacement perpendicular to the stretch axis.

C: The Ca^{2+} signal was quantified and the time course is shown. It demonstrates that the four cells indicated show a slightly different Ca^{2+} response.

► Cell Stretcher CS-10 Series (continued)

The membrane chamber and the prestrain holder also provide a convenient and save way to handle and cultivate the cells. The holder with the mounted chamber fit in a regular 150mm cell culture dish allowing sterile handling and incubation of the cell in a conventional CO₂ incubator. Moreover the cells in the dish can be observed with simple cell culture microscope at low magnification for brief inspection without removing the holder from the dish.

ORDERING INFORMATION:

mcCS10 – Manual Controlled

Dimensions: 18cm (w) x 11.5cm (t) x 2.5cm

Weight: 0.8kg

Powersupply: 1 battery, SR44 and 4 units of holder/mounting included

EMS #	Description	
1000	mcCS10 – Manual Controlled	each

dcCS10 – Linear

Dimensions: 33cm (w) x 7.5cm (h) x 4.5cm

Weight: 2kg

Powersupply: 110V/220V 50HZ switchable and 4 units of holder/mounting included

EMS #	Description	
1010	dcCS10 – Linear	each

dcCS10 – Compensation

Dimensions: 40cm (w) x 6.5cm (h) x 6.5 cm

Weight: 3.2kg

Powersupply: 110V/220V 50Hz switchable and 4 units of holder/mounting included

EMS #	Description	
1020	dcCS10 – Compensation	each

dcCS10 – Biaxial

Dimensions: 24cm (w) x 23cm (h) x 11cm

Weight: 6.2kg

Powersupply: 110V/220V 50Hz switchable, included

EMS #	Description	
1030	dcCS10 – Biaxial	each

Holder

Dimensions: 100mm (w) x 31(40)mm (h) x 15 (21)mm

Weight: 68g

Fits for "cell culture dish" diameter 145mm x h21mm

EMS #	Description	
1040	Holder	each

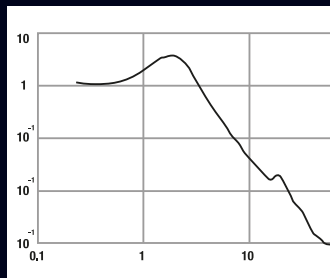
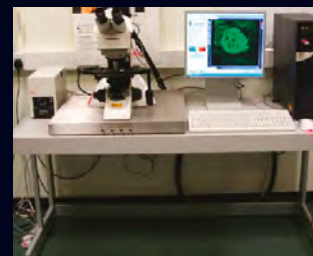
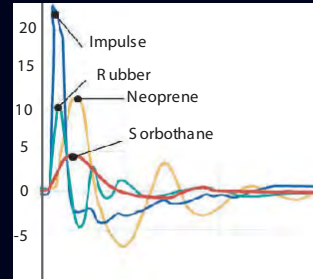
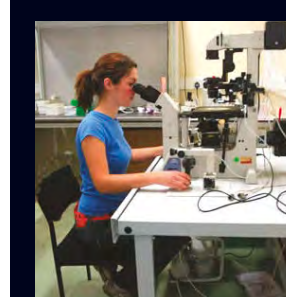
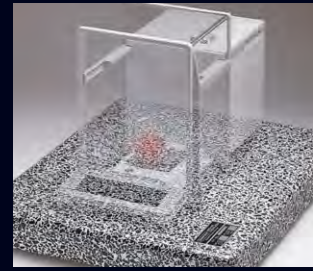
Membrane

Dimensions: 30mm (w) x 60mm (h) x 0.127mm (.005" thick)

EMS #	Description	
1050	Membrane	25/pk

Vibration Isolation Products

Vibration Tables
Balance Workstations
Isolation Platforms



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► Vibration Isolation Products

Creating the best environment for microscopy

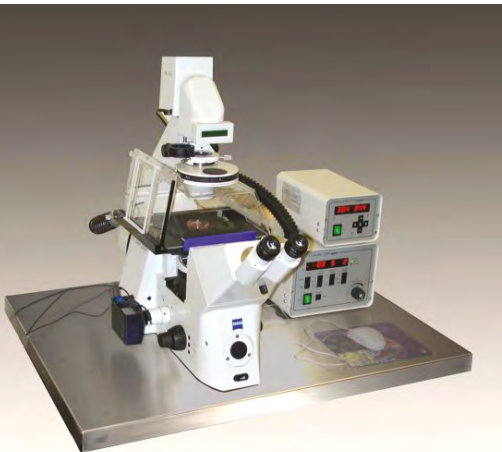
Overview

Vibrations limit the performance of sensitive instruments in numerous applications. Thus the need to remove vibrations to optimize performance has become crucial. We have spent many years developing state-of-the-art workstations and platforms, which provide the user with a truly vibration free surface on which the user can place equipment. Our products are available in a wide range of sizes and shapes to support instruments of varying weights and footprints.

Features

- 2Hz natural frequency built-in air isolators
- Active self leveling and passive pump up versions
- Highly rigid laminated construction with damping core
- Low cost, easy to install and free from maintenance
- Ideal for laboratories and clean rooms, will meet Class 10 (Class 1 available)
- Simple, compact, easy to use and clean
- Wide range of sizes, options and accessories

Confocal Laser Microscope



Theory

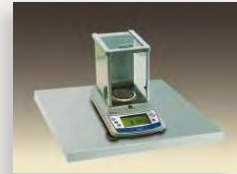
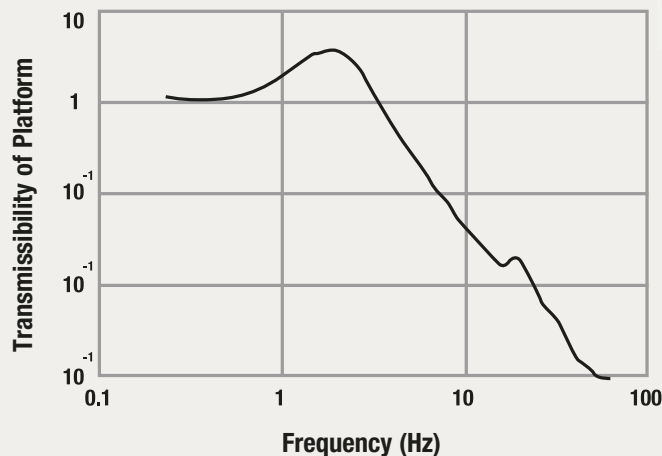
Elimination of movements from a working surface is achieved by isolating it from any external influences such as the floor and the structure itself is rigid and damps out any induced surface movements (fans etc.). The major sources of external disturbances are vertical and horizontal floor movements.

Floor vibrations arise from many sources; road traffic, trains, large machinery, lifts and building sway are among common examples. Typically building vibrations peak in the region of 7 Hz, however a metal frame building of height H has a resonance of roughly $46/H$ hertz, which means that on the fifth floor of a building you can expect horizontal and vertical displacements as low as 3 hertz. Floors almost never exhibit periodic vibrations in the 1 to 3Hz band.

The measure of the effectiveness of an isolation system is given by its transmissibility (below). As an approximate rule isolators start to become effective at between two to three times their own natural resonant frequency. Thus to remove vibrations at 7Hz an isolator with a natural frequency of about 2Hz is required.

The performance of an isolator depends on its stiffness and the mass it is supporting. In general isolator performance improves as mass is increased and for optimum performance one should work close to the maximum load an isolation system is designed to support. As an example, it is bad practice to place a 50kg load on a table designed to support 500kg, whereas a load of 200kg or more would be suitable

The load supported by an isolator is calculated by multiplying the air pressure inside the isolator by the area of the piston it is supporting. Thus a piston of 15cm^2 surface area will support 25kg at 2 Bar. As (pressure) x (volume) for an isolator is a constant at any given temperature, increasing the load on an isolator will cause the piston to drop until the pressure has risen sufficiently to support the load. If one wishes to return the platform to its original level, then one must introduce more air into the isolator at the new pressure.



Analytical Balance



Laboratory Microscope



Materials Tester



Semiconductor Bond Tester

Construction

Our platforms combine a highly rigid damped table with an excellent vibration isolation system in one unique package.

It has long been accepted that the best isolation is achieved using pneumatic isolation chambers, which utilise high performance rolling diaphragms. All our isolators contain such a specially designed diaphragms.

Our isolators are also connected to a damping volume via a tuned restrictor. The restrictor absorbs system energy by converting air movements into heat as it is forced through the restrictor. This removes the overshoot and oscillations, which occur in isolators without dampening chambers and highly specialised restrictors such as ours.

We use a low isolation volume to damping volume ratio, which means that the working surface appears stiff to the touch (as all large low frequency disturbances are rapidly damped away). Small higher frequency disturbances are removed by the isolator chamber, these have a resonant frequency (dependant on version and load) typically in the range 1.5 to 2Hz. and whose characteristics are given in the transmissibility curves.

Our platforms feature a seamless steel top finished in either a grey epoxy powder coat or optionally made from dull polished stainless steel. Both finishes meet the Class 10 requirements. The stainless finish may be required in certain environments and we would be pleased to advise on this. The tops are formed by laminating a highly damping core between two steel plates using high strength aerospace grade adhesives, a technique we developed in producing our range of high performance optical tables and breadboards.

Four isolators, airflow restrictors and damping volumes are integrated into the platforms, which allow the working surface to float freely away from its base during operation. The natural frequency is typically 2Hz both vertically and horizontally and is suitable for all but the most sensitive instruments, where our low frequency option should be selected. We offer a choice of active and passive platform versions.

In active platforms, each isolator is connected to a self-leveling arm, which can be externally adjusted to set the height of the platform and level it. They should be chosen when the load on a table is expected to vary frequently. These platforms require a continuous supply of air. This can be provided by a compressor or using a gas bottle (suitable for months of normal operation and ideal for clean room uses).

Passive platforms are designed for applications where load does not vary. This includes balance tables, which are designed for light loads where the platform is weighted to give good performance.

Platforms are manufactured in one location using state-of-the-art automated machinery to guarantee high tolerances and consistency while keeping costs low. Our products are assembled by a highly skilled workforce and rigorous quality control is applied throughout the manufacturing process.

Excellence in design

Great care has been taken in the design of our products to ensure they achieve the highest levels of performance while being easy to use and to clean thoroughly. With isolation design optimized for use in microscopy and surface design optimized for easy cleaning, our tables are ideal solutions for use in general purpose microscopy to cleanrooms and Biohazard areas.

- Excellent working environment
- Comfortable ergonomic design
- 240grade silicon stainless steel surface available

A better working environment

Platforms and workstations improve the environment for microscopes with all the features necessary to make your work easier. Workstations provide a tailored working environment as well as featuring an isolation platform built into the work surface, making working with a microscope both faster and easier, leading to more reliable measurements in your laboratory. Platforms can also be used stand alone beneath microscopes to isolate them from external disturbances and speed up measurement.

Vibration Control

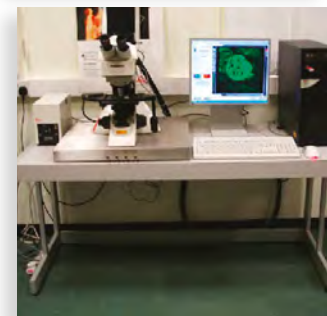
The AMF and AMP platforms offer the ultimate performance, incorporating four 2Hz damped rolling diaphragm air isolators, efficiently isolating frequencies from 6Hz and upwards. The AMS tables incorporate Sorbothane isolators, giving excellent isolation with a natural frequency of less than 7Hz. Our isolators considerably outperform both simple air cushion and rubber isolators, shortening stabilisation times and speeding up measurements.

Flexible Solutions

We offer a range of workstations and platforms to suit different environments and microscope performance levels. Workstations feature a platform mounted on a study steel frame with height adjustable leveling feet and guards to protect the table from accidental knocks during use.

Ergonomic Design

The ergonomic workstation design minimises user stress. With the active area option microscope platforms sit flush with the work surface and the surrounding area is useable for general work without disturbing measurements. Frames have height adjustable leveling feet, for excellent stability and user comfort with retractable castor feet, frame shelf and monitor support optional.



► Selecting a platform

To select a platform you must first decide on the size of the working surface you require, the load it needs to support and the sensitivity of the equipment to vibrations; from this you can determine the class of product you require. You then need to decide whether you will require it to be floor mounted and what type of air supply would be best suited. We would be pleased to assist you and answer any questions you may have.

Active Platforms: AMF Series

These platforms are self-leveling and ideal for use when loads on the platform are likely to change. They can support up to 160kg and are available in a range of standard sizes from 60x60cm up to 150x90cm. Their low 6cm working height and low weight makes them ideal for use on desks and benches.



Passive Platforms: AMP Series

These platforms are designed to be pumped-up and left alone. Simple to use, they are ideal for use with fixed loads or in applications where pressurised air or gas cannot be used. They support loads up to 160kg and sizes range from 60x60cm to 150x90cm with a 6cm working height.



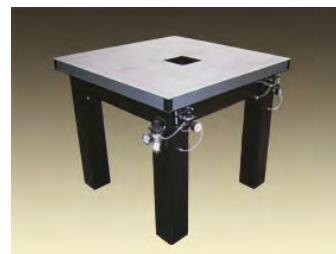
Balance Tables: AMB Series

These passive platforms are weighted to 25kg and are for use with light instruments such as balances. They support loads to 120kg and are available in three sizes, 45x30cm, 40x50cm and 60x60cm. Their small footprint also makes them ideal for use when space is at a minimum. Working height is 6cm.



High Load Workstations: AMH Series

These workstations are designed for heavy instruments such as electron microscopes, which require high degrees of isolation from vibrations. They comprise a highly rigid platform supported on a sturdy isolation frame fitted with leveling feet.



The platform is fabricated by laminating two 5mm thick ferromagnetic steel plates to a 5cm thick aluminium close cell honeycomb core using aerospace grade adhesives.

The resultant plate has excellent compliance characteristics and its rigidity is suitable for supporting large loads up to 1500kg.

The vibration isolators are built into the legs of the frame. Each leg contains a low natural frequency rolling diaphragm isolator connected to a damping volume via a tuned flow restrictor, giving a highly damped system with a natural resonance (at high load) of around 1.1Hz. The isolation system is active with a self-leveling arm attached to each leg allowing the platform to be levelled as required and to compensate for varying loads. The isolators are available in two versions, the standard version for loads up to 500kg and a heavyduty version for loads to 1500kg. The standard platform is available in a range of sizes from 90 x 90cm to 150 x 120cm.

Contoured Platforms: AMC Series

This light and compact passive platform has been specially designed for instruments such as microscopes. Its T-shaped profile allows users to place their arms on either side of the platform while the width at the rear is large enough to support a wide range of instruments.



The AMC Series is available in two different construction materials. Starting with the AMC-12, -12S, and 13, these platforms are made entirely from electroless Nickelplated aluminium parts and is suitable for Class 1 requirements. The top plate is 1cm thick with three damped isolators mounted to the underside.

The AMC-7 platform is made from high grade steel parts welded together for rigidity and coated with a tough epoxy powder white finish. It is resistant to most forms of biological and chemical attack and isolators are simply removed making cleaning easy. The platform top plate incorporates three elastomeric isolators which remove over 97 percent of horizontal vibrations at 50Hz and over 95 percent of vertical vibrations greatly improving instrument performance. These isolators are available in two load ranges, up to 25kgs and from 25 to 75 kgs. Isolators are simply secured by a single thumbscrew and require no adjustments for varying loads.

Sorbothane elastomer isolators have outstanding damping performance compared to isolators that use springs, rubber, orneoprene and so eliminate any rocking or wobble that is a major problem with other brands of platform. Sorbothane rapidly damps down disturbances to the microscope, such as when it is being touched during operation. It greatly improves image quality by protecting microscopes from both horizontal and vertical vibrations emanating from sources such as floors, walls and benching and caused by traffic, lifts, rotating machinery and numerous other sources.

Technical Data:

Platforms	ACTIVE	PASSIVE	BALANCE	HI-LOAD	CONTOURED
Sizes (L x W) cm	60 x 60; 60 x 90; 60 x 120 75 x 90; 75 x 120; 75 x 150 90 x 90; 90 x 120; 90 x 150		45 x 30 40 x 50 60 x 60	90 x 90 90 x 120 120 x 120	36 x 54 (Front 20)
Working Height (cm)	6 (Active with L-F option 11cm)		76	55	
Working Surface	Epoxy powder grey, Stainless Steel optional			Ferromagnetic Stainless	Elec Ni Aluminum
Isolation Type	Rolling Diaphragm Isolator and Damping Chamber				
Natural Frequency	1.5Hz*	2Hz	2Hz	1Hz	2Hz
Height Adjustment (mm)			8	15	5
Self-Leveling	Yes	No	No	Yes	No
Load Capacity (Kgs)	160		120	500/1500 option	150
Air Supply	5 to 10 bar		Pump up	5 to 10 bar	Pump up
Air Connector	6mm, push fit airline		Woods Cycle Valve	6mm, push fit airline	Woods Cycle Valve
Weight (Kgs)	20 to 45		30	120 to 160	5

Natural frequencies may vary dependent on load and other factors. * L-F option

Isolation Platform	AMD-SS	AMD-SA	AMD-ST / AMD-SB
Outer Table Dimensions (WxDxH)	120 x 75 x 75cm	120 x 75 x 75cm	120 x 75 x 75cm
Load Capacity	100kgs	100kgs	100kgs
Surface	Stainless Steel	Stainless Steel	White finish / Stainless Steel
Isolator Type	4 sorbothane passive	4 air rolling diaphragm, passive pump up	4 air rolling diaphragm, Active Air
Isolation Performance	95% at 50Hz, 98% at 98Hz	—	97% at 50Hz, 99% at 98Hz
Natural Frequency	7 Hz	2 Hz	2 Hz
Height Adjustment Range	735 to 765mm	735 to 765mm	735 to 765mm
Weight	55kgs	55kgs	55kgs

Options for Workstations AMD-101 Shelf, AMD-102 Castor Feet, AMD-103 Active Area White Top Plate

Options & Accessories	ACTIVE	PASSIVE	BALANCE	HI-LOAD	CONTOURED
Frame	Yes	Yes	No	Required	No
Height Adjustment (cm)	2.5	—	No	5	No
Castor Feet	Optional		No	No	No
Frame Guard, Monitor Stand, Shelf	Optional		No	No	No

Ordering information

EMS Cat #	Mfr.'s Code	Size cm
AMF Active Air Self Leveling Platform		
6200	AMF-60x60	60x60
6250	AMF-60x90	60x90
6260	AMF-60x120	60x120
6270	AMF-75x90	75x90
6280	AMF-75x120	75x120
6290	AMF-75x150	75x150
6300	AMF-75x150	75x150
6310	AMF-60x120	90x120
6320	AMF-90x150	90x150
AMP Passive Air Pump Up Platform		
6330	AMP-60x60	60x60
6340	AMP-60x90	60x90
6350	AMP-60x120	60x120
6360	AMP-75x90	75x90
6370	AMP-75x120	75x120
6380	AMP-75x150	75x150
6390	AMP-75x150	75x150
6400	AMP-90x120	90x120
6410	AMP-90x150	90x150

EMS Cat #	Mfr.'s Code	Description
Modular Accessories		
6500	F01	Medium Frame for Platform
6510	F02	Frame Shelf
6520	F03	Platform Guard
6530	F04	Platform Shelf
6540	F05	Monitor Stand (needs guard)
6550	F06	Retractable Castor Feet
6560	F08	Arm Rest Bar
6570	F10	Flat Screen Monitor Arm
6580	F15	Gel Arm Rest
6590	F27	Active Area Plate (40x50cm)
6600	F28	Active Isolation Area Top Plate
6610	C01	Silent Compressor
6620	C02	Air Preparation Unit
6630	C03	Mini Compressor

* additional cost applies

Packaging Options for AMF and AMP Series

Crates Platform and with Frame

6480	Up to and including 90x60cm
6490	Crates larger Platform and Frame

Balance Workstations: AMD Series

- Built-in isolation area designed for analytical balance
- Removes up to 99 percent of unwanted vertical and horizontal vibrations
- Flush working area around balance for supporting hardware
- 240 satin silicon 0.4Ra ground stainless steel meets international standards for cleanliness

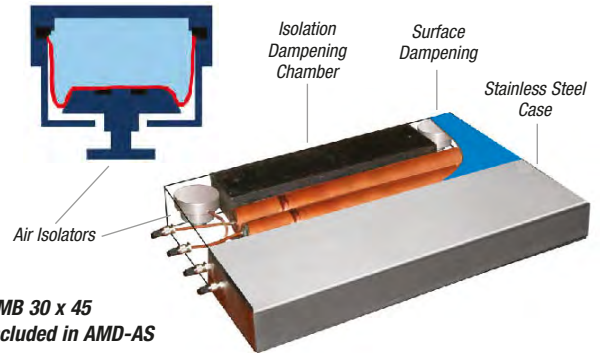
Outperforms rubber and spring isolators and simple granite and steel tables. These workstations remove unwanted vibrations which limit the performance of sensitive instruments such as balances. The top surface is 75x75cm and incorporates a 30x45cm vibration isolation platform, which sits flush with the surrounding table surface in a recess. Instruments are placed directly onto this isolation section of the workstation and isolations are removed by the built-in isolators. Tilting leveling feet on the frame ensure the table sits stably on the floor.



Three versions are available, the ST and SS versions can be easily upgraded to the SA at a later date if required.

Product Details

AMD-SA stainless air table features our AMB-30x45 pneumatic platform. It incorporates four low 2Hz natural frequency rolling diaphragm damped isolators and the platform and table top feature 240 ground satin stainless steel. The isolators are simply inflated via adjustable valves using a bicycle pump.



AMB 30 x 45
included in AMD-AS

AMD-SS stainless version features an AMS-30x45 platform with four 7Hz sorbothane isolators which give an excellent 95 percent isolation at 50Hz. A unique sound deadening core soaks up surface borne vibrations and ensures our tables outperform simple granite and steel tables by up to 20dB. 240 silicon satin stainless ensures our tables meet all the requirements for use in stringent environments such as cleanrooms and biohazard areas.

AMD-ST and AMD-SB standard table has a white powder epoxy table top surface incorporating a AMT-30x40 granite platform featuring four sorbothane isolators. It improves balance performance and is ideal for balances up to 4 to 5 digit.

The smooth seamless table shape ensures thorough and easy cleaning removing risks such as cross contamination. The stainless steel versions feature 240 satin silicon steel with a very low Ra of 0.4 making them ideal for cleanrooms and as well as being resistant to almost all forms of biological and chemical attack. The frame is produced using tubular ERW steel which combines high rigidity with a closed profile that allows easy and thorough cleaning. Tilting leveling feet ensure it sits perfectly in contact with the floor.

Technical Data:

Isolation Platform	AMD-SS	AMD-SA	AMD-ST / AMD-SB
Outer Table Dimensions (WxDxH)	120 x 75 x 75cm	120 x 75 x 75cm	120 x 75 x 75cm
Load Capacity	100kgs	100kgs	100kgs
Surface	Stainless Steel	Stainless Steel	White finish / Stainless Steel
Isolator Type	4 sorbothane passive	4 air rolling diaphragm, passive pump up	4 air rolling diaphragm, Active Air
Isolation Performance	95% at 50Hz, 98% at 98Hz	—	97% at 50Hz, 99% at 98Hz
Natural Frequency	7 Hz	2 Hz	2 Hz
Height Adjustment Range	735 to 765mm	735 to 765mm	735 to 765mm
Weight	55kgs	55kgs	55kgs

Options for Workstations AMD-101 Shelf, AMD-102 Castor Feet, AMD-103 Active Area White Top Plate

Options, Accessories, & Components:

Low Frequency Platform Option (LF Option). Platforms with this option incorporate a specially extended isolator, which has a natural frequency of 1.5Hz vertically and horizontally. It is available only for active platforms. The only difference to the standard versions is that the platform depth is increased to 10cm with a corresponding increase in working height to 11cm.

Frame. Frames bolt directly to the platforms and are feature a hard grey epoxy powder finish. They are supplied with four leveling feet, giving 3cm of adjustment to ensure the frames stability on the most uneven floors. Frame height 71cm, going to a working height of 78cm.

Frame Shelf. Frame shelves are made from 2cm laminated board and are suitable for supporting equipment such as computers

Platform Guard. The platform guard is a sturdy rail (with side rail option) that fully surrounds the platform and protects it against accidental knocks, which would otherwise disturb instruments on the platform.

Platform Shelf. A 30cm wide shelf, which sits on the guard rail over the platform and is quick and easy to remove and replace.

Monitor Stand. This padded stand will support monitors weighing up to 30kg. It features 360 degree rotation of the arm as well as height adjustment. It mounts to the platform guard.

Retractable Castors. These castors incorporate a foot, which can be raised and lowered using a thumbwheel, allowing the workstation to be wheeled around and then securely mounted to the floor in a new location.

Silent Compressor. These compact and oil free air compressors are virtually silent (30dB/A) versions and suitable for running several platforms.



Air Preparation Unit. An air preparation unit should be used if compressed air is used which may be damp or contain small particles. The unit will ensure the air supply is properly cleaned and dry before entering the platforms.

Stainless Working Surface. The dull polished stainless steel surface is ideal for stringent environments, such as within the food industry and in medical applications.

Mounting Holes. We can supply platforms with a ferromagnetic steel working surface featuring either M6 holes on a 25mm grid of ¼-20UNC holes on 1 inch centers.

Concentric Airmount AM2. This low profile airmount has a working height of only 40mm. Our unique design incorporates an isolation chamber surrounded by a concentric damping chamber. The chambers are connected by a tuned airflow restrictor which gives optimum damping with no overshoot while isolating out floor vibrations.

Concentric Airmount AM3. This low cost isolator has a very small footprint and is designed for incorporation into instruments. It is used in conjunction with a damping chamber, which has the advantage of being placable at some distance from the isolator, as required by the user.

High Load Isolator AM7. These high load isolators are capable of supporting loads up to 400kg and have a very low natural frequency as low as 1.1Hz. They are ideal as mounts for heavy sensitive instruments such as electron microscopes.

Leveling Arm AM9. These high load isolators are capable of supporting loads up to 400kg and have a very low natural frequency as low as 1.1Hz. They are ideal as mounts for heavy sensitive instruments such as electron microscopes.



Ordering information

EMS Cat #	Mfr.'s Code	Description	Size cm
AMB Balance Air Platform			
Stainless Steel or White Epoxy Finish			
6640	AMB-45x30		45x30
6650	AMB-50x40		50x40
6660	AMB-60x60		60x60
6670		Crate for Above	
AMD Balance Table with Isolation Area			
Stainless Steel or White Epoxy Finish			
6680	AMD-ST	Sorbothane Isolation Granite/White	75x75
6690	AMD-SS	Sorbothane Isolation Stainless Top	75x75
6700	AMD-SB	Air Stainless Top	75x75
6705	AMD-SA	Air Isolation Area Stainless Top	75x75
AMC Contoured Passive Air Isolation Plate			
6719	AMC-7	EMS AMC-7 Microscope Platform	
6732		L-Option for AMC-7 75kg capacity	
6710	AMC-13	Pump Up Isolator Plate	
6720	AMC-12	Passive Profiled Plate	
6730	AMC-12S	Active Profiled Plate	
AMH 1.5Hz High Load Air Tables			
6740	AMH-90x90		90x90
6750	AMH-120x90		120x90
6760	AMH-150x90		150x90
6770	AMH-240x120		240x120
Hi-Spec 1Hz Air Isolation Legs			
6780	Hi-Spec 1195	Non-Magnetic Legs (3pcs)	
6790	Hi-Spec	Isolation Legs (4 pcs) Active Self-Leveling	

EMS Cat #	Mfr.'s Code	Description	Size cm
Components			
6800	AM2	Concentric Isolator	
6810	AM3	OEM Isolators	
6820	AM5	Dampening Volume	
6830	AM7	Hi Load Isolator	
6840	AM9	Leveling Arm	
6850	AM12	Isolator	
6860	AM12S	Leveling Isolator	
AMS Sorbothane Balance Platform			
Stainless Steel or White Epoxy Finish			
6870	AMS-30x45	Stainless Top	30x45
6874	AMS-120x75	White Isolation Table	120x75
6875	AMS-120x75	Stainless Top	120x75
AMT Series Side Tables			
Select Stainless Steel or Sorbothane Isolating Frame Feet			
6880	AMT-90x60		90x60
6890	AMT-120x60		120x60
6900	AMT-75x75		75x75
6910	AMT-90x75		90x75
6920	AMT-120x75		120x75
6930	AMT-150x75		150x75
6940	AMT-90x90		90x90
6950	AMT-120x90		120x90
6960	AMT-150x90		150x90

TAKING THE next step...

Over the last decade Electron Microscopy Sciences has sponsored and participated in workshops covering a wide range of preparation techniques for electron microscopy and light microscopy.

Now we've added webinars as another way for us to communicate with you.

If you are on the fence about a product, wondering if it's right for your application, you can always contact our expert technicians by phone or now, by webinar!

Our webinars feature our latest, innovative products so you can learn more about the features and benefits of our products such as ChromaCal, Nightsea, LatticeAx, and more without ever leaving your computer.

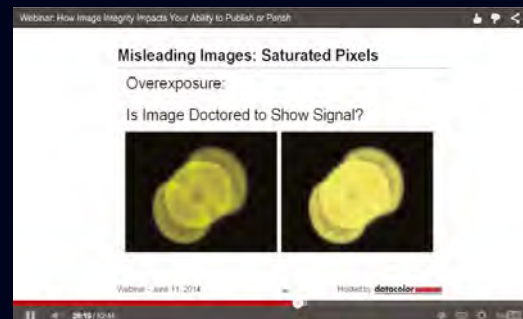
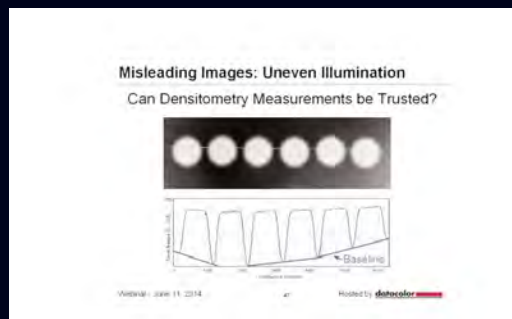
Look for this graphic on our website to find out if there is a product-specific webinar available for your area of interest.



Look for us on YouTube and Facebook as well!



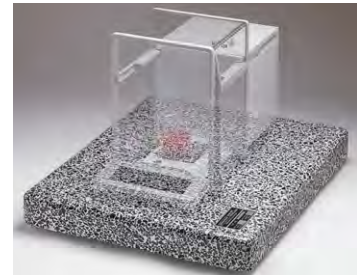
Screenshots are from our most recent webinar, co-hosted with DataColor™



► Vibration Damping Mounts – Vibrasorb®

- Isolate sensitive analytical balances and other instruments from disturbing vibrations.
- Economical space saving alternate to full size balance tables.
- Polishes surface resists scratches and chemical attack.

- Molded from dense black & white terrazzo.
- Platform 64mm (2½") thick.
- Four Vibro-Absorber™ cushions and neoprene feet.
- Supports up to 16 kg (35 lbs).
- Overall height 76mm (3").
- Two sizes available.



Cat.#	Size	Ship weight	Qty
67120-01	Vibrasorb® 45 x 56cm (18 x 22")	39 kg (87 lb)	each
67120-02	Vibrasorb® 35 x 35cm (13¾ x 13¾)	19 kg (42 lb)	each

► Vibration Isolation Platform – VIP Series 300

VIP Series 300 isolation technology is superior to air technology. First, these vibration isolation platforms are passive, mechanical and maintenance free. There are no air hoses or supporting hardware required. Second, Vistek bearings isolate effectively for the horizontal and vertical vibration components. The superior performance of the Vistek bearings in all six degrees of freedom makes this isolation platform the best choice for eliminating unwanted vibrations. Virtually any type of scientific instrument may be positioned on the Series 300 Vibration Isolation Platform. Units such as microscopes, hardness testers, measuring devices, digital imaging systems, AFMs, and Analytical balances are all applications for a bench top or tabletop platform. Standard sizes are 12" x 18", 18" x 24", and 24" x 30", for general use. Custom shapes, sizes and colors are available on request. Transmissibility Curve for the VIP Series 300 1/6th Hertz Vibration Isolation Bearing.

Technical information:

Natural Frequency (Hz)

Horizontal: 0.3 Hz

Vertical: Varies with payload

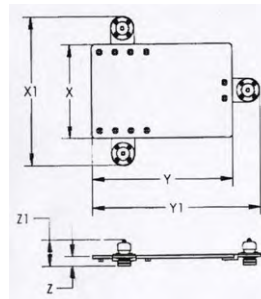
Payload Range Spectrum

Min	Middle	Max
3%	3%	2%

Material

Bearing: Nickel-plated alloy steel with clear anodized aluminum

Plate: Black anodized aluminum



Cat.#	Dimensions, in. (mm)				Payload Range, lb (kg)		Shipping Weight	Qty
	X	X1	Y	Y1	Min	Max		
67120-12	12 (305)	19 (483)	18 (457)	21.5 (546)	10 (4.5)	30 (15.9)	24lb (11kg)	each
67121-12	12 (305)	19 (483)	18 (457)	21.5 (546)	15 (6.8)	55 (24.9)	24lb (11kg)	each
67122-12	12 (305)	19 (483)	18 (457)	21.5 (546)	55 (24.9)	90 (40.8)	24lb (11kg)	each
67123-12	12 (305)	19 (483)	18 (457)	21.5 (546)	135 (59.9)	210 (95.3)	24lb (11kg)	each
67120-18	18 (457)	25 (635)	24 (610)	27.5 (698)	20 (9)	40 (18)	24lb (15kg)	each
67121-18	18 (457)	25 (635)	24 (610)	27.5 (698)	30 (13.6)	70 (31.8)	24lb (15kg)	each
67122-18	18 (457)	25 (635)	24 (610)	27.5 (698)	35 (16)	75 (34)	24lb (15kg)	each
67123-18	18 (457)	25 (635)	24 (610)	27.5 (698)	50 (22.7)	105 (47.6)	24lb (15kg)	each
67124-18	18 (457)	25 (635)	24 (610)	27.5 (698)	70 (31.8)	140 (63.5)	24lb (15kg)	each
67125-18	18 (457)	25 (635)	24 (610)	27.5 (698)	95 (43.1)	180 (81.6)	24lb (15kg)	each
67127-18	18 (457)	25 (635)	24 (610)	27.5 (698)	150 (68)	350 (158.8)	24lb (15kg)	each
67120-24	24 (610)	31 (787)	30 (762)	33.5 (851)	20 (9.1)	75 (34)	60lb (27kg)	each
67122-24	24 (610)	31 (787)	30 (762)	33.5 (851)	40 (18.1)	110 (49.9)	60lb (27kg)	each
67123-24	24 (610)	31 (787)	30 (762)	33.5 (851)	65 (29.5)	120 (54.4)	60lb (27kg)	each
67125-24	24 (610)	31 (787)	30 (762)	33.5 (851)	140 (63.5)	320 (145.1)	60lb (27kg)	each
67127-24	24 (610)	31 (787)	30 (762)	33.5 (851)	275 (124.7)	400 (181.4)	60lb (27kg)	each

► The Richter Anti-Vibration Pad

- Cost Effective – An inexpensive solution which dampens vibrations generated from lab equipment
- Non-Slip – Creates a stable surface that will keep equipment in place
- Versatile – Fits a variety of bench-top vortexes, shakers, rockers and microscopes
- Portable – Small, lightweight design makes transportation between benches and labs easy
- Configurable – Pads can be stacked for heavier units or positioned side-by-side for larger equipment



Cat. #	Pad Size	Qty.
67118-10	7.00" x 8.50"	2/pk.
67118-20	8.50" x 11.00"	2/pk.
67118-30	1 - 7.00" x 8.50", 1 - 8.50" x 11.00"	2/pk.

High-performance
anti-vibration platform
for microscopes

► The EMS AMC-7 Microscope Platform

Key Features

- Contoured shape ideal for working with microscopes
- Unique elastomer isolator removes up to 99 percent of vibrations
- Loads to 25kgs with 75kg load version option
- No rocking or wobble unlike other brands of platform
- One platform size suits majority of microscopes

These platforms remove the unwanted vibrations which limit the performance of microscopes. Their T shaped profile allows users to place their arms on either side of the platform, while the rear section is wide enough to accommodate most makes of microscope.

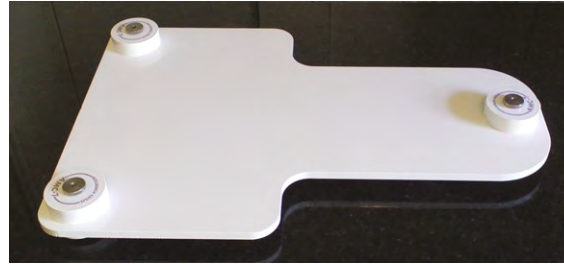


Platforms are made from high grade steel parts welded together for rigidity and coated with a tough epoxy powder white finish. They are resistant to most forms of biological and chemical attack and isolators are simply removed making cleaning easy.

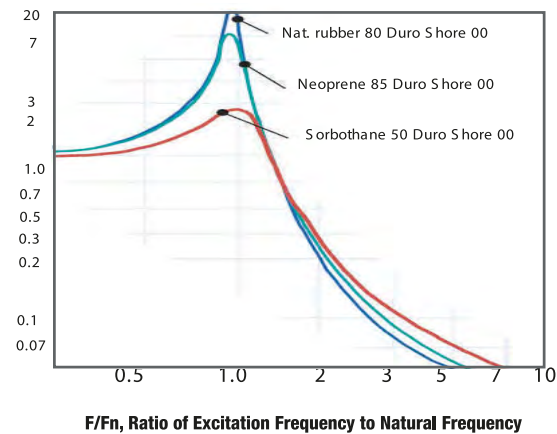
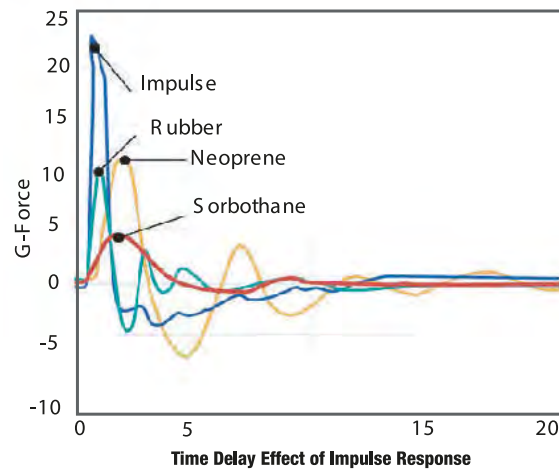


The platform top plate incorporates three elastomeric isolators which remove over 97 percent of horizontal vibrations at 50Hz and over 95 percent of vertical vibrations greatly improving instrument performance. These isolators are available in two load ranges, up to 25kgs and from 25 to 75kgs. Isolators are simply secured by a single thumbscrew and require no adjustments for varying loads.

Sorbothane elastomer isolators have outstanding damping performance compared to isolators that use springs, rubber or neoprene and so eliminate any rocking or wobble that is a major problem with other brands of platform. Sorbothane rapidly damps down disturbances to the microscope, such as when it is being touched during operation. It greatly improves image quality by protecting microscopes from both horizontal and vertical vibrations emanating from sources such as floors, walls and benching and caused by traffic, lifts, rotating machinery and numerous other sources



Type	Performance	Surface	Isolation	Application
AMC-7	Scientific	White epoxy powder	2Hz/7Hz	Microscopes



Specifications

Dimensions (L x W x H)	565 x 380 x 45 mm
Load Capacity	25kgs; 75kgs with Option L
Platform Height	25 mm
Isolators	3 off elastomeric
Isolation performance	
50Hz	97 percent horizontal; 95 percent vertical
100Hz	99 percent horizontal; 98 percent vertical
Natural Frequency	2Hz horizontal; 7Hz vertical
Surface Finish	White powder epoxy
Construction	Steel
Bacterial Resistance	No growth
Fungal Resistance	No growth
Heat Aging	Stable
Working Temperature	-20°C to 160°C
Weight	10Kgs

Cat. #	Description	Qty.
6719	EMS AMC-7 Microscope Platform	each
6732	L-Option for 75-kilo Capacity	each

SECTION 27

Equipment and Accessories

EMS-820 Precision Pulsed Laboratory Microwave Oven and Supplies
EMS 9000 Microwave Oven and Accessories
EMS LYNX II Automated Tissue Processor
EMS Oscillating Tissue Slicers
Vibrating Microtomes
Rapid Immersion Freezer
Cooling Stage for Scanning Electron Microscopes
Thermocirculator and Recirculating Heater/Chillers
Coaters and Coater Targets Replacement Parts
"Mini" Sputter Coater Glow Discharge
Rotary Pumped Carbon and Sputter Coating System
Turbo-Pumped Sputter and Carbon Coaters
Large Chamber Sputter Coaters
Dual Head Turbo-Pumped Sputter Coater
Plasma Ashers For Ashing, Etching, and Cleaning
Freeze Drier and Turbo Freeze Drier
Critical Point Driers
Cryo-SEM Preparation System
Desiccators and Desiccants
Centrifuges, Tubes, and Racks
Stirrers, Stirring Hotplates, and Digital Hotplates
Dri Baths, Modular Blocks, and Fixed Baths
Stirring Bars, Stirring Rods, and Hand Mixers
Vortex Mixers, Microplate Mixers, and Magnetic Stirrers
Tissue Rotators, Mixer Vortex, and Rotator/Rocker
Oven/Incubator, Vacuum Ovens, and Incubators
Cooling Chambers
Freeze Substitution
Ultraviolet Lamps and Lab Jacks



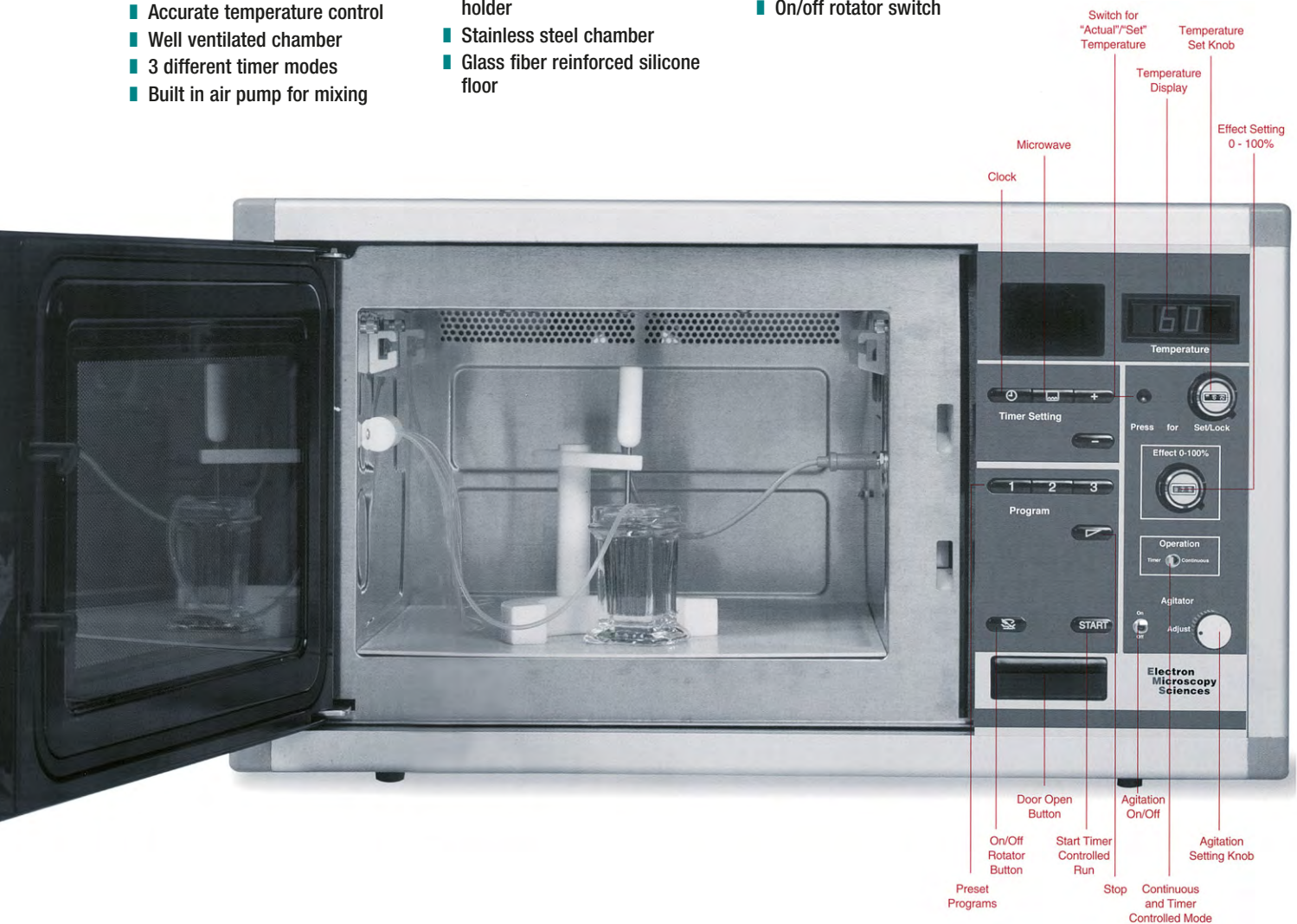
**Electron
Microscopy
Sciences**



► EMS-820 Precision Pulsed Laboratory Microwave Oven

FEATURES

- Easy operation and maintenance
- Easily adjusted effect % knob
- Accurate temperature control
- Well ventilated chamber
- 3 different timer modes
- Built in air pump for mixing
- Manifold for up to 5 mixing tubes
- Adjustable temperature probe holder
- Stainless steel chamber
- Glass fiber reinforced silicone floor
- Built in reflector for even distribution of microwaves
- On/off rotator switch



FOR OPTIMUM RESULTS...

The oven features a very well defined adjustable effect, an accurate temperature control, a well ventilated chamber, and three different timing modes for running the unit.

Our temperature control not only prevents the tissue in the chamber from becoming denatured (by high temperature) but it also assists in pulsing the microwave effect in small precise portions. The temperature control has a direct effect on the magnetron (the microwave generator) as it allows the unit to switch on and off in the most efficient way at the preset effect level. The set effect is adjustable at any time either before or during a run. This aids in the balance of the microwave load and the content of the microwave absorber. It should be noted that the penetration rate and process times are influenced by the presence of microwave radiation in the chamber and for this reason it is imperative that the effect rate be adjustable at any given time during a run.

Inside the chamber there is a manifold for up to 5 tubes which allows you to achieve bubble mixing in from 1-5 containers at once. There is a built in

pump that facilitates the mixing, avoiding temperature gradients in the mixing process. These adjustable bubble mixers make the EMS-820 ideal for decalcification.

Our oven is so versatile that you have the option to run it in three different modes depending on your application:

- 1) 3 optional presets programmed by the operator: 5 seconds-99 minutes
- 2) Continuous run: indefinite time.
- 3) Timed run: up to 99 minutes. with or without turntable.

The oven chamber is made entirely of stainless steel and it is very easy to clean. It is extremely resistant to all staining solutions that are usually employed in histology and like fields. The floor of the unit, which covers the rotator cavity, is a glass fiber reinforced silicone plate which serves as a thermal insulator and will not absorb microwaves. The plate is totally chemical resistant.

► **EMS-820 Precision Pulsed Laboratory Microwave Oven (continued)**

The EMS-820 is designed for easy operation and maintenance. All of the controls can be set with one hand and are easily accessible allowing for changes at any time. An adjustable thermal probe encased in a white PTFE holder (a microwave transparent material) comes with the unit. The probe can be set at different heights to accommodate all different types of containers and volumes of liquid. Attached to the probe is an adapter to hold one of the mixing tubes; this is important because the liquid which is regulated by the thermostat needs to be mixed well to avoid temperature gradients. The probe automatically measures the existing temperature and displays it.

The unit has a built in reflector inside the chamber which evenly distributes the microwaves. A rotator is built into the unit, as well, to prevent "Hot-Spots" from forming even for very small volumes (e.g.; reagent drops on glass slides).

Advantages of the EMS-820 Precision Pulsed Laboratory Microwave Oven

Ease of Use: When using a laboratory microwave oven, one has to determine the set effect to use depending on the type of sample, temperature, and load. Our unit has the effect control knob easily accessible at all times, and can be changed even during the middle of a run. The effect percentage setting is easy to read at all times.

Continuous Run Mode: For longer procedures (greater than 99 minutes our unit runs continuously for an indefinite period of time. There is no need to shut off the unit and begin again.

Multiple Bubble Mixing: A 5-port manifold for mixing up to 5 different containers at once.

Stainless Steel Compartment: Very easy to clean and resistant to staining or scratching. Resistant to all staining solutions.

Adjustable Temperature Probe Holder: It will accommodate any size container and it is flexible and very easy to align.

Glass Fiber Reinforced Silicone Floor: It comes standard with the unit and it covers the rotator when it is not in use.

Ventilation: Our unit has a built in powerful fan which accommodates at least 2 meters of tubing.

SPECIFICATIONS

Magnetron Effect.....	1000W
Effect Range	0-100%
Temperature Range.....	25-100°C
Temperature Accuracy.....	+/- 0.5°C within 25-70°C
Temperature Variation	+/- 0.4°C at 40°C Balanced effect with 200ml H2O load and 200ml H2O sample
Timer.....	5 sec-99min 99sec
Continuous Run.....	Timer override-works as a count up timer for an indefinite period of time
Chamber evacuation	Fan tubing outlet at rear
Safety Switch Off At.....	105°C Chamber temperature
Measurements (Inner).....	315mm x 315mm x 205mm
Outer Dimensions	550mm x 450mm x 350mm
Pulse length	3 sec.
Microwave reflector	Motor-driven metallic field stirrer to eliminate hot spots

ORDERING INFORMATION

97000	EMS-820 Precision Pulsed Laboratory Microwave Oven - 115V. Complete with The Microwave Cookbook for Microscopy, by Kok and Boon. each
97100	EMS-820 Precision Pulsed Laboratory Microwave Oven - 220V. Complete with The Microwave Cookbook for Microscopy, by Kok and Boon. each



Different Timer Options:

I Continuous Run: For long processes requiring more than 99 minutes. (e.g.; decalcification)

HOURS MINUTES

12 34

For 12 Hours 34 Minutes

II Timer Controlled Run: For processes less than 99 minutes. (e.g.; section staining, fixation, etc.)

MINUTES SECONDS

12 30

For 12 Minutes 30 Seconds

III Preset: Operated programmed 5 sec.-99 minutes with or without turntable.

MINUTES SECONDS

00 18

For 0 Minutes 18 Seconds

➤ Microwave Accessories

➤ Microwave Leakage Detector

Evaluate the RF emissions of mobile phone, radio and TV transmission towers, wireless camera, Wi-Fi and LAN detection and installation, microwave oven leakage and other environmental safety concerns. Radio Frequency (RF) is the range of electromagnetic frequencies above the audio range and below infrared light. Features maximum and minimum hold, an audible alarm, and a zero adjustment to eliminate background EMF. The display also indicates overload and low battery. Comes with a soft carrying case and standard 9V battery, which provides approximately 100 hours of use.



Dimensions: 5¼" x 2¼" x 1¼" (130 x 56 x 38mm). Weight: 6oz (170g).

Specifications

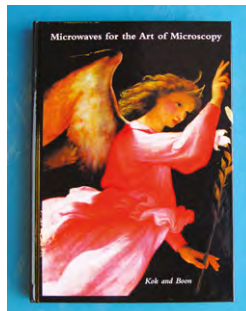
Display:3¾ digits, maximum reading 3999
 RF Power Density:0.003~2.700 mW/cm²
 RF Frequency:50MHz ~ 3.5GHz
 Microwave Frequency:2450MHz
 Resolution:0.001mW/cm²
 Accuracy:±2dB @ 2.45GHz ±50MHz
 Axis:Single
 Alarm:@ readings >1mW/cm²
 Operating Temp:41°F ~ 104°F (5°C ~ 40°C)
 Operating RH:<80% RH

72083-00 Microwave Leakage Detector each

➤ Art of Microscopy

A complete text book encompassing 384 pages of all aspects of microwave technology. All of the techniques found in a Microscopy, histology and general research laboratory are contained in this revised edition of the book.

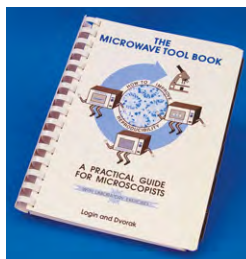
Written by: Kok, L. P. and Boon, M. E. (2003). Coulomb Press. Leyden, The Netherlands. ISBN# 90-71421-41-4.



31100 Art of Microscopy each

➤ The Microwave Tool Book; A Practical Guide For Microscopists

A step-by-step work book of fun laboratory exercises that teaches you how to calibrate and standardize microwave ovens; practice safety when using a microwave in the laboratory; see areas of high and low microwave power; measure cycle time and magnetron warm-up time; use your oven for fixation, staining, embedding, etc. When you complete the exercises in this book, you will find that what has up to now been a confusing amalgamation of concepts and recipes will become understandable and easy. Approx. 150 pp., 24 exercises, dozens of illustrations, and lots of practical tips. Written by: Gary R. Login, DMD, DMSc, and Ann M. Dvorak, MD, Dept of Pathology, Harvard School Of Dental Medicine, Harvard Medical School, and Beth Israel Hospital Boston, MA. 02115.

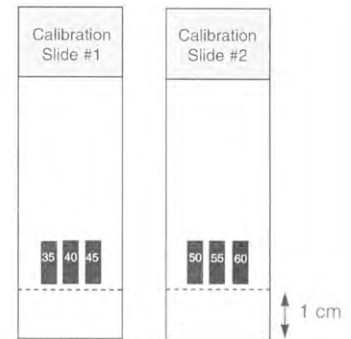


31110 Microwave Tool Book each

➤ Microwave Calibration Slide Set*

EMS EXCLUSIVE

A calibration slide for microwave staining. A set which includes two glass slides. Slide #1 has liquid crystal squares corresponding to the following temperatures: 35°C, 40°C, 45°C; Slide #2 has liquid crystal squares corresponding to the following temperatures: 50°C, 55°C, and 60°C.



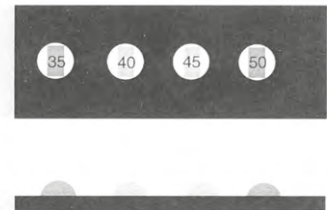
This calibration set will ensure reproducible programming of the oven to achieve an ideal target temperature of large staining volumes (50-200ml solution).

97031-01 Microwave Calibration Slide Set Set

➤ Stain-'N'-Temp Slide*

This device is used as an aid when programming a microwave oven to achieve an ideal target temperature of 20-100ml staining volumes. The tool is designed to give quantitative temperature information about the droplet during staining of tissue sections on electron microscope grids.

EMS EXCLUSIVE



This unit is a 4-well PTFE-coated glass slide, each well 8mm in diameter which will maintain the uniform shape of the droplet; 4 liquid crystal temperature strips ranging from 35° to 50° are affixed to each well to monitor the microwave oven temperature.

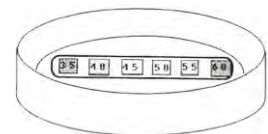
97030-01 Stain-'N'-Temp Slide each

97030-06 Stain-'N'-Temp Slide 6/pk

➤ Fix-'N'-Temp Container*

EMS EXCLUSIVE

This container will permit rapid specimen handling and provides temperature information during microwave irradiation. A



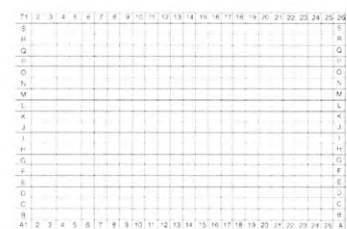
liquid crystal strip is affixed into the bottom of a 35mm diameter petri dish and covered with a thin layer of Embed resin. The temperature range is 35°C-60°C. This container is ideal for tissue fixing by microwaves. The two active temperature windows are 45°C and 50°C.

97033-01 Fix-'N'-Temp Container each

97033-06 Fix-'N'-Temp Container 6/pk

➤ Alpha-Numeric Oven Tray*

Made from polypropylene, Each line is spaced 1 cm apart with letters along the sides and numbers across the top and bottom. This tray has ruled lines that aid in the reproducible placement of the specimens in the oven.

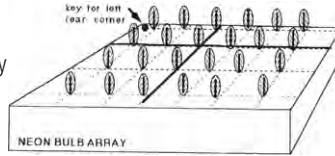


97035-01 Alpha-Numeric Oven Tray each

➤ Neon Bulb Array*

EMS EXCLUSIVE

This Neon Bulb Array is made from silicone and has many advantages:



1. Silicone has a high resistance to extreme heat.
2. The silicone holds each bulb snugly and prevents bulb spillage during handling.

Each bulb in the mat is 2.5cm apart. The mat is divided into quadrants. A mark on the back left corner of the array lid is used to key the back left corner of the oven. There are letters and numbers along each edge for easy placement on the Alpha-numeric tray. The mat size is 8"x8".

97036-01	Neon Bulb Array	each
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*The above microwave accessories are developed in collaboration with Dr. Gary Login, Beth Israel Hospital, Boston, Ma.

➤ Coverplate™ Technology

The Coverplate Microwave Immunostaining Systems

Shandon Lipshaw's patented Coverplate technology is the foundation of our microwave immunostaining system. Increased quality control, time and reagent savings, specimen protection, and consistent superb quality stains can be expected when using our Coverplate Microwave Immunostaining protocols.

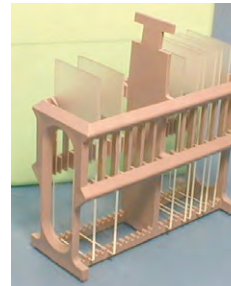
97091	Disposable Cover Plates™	10/pk
97092	Cover Plate™ Slide Rack (holds 10 cover plates)	each

➤ Cassette Rack for Microwave Histoprocessing

We are very pleased to announce the development of a simple and reliable device designed to hold up to 24 standard cassettes for histoprocessing in a microwave. This new rack is manufactured from PTFE resins, and will withstand repeated exposure to fixatives, dehydrating agents, clearing agents and paraffin. It is easily cleaned in hot water. It is intended for use with a disposable tray which holds the processing chemicals.

Four processing racks and trays will fit into the EMS 9000 Microwave Processor, so that up to 96 cassettes can be processed in one run. Using this system, the histotechnologist needs to handle the individual cassettes only once, to load them into the racks. The rack is then placed into a tray containing the dehydrating medium, usually 100% ethyl alcohol, and microwaved. After dehydration, the rack containing the cassettes is transferred into a tray containing the clearing agent, usually isopropanol, and microwaved. After clearing, the rack is transferred to a tray containing liquid paraffin, and microwaved. The whole process can take as little as 25 minutes (for small specimens, such as needle biopsies). There are no hazardous chemicals needed (no xylene!).

97050	PTFE Cassette Rack for Microwave Histoprocessing	each
97051	Microwave Histoprocessing Rack with 10 Disposable Trays	set



➤ Other Holders, Racks, and Trays

97052-01	Microwave transparent dish	each
97052-04	Microwave Slide Staining Holder	each
97090	Microwave Slide Staining Holders, with disposable tray (each rack holds 24 slides).	6/pk
97082	Microwave-Transparent Trays	50/pk



➤ Formalin Solutions: A New Cassette Holder for Microwave Fixation and Processing

Each holds 64 or 40 cassettes in a single horizontal plane, which conforms to research regarding the way to achieve the best distribution of microwave energy. It is based upon an original design in wood (the 'Bamboozle') developed by Dr. Richard Dapson of Anatech, Ltd. It is adapted to a pyrex container which allows the paraffin to easily hold its temperature, and minimizes the risk of overheating of specimens due to lack of sufficient microwavable load.



97070-10	Cassette Holder and Tray, holds 64 cassettes	each	97071-10	Cassette Holder and Tray, holds 21 cassettes	each
97070-01	Tray only	each	97071-01	Tray only	each
97070-02	Cassette Holder only, holds 64 cassettes	each	97071-02	Cassette Holder, holds 21 cassettes	each

➤ Incubation Tray for Microwave Immunostaining

For immunostaining, we recommend a water load that is the same size as the bottom of the microwave cavity in order not to disturb the distribution of microwave energy within the cavity. In our research, we found that between 150 and 200ml of water in the bottom of the incubation tray prevents evaporation of the droplets of reagent. A PAP pen should be used to maintain the droplets at a uniform size and shape.



97060	Microwave Incubation Tray for Immunostaining	each
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➤ Micro Tube Rack- Microwaveable

Polypropylene floating racks keep microtubes submerged in a water bath – perfect for controlling sample temperature. Detachable legs give the users more options: attach legs so rack stands upright on benchtop, or detach legs so sample tubes can be quickly popped out by pushing down onto any surface.



Ideally to hold microcentrifuge tube in water bath during polymerization, such as LR White®, JB4... These racks are not autoclavable. Measures: 60 mm high, including legs.

EMS #	Wells	Tubes	Shapes/Color	Qty
72372-SB	16	0.4/0.5 ml	Square (102mm) Black	each
72372-SW	16	1.5/2.0 ml	Square (102 mm) White	each
72372-RB	8	1.5/2.0 ml	Round (68 mm) White	each
72372-R20	20	1.5/2.0 ml	Round (98 mm) White	each

► The EMS 9000 Precision Pulsed Laboratory Microwave Oven

The EMS 9000 Laboratory Microwave Oven represents a state-of-the-art solution for performing many of the steps in sample preparation prior to either light or electron microscopy. Procedures such as fixation, staining, dehydration, decalcification, impregnation, polymerization as well as immunohisto and cytochemistry can be done with ease in the EMS 9000.

The EMS 9000 offers a significant reduction in processing times while obtaining improved results.

Features:

- 900 watt nominal output with variable wattage
- Bubble manifold for 5 tubes
- Forced exhaust system with fail-safe interlock
- Adjustable duty cycle—one second and greater for very precise process control
- Magnetron pre-warming
- Right side closet
- Vacuum system for rapid infiltration (optional)
- Load cooler/circulation system (optional)
- Three different timer modes
- Multiple safety interlocks
- Visual and aural warnings on errors and malfunctions
- All controls are automated
- Flexible temperature probe

Advantages of the EMS 9000 Precision Pulsed Laboratory Microwave Oven.

- Ease of use: User-friendly touch keypad to set and store all parameters-programmable
- Multiple running modes
- Multiple bubble mixing (5 ports)
- Adjustable temperature probe
- Ventilation
- Optional vacuum cycling for rapid infiltration
- Optional Load cooler
- Safety exhaust fans with fail safe interlock
- Integrated on board digital controller

Includes:

- 8' Ventilation Hose
- User's Manual
- Microwave Companion
- Processor Tray
- Vacuum Processor Bowl (when ordering the unit with Vacuum option)
- Vacuum Processor Cover (when ordering the unit with Vacuum option)
- 74 Position Cassette Basket Set
- (2) Histoprocessing Bowls
- (2) Microwave Transparent Containers
- Polar Heat Sample Pack
- Preserve Solution

For Optimum Results

The EMS 9000 features a touch pad keyboard that allows for all settings to be programmed quickly and easily. With a very well defined adjustable effect, accurate temperature control, well ventilated chamber, and three different timing modes, the EMS 9000 is the most advanced microwave processor available today.

For Temperature Control

Our temperature control not only prevents the tissue in the chamber from becoming denatured (by high temperature) but it also assists in pulsing the microwave effect in small precise portions. The temperature control has a direct effect on the magnetron for it allows the unit to switch on and off in the most efficient way at the preset effect level. The temperature probe is mounted on a ball swivel that allows for easy placement of the probe within the microwave chamber. In addition, the probe is made from stainless steel and it is quite flexible so that it may be bent and formed as required to place it in various shaped containers. The temperature sensor is located at the tip of the probe.



Adjustable Set Effect

The set effect is adjustable at anytime either before or during a run. This aids in the balance of the microwave load and the content of the microwave absorber. It should be noted that the penetration rate and process times are influenced by the presence of microwave radiation in the chamber and for this reason it is imperative that the effect rate be adjustable. The unit allows for preset parameters, which are stored in the EMS 9000 memory and are called upon to perform particular processes automatically.

Bubble Mixing from up to 5 Tubes

Inside the chamber there is a manifold for up to 5 tubes that allows you to achieve bubble mixing in from one to five containers at the same time. There is a built in air pump that facilitates the mixing and avoids temperature gradients in the mixing process. These adjustable bubble mixers make the EMS 9000 ideal for decalcification.



Our unit is so versatile that you have the option to run it in three different modes depending on your application.

1. Dual mode

a.) Time at temperature—The timer starts after the selectable threshold temperature is reached.

The timer measures the time of the process at the set point temperature

b.) Total time—The timer starts upon entry into "run" state and measures the total time of the process including the ramp-up time.

2. Extended timer range of 99 hours: 59 minutes: 59 seconds

3. Count up and count down timing

The EMS 9000 processor has two microwave power control modes.

■ **Temperature**—Under the temperature control, the power is adjusted in a closed loop fashion to obtain a particular temperature profile.

■ **Power**—Under power control, the power is adjusted in a fashion that ignores the process temperature as a control factor. In both of the control methods power output is pulsed with a one second cycle time. However, because the EMS9000 can supply power pulses as short as 120 milliseconds, the power output can be finely tuned to provide excellent control in both modes.

► The EMS 9000 Precision Pulsed Laboratory Microwave Oven (continued)

The system has many unique safety features that make the EMS 9000 the safest unit on the market!

The on-board screen will caution and shut down the system if there is high probe temperature, system over temperature; keyboard error; inoperative vent or low probe temperature.

The oven chamber is made entirely of stainless steel and is very easy to clean .It is extremely resistant to all staining solutions and solvents. The floor of the unit is ceramic which serves as a thermal insulator and will not absorb microwaves and it is completely chemical resistant.

The EMS 9000 is designed for easy operation and maintenance. All of the controls can be set with one hand and are easily accessible allowing for changes at anytime.

The unit has a built-in reflector inside the chamber that evenly distributes the microwaves and prevents "hot spots" from forming even for very small volumes.

Specifications

Microwave Output:	825 W
Effect Range:	0-100%
Temperature Range:	0-120°C
Temperature Accuracy:	Timer error: <0.1% in all modes
Temperature Readout Update Rate:	once/sec
Temperature Readout Accuracy:	<0.5°C
Power Control Accuracy:	error <1%
Air Agitation:	Total air agitator flow is 1 liter per minute nominal
Internal Lighting:	Chamber Lighting available at all times via keyboard switch (40 watt incandescent lamp)
Fluid Ports:	2 ports supplied as a standard - accepts up to 3/16" hose.
Pulse Length:	1 second
Timer Value:	0-99:59:59
Vent System:	Vent fan rated at 106 CFM nominal
Input Power:	15A at 120 Volts nominal 10A at 230 Volts nominal
System Dimensions:	19"High x 21.5"Wide x 24.5"Diameter (48.3cm x 54.6cm x 62.2cm)
Microwave Chamber:	9.5" High x 13.5" Wide x 15.5" Diameter (24.1cm x 34.3cm x 39.4cm)
Weight:	70 pounds
Continuous Run:	Timer override works as a count up timer for an indefinite period of time.

Safety Interlocks:

- * Vent interlock inhibits operation unless vent airflow is normal
 - * Primary Door Interlock
 - * Secondary Door Interlock
 - * Monitor Switch - Short circuit of the magnetron when door is open
 - * Oven temperature Switch
- 100, 120, 230 volt models FCC approved, CSA NRTL approved.

Ordering Information

97030	EMS 9000 Laboratory Microwave Precision Pulsed Microwave Oven. Complete with: Integrated Vacuum pump, Remote Temperature Probe, Stirrer Antenna, Microwave Cookbook; Microwave Tool book	each
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Optional Accessories

► **EMS 9000 Processing Chamber: An EMS Exclusive**

Microwave processing tissues for electron microscopy can yield inconsistent results caused by different microwave distribution patterns within the microwaves chamber. Exact, consistent placement of samples within the chamber is key to achieving uniform results. After two years of development and testing at a leading University Hospital, Electron Microscopy Sciences is proud to introduce the MPC 9000. The MPC 9000 developed only for our use in our top-of-the-line EMS 9000 laboratory microwave processor, hits the target that every laboratory needs: consistent processing, vacuum infiltration, and quick specimen turnaround.



Sturdy, heat & chemical resistant guide allows exact placement of processing chamber every time.



Lynx I specimen vial are locked in and tip-proof during processing. That's the specimen basket it holder assembly in the rear vial.

Features:

- **Sturdy heat and chemical resistant guide frame.**
- **Uses standard EMS Lynx I & II specimen handling technology**
- **Two tip-proof processing stations for disposable processing vials.**
- **A wide range of processing baskets configurations available.**
- **Feed-through for process temperature probe placement while under vacuum.**
- **Low maintenance chamber disassembles for easy cleaning.**



User may mix and match the basket configuration to match the workload

Model #	Product Description	
97045	MPC9000 Microwave Processing Chamber	each

► EMS 9002 Vacuum Processor (factory-installed option)

Made from Pyrex® glass which offers better temperature conductivity and stability than any other material and is chemically resistant and microwave transparent. The EMS 9002, when used in conjunction with our EMS 9000 processor, improves ultra-structural preservation during microwave assisted chemical fixation and reduces infiltration times dramatically.

Specifications

Vacuum Pump

Voltage	115V
Amps	2.6
CFM (Free Air)	0.8
Fittings	1/4" I.D. tubing

Cassette Rack

Material	All PTFE
Capacity	74 cassettes

Vessel

Dimensions	Tray: 12" x 10" x 5"
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Bowl: 9.75" diameter x 2" depth

Liquid Capacity	2.9 liters
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Vacuum Cover

Material	polypropylene
Fittings	1/4" I. D. Tubing

Cat. #	Description	Qty.
97050-A	EMS 9002 Vacuum Processor, factory installed option, Complete with: Processing Vessel, Cassette Rack, and Vacuum Pump.	each

► Accessories for the EMS 9002 Vacuum Processor

► Vacuum Processor Kit

For vacuum processing of tissue samples in the Vacuum Microwave Processor



Includes:

- Vacuum Processor Bowl (2825/1)
- Processor Tray (2825/3)
- Vacuum Processor Tubing Kit (2825/4)
- 74 Cassette Processing Rack (2825/6)

Cat. #	Description	Qty.
97052-10	Vacuum Processor Kit	each

► Vacuum Processor Tubing Kit

Used in conjunction with Vacuum Processor Bowl (H2825/1) and Vacuum Processor Cover (H2825/2).

Cat. #	Description	Qty.
97052-11	Vacuum Processor Tubing Kit	each

► Non-Vacuum Processor Kit

For processing of tissue samples in the H2850 Microwave Processor.

Includes:

- Non Vacuum Processor Bowl (H2825/5)
- Processor Tray (H2825/3)
- 74 Cassette Processing Rack (H2825/6)



Cat. #	Description	Qty.
97052-12	Non-Vacuum Processor Kit	each

► 74 Cassette Processing Rack

For cassette storage during tissue processing.



Cat. #	Description	Qty.
97052-13	74 Cassette Processing Rack	each

► Processor Tray

Used to transfer processor bowls in and out of microwave processors. Made of durable microwave transparent polypropylene plastic.



Cat. #	Description	Qty.
97052-14	Processor Tray	each

► Vacuum Processor Bowl

Used in conjunction with Vacuum Processor Cover and Vacuum Processor Tubing Kit.



Cat. #	Description	Qty.
97052-15	Vacuum Processing Bowl	each

► Non-Vacuum Processing Bowl

Not for use with vacuum attachments



Cat. #	Description	Qty.
97052-16	Non-Vacuum Processing Bowl	each

Using a Neon Bulb Array

EMS Catalog #97036-01, see page 991

The Neon Bulb Array is a tool which helps you to locate power peaks in your microwave oven. It shows you where to place your samples in the microwave, therefore, improving the reproducibility of your results.

Procedure

- Take two photocopies of Figure 1. Be sure the number and position of circles on your drawing match your Neon Bulb Array. You will chart illuminating patterns on these maps.
- Place the Neon Bulb Array on the floor of the microwave oven. Place the corner with the dot against the oven's left, rear corner.
- Close the oven door. Program the oven to irradiate at 100% power for 30 seconds. Press start.
- Observe the illumination pattern of the bulbs in the left, rear quadrant of the Neon Bulb Array. On the drawing mark an "X" on each bulb that is continuously lit.
- Let the bulbs cool for two minutes. Do not remove the Neon Bulb Array.
- Repeat steps 3 through 5 three more times, one for each of the remaining quadrants.

- Place a beaker with 200 ml of room-temperature water in the right, rear corner of the oven. If necessary, remove enough bulbs from the Neon Bulb Array to make room for the beaker of water to sit on the mat.
- Repeat steps 3 through 5 one time for each of the four quadrants of the array. Compare the illumination patterns of each map. Place the maps in your notebook.

Expected Observations

When the microwave oven contains only the Neon Bulb Array, most of the neon bulbs will remain continuously lit. With the beaker of water in the oven, the pattern of bulb illumination will change dramatically. Few bulbs will be lit; those that light up may flicker.

Precautions

- Do not irradiate the neon bulbs for more than 1 minute. They will become too hot to handle.
- Do not place the beaker of water on top of the bulbs. The bulbs may break and the water may spill. Instead, remove some bulbs to make room for the water load.

Reference: Login and Dvorak. (1994) "The Microwave Tool Book, a practical guide for Microscopists". Published and distributed by: Beth Israel Hospital, Department of Pathology, 330 Brookline Avenue, Boston, MA. 0215-5491.

Lynx II Automated Tissue Processor for Histology and Microscopy

EMS is proud to announce the release of the most unique state-of-the-art tissue processor which not only is compatible with all plastic resins but paraffin waxes as well.

Introduction:

LYNX II is designed to be the successor of the Lynx Tissue Processor with several enhancements including capabilities to perform optional processing of larger size samples for Histology.

The LYNX II holds 24 reagent vials for EM processing. Optional HP (Histology processing) may be done with 12 larger size reagent vials for HP processing. In both EM and HP modes, LYNX II has two independently controlled heating/cooling stations.

Operational Overview of LYNX II:

LYNX II is a batch mode, tissue processing system. The tissues may be processed for EM or HP. Tissues of either type are processed in the same manner: Samples are mounted on the sample arm and reagents are loaded on the reagent carousel. Based on the program selected by the user, the LYNX II rotates the reagent carousel until the selected reagent station is at the processing station. At the processing station the sample is lowered into the reagent. Based on the selection of agitation and vacuum, the LYNX II periodically moves the sample arm to provide agitation and applies vacuum when the agitation is not in progress. Once the programmed time in a given reagent is over, the sample is raised and the next reagent is rotated in the processing station.

The operator may select the processing for EM or HP by the program numbers. Programs 1 through 10 are used for EM processing and programs 11-20 are used for HP processing. In addition to the proper program number selection, it is the responsibility of the end user to use the proper carousel positions and the appropriate type of reagent vials based on the selection of EM vs. HP processing. Once the unit is properly configured for EM or HP processing, the operator loads the reagent carousel and the samples, selects the desired program and starts the run.

At the end of the run, the sample is retained in the last reagent until the operator removes the sample.

Features:

Number of reagent vials for HP processing	12
Number of reagent vials for EM processing	24
Volume of reagent in EM reagent vial	25 ml
Volume of reagent in HP reagent vial	125 ml
Number of Programs	20 (10 for EM and 10 for Histology)

- Two independently controlled heating/cooling stations
- Easy replacement of reagent carousel
- Paraffin Processing
- Sample agitation
- Vacuum infiltration during processing
- Choice of plastic and metal containers for improved chemical compatibility and heat transfer
- Built-in fume extraction and ability to connect the discharge hose to lab exhaust system
- Optional external media based interface to a PC for ease of programming and allowing for the editing of programs on a PC and the transfer of programs between the LYNX II and the PC
- Internal battery back-up during power fail to protect samples
- Ability to continue run after power interruption
- User Friendly Operator Interface
- Optional external UPS for continued processing during longer power outages



Functional Specifications:

System Configuration:

1. LYNX II is designed with the following functional modules.

- Rotary mechanism to rotate the reagents
- EM and HP reagent carousel
- Up/Down mechanism to move the sample in and out of the reagent as well as to provide the agitation
- EM and HP Sample arms
- Tight seal for all reagent containers except for the one at the processing station.
- Vacuum pump and a pressure sensor or a switch
- Two Peltier operated heating/cooling stations with independent temperature sensors and controls
- Fume extraction fan and air flow sensor

2. Reagent Carousel:

A reagent carousel may be installed, either a 24-position carousel for holding EM reagents or a 12-position carousel for holding HP reagents. The EM carousel holds cylindrical vials that are approx. 1.2" in diameter and 2.5" tall, whereas HP vials are approx. 2.2" diameter (to hold 1.75" x 1.2" cassette flat) and 2.5" tall.

The carousel is approx. 12" in diameter. Each vial has a flange for ease of handling. The vials are available in either plastic or aluminum. The vials may be mixed and matched between the metal and the plastic vials on a given carousel for certain kinds of processing.

The LYNX II has a built in sensor to detect that the proper reagent vial types (EM vs. HP) are installed on the unit before starting a run. Ability to detect only one of the two vial types is sufficient.

3. Sample Arm:

The sample arm holds either an EM sample holder assembly or an HP sample holder assembly. Each sample holder assembly is designed to mount on the arm at a location to center the samples in its respective reagent container. The Sample Arm top may be changed to accommodate different samples.

4. Agitation and Vacuum:

The arm provides a gentle agitation (approx. 5 mm up and down travel at a rate of 2.5 mm per second or one up/down agitation per second) once the sample is in the reagent container. Five agitation strokes are executed in 5 seconds and repeated every 45 seconds. If vacuum infiltration is selected, the agitation will be applied for 5 seconds followed by 40 seconds of vacuum. These agitation-only or the agitation-vacuum cycles will be repeated for the duration of the station time.

The sample holder assembly has a fitting to attach the vacuum hose from the vacuum pump.

Lynx II Automated Tissue Processor for Histology and Microscopy (continued)

5. Heating-Cooling Stations:

The LYNX II provides 2 independent, identical heating-cooling stations (HCS). Each HCS is heated or cooled by a Peltier module and has its own temperature sensor. One HCS is located at the sample processing station and the second one is located one position prior to the sample processing station. This arrangement allows for the pre-heating or pre-cooling of the reagent for a program where the reagents are arranged in a sequential, contiguous manner.

Each HCS can be programmed to be between 4 deg. C and 65 deg. C. The accuracy of the actual temperature will be +/- 2 deg. C measured on the surface of the Heating - Cooling station. The set point at the HCS surface is reached within 7 minutes of the arrival of the reagent at the station.

6. Fume Control:

LYNX II provides a fume extraction fan to direct fumes from the reagent/sample area to an exhaust port. An external hose may be connected to the unit and the hose may be directed to a fume hood or to a laboratory exhaust system. The fume extraction is designed to ensure that the fumes are diverted away from electronics and the mechanism components.

7. Lid/Cover:

An acrylic cover with a latch is part of the fume control system. The controller of the system can detect if the cover is latched or not. By default, a run cannot be started (and will pause) if the cover is not in place. However, there is a software override will allow for the running of the unit without closing the cover.



8. Seal for Reagent Vials:

A tight seal is provided to cover all reagent vials except for the one under the processing station.



Reagents Used:

Materials for various components and subsystems of LYNX II are compatible with the following reagents during processing.

HP Processing

- Formalin
- Alcohol
- Xylene
- Xylene Substitutes
- Water
- Paraffin
- 10% Bleach Solution
(to wipe clean the system)

EM Processing

- Buffers
- Osmium Tetroxide
- Ethyl Alcohol
- Acetone
- Propylene Oxide
- Epoxy/Acrylic Resins

9. Operation During Power Outage:

The LYNX II contains a small internal battery capable of moving the sample from up position to down position and the carousel to the next reagent position at least three times without being re-charged, to preserve the sample during a power outage.

When the electronics in LYNX II detects that the A/C power is about to fail, the LYNX II will shut down the power to the Peltier elements at both heating/cooling stations. Next, it will ensure that the samples are down in a reagent container. If the samples are out of a reagent vial (since LYNX II was just about to rotate the carousel to the next reagent position or was in the middle of the rotation), the carousel will be rotated by one position and then the samples will be lowered in to the reagent at the processing station. The time when the power fail warning was activated will be recorded and the unit will go in the standby mode.

Once the power is restored and is maintained for at least 30 seconds, LYNX II will resume the run. As LYNX II resumes run, the station time countdown does not resume until the heating/cooling stations have reached the desired temperatures. The station time countdown does not begin for additional 60 minutes if the temperature at the processing station or at the previous station was above 55° C during an HP run. This feature ensures that the paraffin at either of the two stations completely melts before moving samples to the next station.

Specifications

Dimensions:

Max Width:	22.5"
Max Depth:	19.0"
Max Height:	12.0" (cover closed)
Max Weight:	50lb (32 kg)

Electrical Design:

Display:	8 lines x 20 column text only LCD
Keypad:	Membrane style keypad with tactile feed back
Mechanism Drive:	Stepper Motors

Power Requirements:

100 - 115 volts AC, 50-60 Hz, 8 Amps Max.
230 volts AC, 50-60 Hz, 4 Amps Max.
Back-up power: NiCd Battery, 12 volts, 1 Amp-hour

Fuse Rating:

100 - 115 volt version	8 Amps x 250 Volts AC, Time Delayed (Slo-Blo)
230 volt version	5 Amps x 250 Volts AC, Time Delayed (Slo-Blo)

Operating Environmental Conditions:

Ambient Temperature:	15 to 25° C (70 to 90° F)
Relative Humidity:	20-80% non-condensing
Ambient Pressure:	28"-32" (70-80 mm) of Hg

Storage/Transportation Conditions:

Temperature:	10-40° C (50 to 102° F)
Humidity:	15%-80% non-condensing
Pressure:	28"-32" (70-80 mm) of Hg



Lynx II Automated Tissue Processor for Histology and Microscopy *(continued)*

Ordering Information

Lynx II Accessories and Consumables

Cat. #	Description
L12600	Lynx II for Microscopy*
L12601	Lynx II for Histology**
L12610	Histology Kit (Histo Sample Holder, Histo Sample Arm, Histo Carousel, Power Cord, Operator Manual, Histo Aluminum Containers (24), Histo Plastic Containers (36), Plastic Caps (36), Exhaust Hose, Small Cassettes (100), 2 Sample Record Note Pads, Spare Fuses.
L12612	Electron Microscopy Kit (EM Sample Holder, EM Sample Arm, EM Carousel, Loading Jig, Power Cord, Operator Manual, Aluminum Containers (24), Plastic Containers (72), Plastic Caps (72), Exhaust Hose, Small Baskets (100), Large Baskets (100), Basket Lids (100), 2 Sample Record Note Pads, Spare Fuses
L12602	Lynx II for EM and HP Combined***
L12655	EM Reagent Vials, Bag of 72
L12656	EM Regent Vial Cap, Bag of 72
L12657	HP Reagent Vials, Bag of 36
L12658	HP Reagent Vial Cap, Bag of 36
L12659	EM Aluminum Container (Box of 24)
L12660	HP Aluminum Container (Box of 12)
L13154	EM Sample Holder Assembly (Basket Stem Assembly)
L12663	HP Cassette Holder Assembly
L12661	Vacuum Pump Tubing (1 each)
L12662	Vial Seal Assembly
L12937	Rubber Bumpers, 50/pk
L12995	EM Sample Arm Seal
L12996	HP Sample Arm Seal
L12952	EM Carousel (Without Aluminum Containers)
L12953	HP Carousel (Without Aluminum Containers)
L12664	Replacement Back-up Battery
L12665	Lynx II Operator Manual
L12667	Lynx II Service Manual
300.0005	Disposable Basket Lid
300.0002	Disposable Basket Small
300.0041	Specimen Record Pad 3 and 4 Divisions
300.9513	Specimen Record Pad 8 Divisions
300.8041	Exhaust Hose 3 Meter
300.0011	EM Sample Loading Jig (Same as Lynx I)
300.0196	Disposable Basket 8 Segment
300.0003	Disposable Basket Large

*The Lynx II for Microscopy comes with: EM Sample Holder, EM Sample Arm, EM Carousel, Loading Jig, Power Cord, Operator Manual, Aluminum Containers (24), Plastic Containers (72), Plastic Caps (72), Exhaust Hose, Small Baskets (100), Large Baskets (100), Basket Lids (100), 2 Sample Record Note Pads, Spare Fuses.

** The Lynx II for Histology comes with: Histo Sample Holder, Histo Sample Arm, Histo Carousel, Power Cord, Operator Manual, Histo Aluminum Containers (24), Histo Plastic Containers (36), Plastic Caps (36), Exhaust Hose, Small Cassettes (100), 2 Sample Record Note Pads, Spare Fuses.

***The Lynx II for Microscopy and Histology comes with everything found in both units .

All of the above accessories may be purchased separately or in the kit.

Lynx I Accessories and Replacement Parts

Cat. #	Description	
300.0002	Disposable Basket Small	100/pk
300.0003	Disposable Basket, Large	100/pk
300.0005	Disposable Basket, Lid	100/pk
300.0196	Disposable Basket, 8 Segment	100/pk
300.0036	Disposable Vials	100/pk
300.9011	Loading Jig	each
300.9017	Vial Lid Assembly	each
300.9010	Basket Stem & Foot Assembly	each
306.0830	Key	each

300.0041	Specimen Record Pad 3&4 Div.	each
300.8041	Exhaust Hose, 3 meter	each
300.9014	Heater/Cooler	each
300.0140	Disposable Vial Cap	100/pk
300.9023	Vial Retaining Band	each
300.9513	Specimen Record Pad 8 Div	each
User Replaceable Parts		
300.9500	Assembly Heater/Cooler	each
300.0015	Cap (TurnTable Locking)	each
300.0008	Location Pin	each
300.8105	Printer Data Cable	each
300.9100	Starter Kit	each
300.0139	User Manual	each
300.9016	Vial Seal Assembly	each

► Lynx Process Accelerator (LPA) An EMS Exclusive

One of the most time consuming tasks during Paraffin processing is wax infiltration. Not a step to cut corners on unless you want to deal with poorly infiltrated blocks. The Lynx-LPA was designed to allow a greater through-put of specimens without compromising the critical infiltration step. Once your initial tissues reach the first paraffin step you can transfer the cassette holder to the Lynx-Pal for vacuum infiltration while you un-burden the Lynx to start another process cycle.



The LPA has 3 positions to accept three HP cassette holder which conveniently uses the same Aluminum vial as the Lynx processor to contain paraffin. Each Aluminum vial is fitted with a platform to allow the stir-bar to circulate the melted wax.

Processing time can be set between 1 and 180 minutes in variable increments. Temperature can be set between 40 and 65 deg. C in one degree C increments. Temperature is displayed in Deg C as a two digit number without any decimal point. The temperature accuracy at the sensor (and on the display) will be within +/- 2 deg. C. Vacuum off time can be between 0 and 3 minutes in 1 minute increments. Vacuum cycle runs as on time followed by the off time where 0 on time implies that no vacuum is necessary and 0 off time implies that vacuum must be on continuously. During sample processing the vacuum is applied as per on and off time selection. If the processing is paused, the vacuum is released within 15 seconds. At the end of the cycle time, the vacuum continues to be cycled and temperature is held at the desired point.

Specifications:

Number of Paraffin Containers:	3
Temperature Range:	37° C – 75° C
Vacuum On Time:	0:30 To 3:00 (Min:Sec) in 30 second increments
Vacuum Off Time:	0:15 to 2:00 (min:sec) in 15 Second increments
Vacuum:	Preset at factory, 5 (+/- 2) PSI below ambient
Temperature Accuracy:	+/-20C at the sensor at set point
Temperature Offset:	-5 to +50C
Process Time:	0:15 To 3:00 (hour:Min) in 15 minute increments
Stirring:	Magnetic Stir Bar
Input Voltage:	100-230 Volts AC 50/60 Hz
Power :	150 Watts Max

Cat #	Description	
LX12668	Lynx Process Accelerator (LPA)	each

► All New-Innovative– State-Of-The-Art Oscillating Tissue Slicers



The EMS Oscillating Tissue Slicers for the most challenging of sectioning with the highest quality. The EMS 4500 and 5000 Oscillating Tissue Slicer represents the most thoughtfully designed solution to sectioning either fixed or fresh tissue, as thin as 5 microns. No longer is there a need for embedding or freezing your sample and preparation time is reduced dramatically. The risk of distortion and artifacts normally associated with these procedures are eliminated. The EMS 4500 and 5000 meets the highest standards for precision and accuracy and it meets or exceeds the performance of units on the market costing twice as much.

► The EMS Tissue Slicer Family

The EMS 5000 series may be used for the sectioning of samples for use in the fields of electrophysiology of fresh tissue, immunocytochemistry and immunohistochemistry, Neurophysiology, Neuropathology, Experimental Biology, Histology, Cytology, Botanical Research, Microscopy, Polymer and Materials Science. The EMS 5000 now features a new innovative design of the slicer head which minimizes Z-Axis vibration. This improvement dramatically improves slice surface integrity and is especially beneficial in the field of fresh tissue where IR/DIC imaging methods are concerned. The unique blade holder has now been modified to accept: razor, sapphire, diamond and glass blades.

To reduce time between slices the EMS 5000 series features a user programmable travel window (cutting window). This allows the sectioning cutting range of the blade to be customized to the specimen sample. This feature of "automatic sectioning" offers a beginning advance and end advance further automating the EMS 5000. In conjunction with our "home button" the programmable window guarantees rapid sectioning of even the largest of specimens. As well, the EMS 5000 allows the sectioning of samples in two different modes. In single slice mode, the unit sections samples and harvests them while the blade repositions itself to perform the next slice and in the multiple slice mode the EMS 5000 will automatically perform multiple uniform slices.

The EMS 5000 series control panel has been totally redesigned to allow for ambidextrous and ergonomic operation. The keypad has been sealed to avoid buffer spill seepage. The tray is made from molded clear polycarbonate for improved viewing of the slicing operation. The tray is removable to facilitate specimen mounting and cleaning. Two white LED's are installed in the blade head, which provide constant cold

illumination of the specimen during the slicing process.

The EMS 5000 series is engineered for maximum stability ensures even the most delicate of tissue to be cut successfully every time. The knife holder allows any blade (as per list) to be secured and the blade angle set from 10- 30 degrees. The specimen mount is x, y, z axis adjustable and the knife advance is continuously adjustable with a touch of the keypad from 0- 5mm/s and the section thickness is now adjustable in 1 micron increments ranging from 1-999 microns. Our precision slicer features automatic touch selection of section thickness, blade speed, advance, and a user-defined travel window so that the consecutive sections may be cut easily and rapidly. Other EMS 5000 features include: Touch pad control of the blade height, slice counter / slice thickness, precise bar graph displays of blade oscillation and advance speeds. Blade oscillation is adjustable from 50-5000 cycles/minute and advance speed is adjustable continuously from 100 microns -5mm/sec.

Our EMS 5000 series is designed for easy operation and maintenance. The specimen collecting tray is removable and easy to clean. All controls may be set with one hand with options for multiple slicing modes.

The unit comes complete with gooseneck magnifying lens, media tray (2.5" wide) and pedestal, specimen vice holder, blocks, as well as a foot switch with 6' cable. A large tray (3.5" wide) is available as an option and comes complete with fixed stage and adjustable pedestals.

The tissue pedestal with pivotal pin (included with media tray), allows for the mounting of a specimen directly to the pedestal and the ability to change the angle of your specimen relative to the blade, offering you perfect specimen orientation. The sample vice with pivotal pins (also included in package) allows for the adherence of your specimen directly to a mounting block.

Updates and Advantages of the EMS 5000 Series

- Cutting window for automatic sectioning allows for faster and more reliable sectioning.
- Control pad with membrane buttons is now separated from the slicer module improving ergonomics and reducing buffer spillage from contaminating the controls.
- X,Y, and Z – 3 axis adjustable specimen mount.
- Easy to release slicer head for safety and ease of specimen mounting.
- Slice thickness is now adjustable from 1-999 in 1 micron steps.
- One touch "home" button to return the blade arm to a predetermined point near the specimen.
- The specimen tray is made from a clear polycarbonate for improved viewing of the slice operation. No worry of leakage and section visualization in easy.
- The pivot pins which come as a standard on the pedestal as well as the vice holder allow changing of the angle of the pedestal relative to the blade. Easy sample orientation in all directions.
- The tray includes a lock on feature for a more secure mount to the platform.
- The standard unit comes complete with our unique pivotal tissue pedestal (you can mount the specimen directly on the pedestal without the need for vices or blocks mounted in the sample tray)

➤ **The EMS 4500 Tissue Slicer**

The EMS 4500 Tissue Slicer is a scaled down version of the EMS 5000. All of the specifications of the EMS 5000 are the same for the EMS 4500. The only difference between the two units are as follows:

The EMS 4500 does not include:

Functional Features	Accessories
1. Adjustable window	1. Foot Switch
2. Multi-Slice function	2. Tissue Blocks
3. Home functionality	3. Vice Holder

The EMS 4500 can be upgraded to the complete EMS 5000 unit at any time.

➤ **The EMS 5000 Refrigerated Controller and Tray**

The EMS 5000 Refrigerated Controller and Tray provide refrigeration capabilities to the Tissue Slicer. The controller three digit LED displays the current temperature of the bath medium in degrees C. The temperature is maintained within 0.5oC. The temperature range on the unit is between 0-10oC.

The refrigerated tray is fitted with a peltier heat exchange unit. A cold water source is circulated through the assembly to transfer heat. The tubing is connected to the tray with quick connect fittings. No tools are necessary for installation. The fittings are self sealing to prevent leaking during installation. The tray fits directly to the mounting platform of the EMS 5000.

Features:

- Control pad with membrane buttons separated from the slicer module to improve ergonomics, reduce “handedness”, and isolate switches from bath solutions.
- New slicer head design increases blade motion stability and minimizes vibration that causes tissue distortion.

- Slice thickness from 0 to 999 microns, set in 1 micron increments. Push button advance; digital display of status.
- Easy release slicer head facilitates safe, easy specimen mounting as well as easy cleaning.
- Ultra light blade oscillation mechanism
- Accepts metal, glass, diamond and sapphire blades
- 3 axis adjustable specimen mount (X,Y,Z).
- User defined “travel window” reduces blade travel time between slices.
- User selectable slicing modes for “hands-free” performance of many slices.
- Slice counter/Slice thickness display
- Precise bar graph displays of blade oscillation and advance speeds.
- Consistent live tissue slices of 10 microns achieved.
- Adjustable/Removable magnifier lens X2-Swings away when not in use.
- White LED’s mounted to knife holder for constant, direct, cold source illumination during slicing.
- Blade mechanism above bath simplifies maintenance; easy to clean removable tray.
- Mounting of the specimen can be done directly on our unique tissue pedestal (with the option of using the pivot pin [see diagram 1] or just setting the pedestal flat on the bottom of the tray on a 90o angle [see diagram 2] in addition a sample vice holder, with pivot pin can be attached to the tray and mounting blocks used [see diagram 3] – both devices come standard with unit).
- Adjustable knife angle indicator is built into the arm of the unit.

1. Slice Counter/ Thickness

Displays a count of the number of slices from a user defined zero reference. When prompted, displays the slice thickness setting in microns.

2. Oscillation

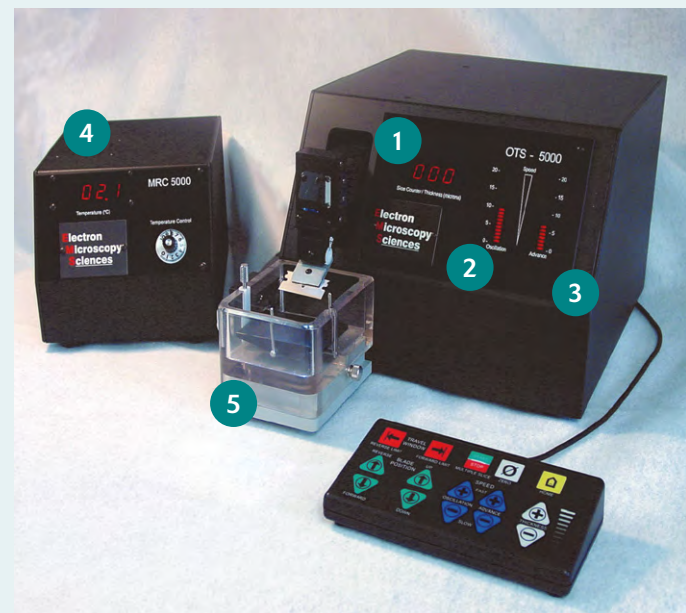
Displays the speed of the blade oscillation in bar graph form. Each line of the graph represents a speed.

3. Advance

Displays the speed of the blade advance in bar graph form. Each line of the graph represents a speed.

4. Refrigeration Controller

5. Tray



Electron Microscopy Sciences is committed to offering you the most up-to-date equipment on the market. For this reason if you would like to see us implement any changes to our Tissue Slicers or any of the products that we sell please let us know. All ideas and suggestions are encouraged and we look forward to hearing from you.

► The EMS 5000 Refrigerated Controller and Tray (continued from p. 687)

Specifications: 5000 Series

Vertical travel	28mm
Slice Thickness:	Adjustable from 1 to 999 microns in 1 micron increments
Blade Speed	Adjustable from 50- 5000 cycles per minute
Blade Angle Adjustment	Adjustable from 15 to 35degrees
Blade Travel	35mm total
Blade Advance Speed	Continuously adjustable from 100 microns-5mm per second
Blade Types	Sapphire, Razor, Diamond, Glass
Blade Reverse Speed	2.5mm per second
Specimen Size	25mm Wide x 25mm Diameter x 15mm High maximum volume
Magnifier	4" diameter, X2 lens mounted on 12" (30cm) gooseneck, 9" working distance
Lighted	White LED's mounted on the knife holder aimed at blade edge.
Dimensions	Slicer: 27cmx40cmx21.5cm (10.5"x16 x7.5") Keypad: 17cm x 8.5cm x 3.4cm (6.7" x 3.4" x 1.35")
Weight	13kg (30 lbs)
Power Requirements	110-240VAC, 50-60Hz universal power input. Available with CE Mark
Display	3 segment LED display of slice counter and thickness. (Changes with appropriate buttons) 20 segment LED's bar graph display blade oscillation and advance speed.
Specimen Mount	X, Y, Z axis adjustable pedestal: 1¼" x 2½"
Working Space Requirements	12" Wide x 18" Diameter x10" High) (30cm x 45cm x 25cm)
Mounting Blocks	½ x ½ x ½" (3 each) /1 x 1 x 1" (3 each)

Specifications: 5000 Series Refrigeration Controller and Tray

Temperature Control Range	0° — 10°C
Temperature Indication	3 digit LED display indicates temperature in 0.1oC with a negative sign indicator.
Power Requirements	115/230V AC 50-60 Hz auto ranging fused at 1 amp max current
Dimensions	Control Module: 8.25 x 6.25 x 5.5" (20.9cm x 15.9cm x 13.9cm) Cooling Tray: 4.25 x 3.5 x 2.625" (10.8cm x 8.9cm x 6.7cm) with a 3' cable (91.4cm)



Control Keypad



Blade Position

Forward: Moves the blade arm forward at the set advance speed. Press once to begin movement, again to stop.

Reverse: Moves the blade arm back at the maximum travel speed. Press once to begin movement, again to stop.

Up: Moves the blade arm up. Momentarily pressing the button moves the blade arm the set thickness amount. Pressing the button for longer than one second moves the blade at the fastest travel speed.

Down: Moves the blade arm down. Momentarily pressing the button moves the blade arm the set thickness amount. Pressing the button for longer than one second moves the blade at the fastest travel speed.

Speed

Oscillation: Pressing these buttons increments (+) and decrements (-) the blade oscillation speed.

Advance: Pressing these buttons increments(+) and decrements (-) the blade arm advance speed.

Thickness

Pressing these buttons adjusts the slice thickness. Pressing momentarily changes the setting in 1 micron increments. Holding for longer than 1 second causes 10 micron changes.

Travel Window

Reverse Limit: Pressing this button sets the position for the blade arm to start the slice process. The limit can be changed using the blade position buttons at any time to override the limit. Pressing this button again will set the new limit.

Forward Limit: Pressing this button sets the position for the blade arm to stop and return to the reverse limit. The limit can be changed using the blade position buttons at any time to override the limit. Pressing this button again will set the new limit.

Multiple Slice

Start/Stop: Pressing this button starts the process of automatically slicing. Pressing this button once will begin the blade arm moving forward. It will continue until it reaches a forward limit (travel window or mechanical) stop, return to the reverse limit, step down the selected thickness, and begin another slice. Pressing this button during this process will cause the arm to stop and wait for a command. The multiple slice process will continue until the lowest mechanical limit is reached. It will then automatically return to the home position (full up and back).

Zero

Pressing this button resets the slice counter display to read all "0".

Home

Pressing this button at any time will cause the blade to return to the home position.

Different Mounting Options

Mounting of the specimens can be done directly on our unique tissue pedestal with the option of using the pivot pin (see diagram1) or just setting the pedestal flat on the bottom of the tray on a 90° angle (see diagram2). In addition, a sample vice holder, with pivot pin can be attached to the tray and mounting blocks used (see diagram3). Both devices come standard with the EMS 5000.

The cutting angle can be easily changed and calibrated by loosening the set screw on top of the support arm. The angles between 10-20o can be read off the scale on the side of the support arm.

Diagram 1

Standard Pivoting Tissue Pedestal

The pivot pedestal arrangement is designed so that the sample can be glued directly to the surface and the angle of the sample can be adjusted relative to the blade.

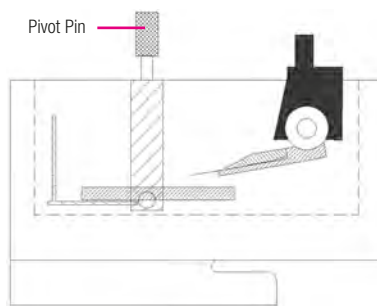


Diagram 2

Standard Tissue Pedestal

This is the same pedestal as in diagram one; however you have the option to mount the pedestal flush to the base on a 90o angle

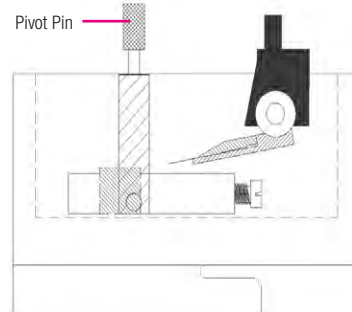
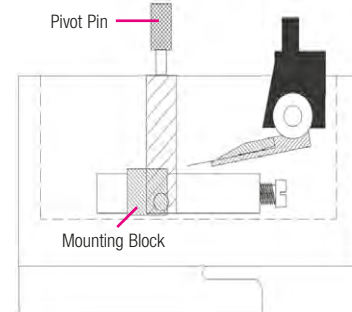


Diagram 3

Sample Vice Holder

The sample vice which is provided with the system can be easily alternated with the pedestal. 1.2cm square mounting blocks (provided with the system) or the other pegs are held by the vice clamp.



Ordering Information:

93200	EMS 4500 Oscillating Tissue Slicer with: 2.5" wide media tray with pedestal, Razor Blades (25/pk), Gooseneck Magnifying Lens LED Lights, Adhesive, 1/16" hex key for blade angle adjustment and OperatingInstructions, 110V-240V.	each
93205	EMS 5000 Oscillating Tissue Slicer with: 2.5" wide media tray with pedestal, Specimen Vice Holder for 2.5" tray, Razor Blades (25/pk), Anodized Aluminum Blocks-Both Sizes (3/pk), Foot Switch with 6' Cable, Gooseneck Magnifying Lens LED Lights, Adhesive, 1/16" hex key for blade angle adjustment and Operating Instructions, 110V-240V.	each
93226	EMS 5000 Control Module and Refrigeration tray	each
93220	EMS 5000 With Refrigeration including 2.5" wide media tray with pedestal, Specimen Vice Holder for 2.5" tray, Razor Blades Anodized (25/pk), Aluminum Blocks-Both Sizes (3/pk), Foot Switch with 6' Cable, Gooseneck Magnifying Lens LED Lights, Adhesive, 1/16" hex key for blade angle adjustment and Operating Instructions, 110V-240V.	each

Replacement Parts:		Qty/pk
93020	General Purpose Razor Blades	25/pk
93211	Specimen Vice for Standard Tray	each
93050	Tray-Complete including Fixed Stage and Adjustable Pedestal	each
93401	Standard (2.5") Tray	each
93030-C	Pedestal Assembly	each
93402	Large Tray Only	each
93404	Fixed Stage Pedestal for Large Tray, Complete Assembly	each
93030	Surface for Standard Tray Pedestal	each
72588	Specimen Adhesive	5/pk
93034	Mounting Blocks 1/2"	3/pk
93035	Mounting Blocks 1"	3/pk
93036	Magnifier	each
93037	Foot Switch	each

Optional Accessories:

93039	Glass Blade Holder	each
93041	Sapphire Blade Holder	each
93060	Sapphire Blade	each

► Slicer Kit

To make your job easier we have put together a kit of accessories that will assist you when using our Oscillating Tissue Slicer.

Complete Kit includes: Sable brush, Parafilm 4x250', Quick Bond (5 tubes/pk), Kimwipes, Set of tweezers (#5, #6, #7) Fontax, Specimen forceps (4", 6"), Sample specimen bottle with cap-8ml (6per pack), Glass Microbeakers 5 ml (6 per pack), Glass Microbeakers 7.5 ml (6 per pack). -All items in the kit can be purchased separately.

93040	Slicer Kit	kit
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► EMS 4000 Replacement Parts

93030-C-4000-P	2.5" Tray and Pedestal Assembly	each
93401-4000	Standard (2.5") Tray	each
93030-C-4000	Small Pedestal Complete Assembly	each
93050	Large Tray with pedestal	each
93030-4000	Standard Pedestal Surface Only	each
93031	Large Pedestal Surface Only	each
93034	Anodized Al Mounting Blocks 1/2"	3/pk
93035	Anodized Al Mounting Blocks 1"	3/pk
93037	Foot Switch	each
93031-C	Pedestal for Large Tray, Complete Assembly	each
93026	Light Bulb	each
93020	General Purpose Razor Blades	25/pk

Recommended Accessories

93038	Glass Knife Holder: Allows you to reproducibly cut fresh (10µm sections) and fixed tissue. This holder attaches directly to the unit and will accommodate 6.4mm x25mm glass knives.	each
71016	Histology Glass Knife Strips; (6.4mmx25mmx400m) 30 per pack. Saver.	each
93050	Large Media Tray with Pedestal. 95 x 25 x 73mm (internal dimensions).	each

Top-of-the-range, high precision, vibrating microtomes...the finest slicers in the world for all specimen preparation.

► 7000smz-2, 5100mz, and 5100mz-plus Vibrating Microtomes

The 7000smz-2 unit with a z-axis deflection of Sub-Micron and a blade advance controllable to 10 microns/second. The 5100mz-Plus and 5100mz are very competitively priced high precision units with a z-axis deflection of only 1-2 microns and a blade advance controllable to 10 microns/sec. On all units the section thickness step size is 0.001mm. The 7000smz-2 and 5100mz-Plus are supplied with their own z-axis calibration verifier.

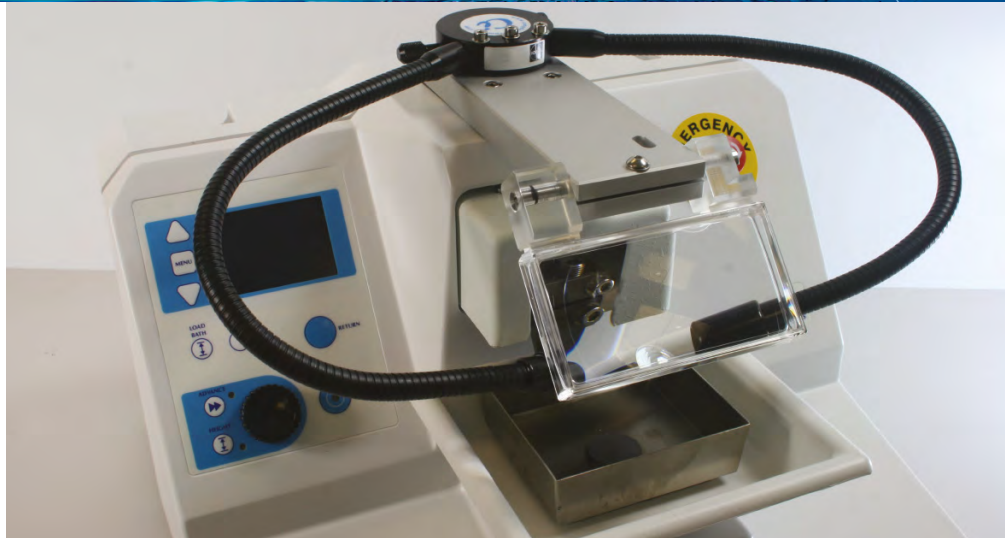
All types of sectioning is possible including sectioning for visual patching of neurological tissue, heart, and lung, and much more....

The effect of excessive Z-axis deflection on the health and viability of the tissue preparation has been much discussed since the publication of Jonas et al (2003) and the 7000smz-2 will now deliver perfect sections every time with sub-micron Z axis deflection across a wide range of vibration speeds and amplitudes. The affordable 5100mz-Plus offers almost the same features with Z-axis deflection of 1-2 microns at all vibration speeds and amplitudes, which is less than most other microtomes on the market.

The all-new user interface is both easy to use and versatile. The 7000smz-2 and both 5100mz models offer similar operation at the press of a button. The versatility includes simple operation at the push of a button or a range of changeable and programmable parameters and a menu enables the settings of your own preferences.

The 7000smz-2 also gives you longevity of performance, in other words it not only gives submicron performance out-of-the-box but the advance vibrating mechanism does not contain bearings and other components subject to wear. Consequently it will retain the sub-micron Z-axis deflection performance for years to come, giving you consistency in your biological preparation.

Tissue cooling is accomplished by the use of either an ice-water bath or an electronically controlled thermo-electric cooler. Other options include a LED cold light source and a magnifier or a stereoscope for clear observation whilst slicing.



FEATURES AT A GLANCE

7000smz-2:

- Includes a z-axis calibration unit
- Z-axis blade adjust minimizer
- Blade holder angle to user requirement
- Set start and stop position from blade travel.
- Vibration speeds from 50 to 120 Hz
- Amplitudes from 0.5mm to 2.5mm
- Controlled blade advance at 10microns per sec
- "Auto" programming by storage of the first slicing
- Ice water bath easily removed for cleaning
- Optional LED light and scope for clear observation

5100mz-Plus and 5100mz:

- Includes the Z-axis calibration unit (5100mz-Plus only)
- Vibration frequency from 50 to 80 Hz
- Adjustable amplitude from 0.5mm to 1.5mm
- Fine control of the blade advance (min. 0.1 mm/sec)
- Set start and finish position of blade travel
- Remote controls allowing for sterile use in culture hood
- Ice water bath easily removed for cleaning
- Optional cold light and magnifier for clear observation
- Optional Peltier cooled bath

The New 5100mz series Vibrating Microtomes share the User interface with the premium 7000smz-2, placing a wide range of adjustable parameters at the user's fingertips. Use in fully manual or the semi-automated "Slice window" mode which automatically remembers the start and finish position of the slice.

Model 5100mz-Plus

The 5100-Plus is perfect for those who need to keep slices viable for longer e.g. for electrophysiological field recordings. The user can calibrate the Z-axis deflection of the blade to 2 μ m with the adjustable blade holder and "Optical" Calibration device. Minimal Z-axis deflection reduces the "chatter" and minimises damage to the slice surface, leading to greater viability of the cells on the slice surface.

Model 5100mz

The 5100mz is a very competitively priced, high precision, vibrating microtome which shares many features with the top of the range 7000smz series, such as the vibrating mechanism, the inner and outer tissue baths and the easy to use control system.



5100 Series: Control box on umbilical cord ideal for operation in an isolated environment

This New entry-level Microtome is perfect for techniques such as histology, organotypic slice culture and low resolution imaging with a fixed blade holder and a mechanism Z axis error of \approx 5-8 μ m.

Options

Temperature Controlled Standard Tissue Bath

Model 7610

Product Description

The 7610-A Tissue Bath Cooler Unit is intended for use with our 7000 and 5000 range of vibrating microtomes. Unfixed brain slices sectioned at 4°C give better tissue preservation and are viable for longer in-vitro recordings. Additionally, some enzyme histochemical techniques give better staining results when sectioned at low temperatures.

The 7610 Series coolers use "Peltier" thermoelectric elements. The stainless steel tissue bath and mount are detachable to allow sterilisation by autoclave if required.

The equipment comprises of a mains operated control unit, cooling element, tissue bath and specimen holder. The control unit houses a power supply and temperature control circuitry. The cooling element assembly consists of thermoelectric "Peltier" elements, temperature feedback sensors and a cold water fed heat exchanger. Current from the power supply flows through the thermoelectric elements, which act as heat transfer units. Heat is drawn off, cooling the solution in the tissue bath. The heat generated by this process is removed by the water supply fed through the heat exchanger. The unit uses a proportional temperature control algorithm to maintain temperature stability. This will hold the bath temperature to within 0.5°C of the temperature set point. There will, however, be a small variation in temperature vertically through the bath. Experience will show the best temperature to be set for any given requirement and ambient temperature.

Product Specifications

Display Resolution:.....0.1°C	Voltage Requirements: .....230V 50Hz or 115V 60Hz
Temperature Accuracy:+/- .5°C	Power Rating:.....60W
*Temperature Range:.....+8°C to 0°C	Inlet Fuse Rating: .....2A

**Note that the actual temperatures achievable will be dependent upon the solutions used and local temperature conditions*



Tissue Bath mount

Integrally Mounted Magnifying Glass

Model 7000-1-3



Product Description

For general global slices a magnifying glass offering approx 2x magnification is sufficient. However, if specific loci are under study then an inspection microscope is desirable. The binocular inspection microscope with 10x-40x magnification, a zoom of 1x-4x and a working distance of 80mm is ideal for the task.

Product Features

- 115mm Diameter
- 305mm Focal Length
- 2x Magnification

Integrally Mounted Inspection Microscope

Model 7000-1-1
(x20-x40)

Model 7000-1-2
(x5 and x10)



Integrally Mounted Cold Light Source

Model 7000-2-1

Product Description

To facilitate the careful slicing operation, it is most important that the progress of the blade through the tissue be clearly observed. This observation is used to ensure control of the speed of advance and of the oscillation of the blade. Two elements are required for clear observation, light and magnification.

Product Features

- Ability to direct the light where needed with two flexible fiber optic light guides.
- Maintains temperature stability of the tissue or surrounding a.c.s.f.
- Light Intensity is adjustable by a rotary dial knob.
- 20W/12V Halogen lamp
- 2000 hour life approx.
- Fan and electronic power supply
- Adjustable with potentiometer
- Twin 500mm fiber optic light guides

Integrally Mounted Cold Light Source and Magnifying Glass

Model 5100-1-3

Product Description

A magnifying glass for general global slices offering approximately 1.5x magnification. Integral cold light powered directly via the Model 5100mz Vibrating Microtome.



Upgrade Kit for 5100mz

Model 5100-1-45

Optional kit to upgrade the 5100mz to the 5100mz-Plus. Allowing the user to optimally calibrate the Z-axis deflection of the blade to 2± 0.1 µm.

5100-1-45 Upgrade Kit for 5100mz each

Specifications

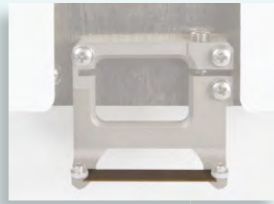
	7000smz-2	5100mz
Section thickness step size	1 μ m	1 μ m
Vertical (Z-axis) calibration device	'Opti-cal' included as standard	'Opti-cal' optional extra
<i>Campden's 'Opti-cal' is calibrated with metrology equipment traceable to National Standards</i>		
Vertical (Z-Axis) Deflection (Calibration)	Sub- μ m ($\pm 0.1 \mu$ m)	$\approx 5-8 \mu$ m (2.0μ m ± 0.1 with calibration upgrade kit)
Max specimen size	33*50*19	33*50*19
Maximum (vertical) travel of bath table	19 mm	19 mm
Memory to store section thickness	Yes	Yes
Multiple user settings	8 different	8 different
Cutting head advance speed, while slicing	From a minimum of -1.00 mm/sec, through zero to a maximum of +1.00mm/sec	From a minimum of -1.0 mm/sec, through zero to a maximum of +1.0mm/sec
Cutting head advance speed resolution while slicing	0.01 mm/sec	0.1 mm/sec
Cutting head advance speed max (fast mode when not slicing)	+/- 4.0 mm/sec	+/- 2.0 mm/sec
Specimen retraction as blade retracts	Yes	Yes
Cutting head retraction speed (fast mode)	4.0 mm/sec	2.0 mm/sec
Automation	Manual, semi-auto 'Slice Window' or fully automated 'Profile Repeat'	Manual or semi-automated 'Slice Window'
Blade oscillation Frequency range (dependent on amplitude)	50-120 Hz	50-80 Hz
Frequency step size	5 Hz	5 Hz
Blade oscillation amplitude	Minimum: 0.5 mm (nominal) Maximum: 2.5 mm (nominal)	Minimum: 0.5 mm (nominal) Maximum: 1.5 mm (nominal)
Amplitude step size	0.25 mm (nominal)	0.5 mm (nominal)
Cooling options	Ice bath surround or Peltier type temperature controller	Ice bath surround or Peltier type temperature controller
Power requirements	115VAC 60Hz 230VAC 50Hz (selectable)	90-264 VAC 50/60Hz (Switch Mode PSU)
Power rating	100W	65W
Fuse rating (115V) (230V)	T2A 250VAC T2A 250VAC	T2A 250VAC T2A 250VAC
Light source	100-240Vac 3W mains connection	Powered from 5100mz
Dimensions	410mm W x 400mm D x 270mm H (excluding light source and microscope)	350mm W x 450mm D x 350mm H (excluding magnifier/light source)
Weight	35kg	15kg
Packaged weight & dimensions	Wooden crate 70x54x48cms, 55Kgs	Box wt & dims TBA



Consumables

Ceramic Blades Model 7550-1-C

The new blade holder design is now included with all Integraslice and Vibroslice instruments. 7550-1-C and 7550-1-SS are designed for new Integraslice instruments.



Product Features

- Made from ultra hard zirconium
- Honed by a process of "lapping" both sides of the single bevel to micron flatness
- Great rigidity, hence a straight cutting edge
- Prolonged slice life, especially in the most difficult of tissues such as young brain or very old brain
- Inert and impervious to corrosion
- Initial higher cost is offset by its longevity
- Fits into a special blade holder now standard on both Integraslice and Vibroslice instruments
- Dimensions: 38mm x 7mm x 0.5mm

Stainless Steel Blades

Model 7550-1-SS



- Double beveled on both faces, honed to an acute cutting edge and hardened to 56 Rockwell.
- Nevertheless, stainless steel is relatively soft and these blades are usually used once or at a maximum changed every day.
- These blades are for use in specially designed blade holders for Vibroslice instruments manufactured prior to 2003.

Blade Specifications

	7550-1-SS	7550-1-C
Material	Stainless Steel	Ceramic
Dimensions	38mm x 9mm x 0.5mm	38mm x 7mm x 0.5mm
Geometry	Double sided	Single sided
Bevel	Double bevel	Single bevel
Honing	Ground edge	Lapped edge
Packaging	50 per pack	5 per pack

Ordering Information

7000smz-2 and 5100mz-Plus, and 5100mz Vibrating Microtomes, Options, and Accessories

The finest vibration microtomes with sub-micron z-axis deflection at all speeds and amplitudes of vibration.

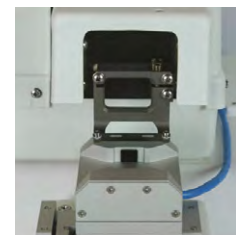
5100mz-Plus	Vibrating Microtome, includes demountable tissue bath (7000-1-3) and sample blades in stainless steel and ceramic. 115V or 220V	each
5100mz	Vibrating Microtome, includes demountable tissue bath (7000-1-3) and sample blades in stainless steel and ceramic. 115V or 220V	each
7000smz-2	Programable Vibrating Microtome, includes demountable tissue bath (7000-1-3) and sample blades in stainless steel and ceramic plus 'Opti-Cal' z-axis calibration device. 115 V or 230 V	each

Upgrade Kit for 5100mz

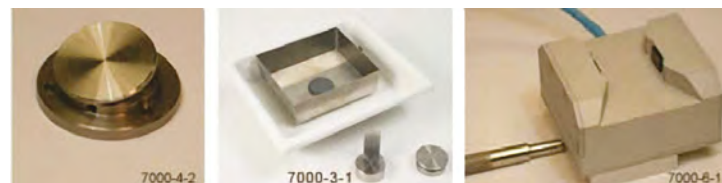
Model 5100-1-45

Optional kit to upgrade the 5100mz to the 5100mz-Plus. Allowing the user to optimally calibrate the Z-axis deflection of the blade to $2 \pm 0.1 \mu\text{m}$.

5100-1-45	Upgrade Kit for 5100mz	each
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Optional Accessories



7610-A	Standard Temp. Controlled Tissue Bath (autoclavable) and Controller	each
7000-1-3	Magnifying Glass, mounted to machine	each
7000-1-2	Inspection Microscope fixed x5-x10	each
7000-1-1	Inspection Microscope zoom x20-x40	each
7000-2-1	Cold Light Source	each
5100-1-3	Integrally Mounted Cold Light Source and Magnifying Glass for 5100mz and 5100mz-Plus	each

Spares and Accessories

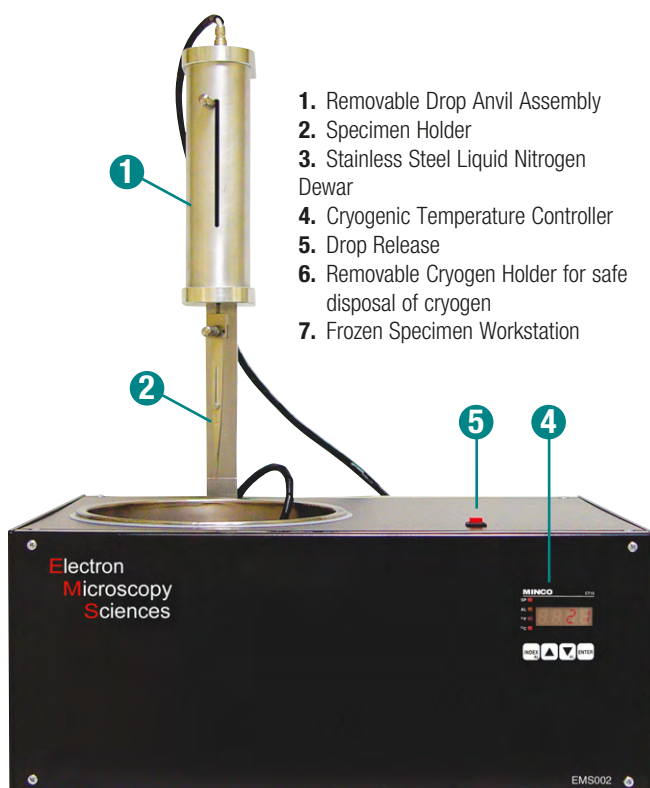
7000-3-1A	Tissue Bath Mount (additional price only - this mount comes standard with purchase of 5100mz or 7000smz-2)	set
7000-3-2	Stainless steel inner specimen bath	set
7000-4-1	Specimen Mount Only	each
7000-4-2	Tilting Tissue Mount	each
7000-5-3	Blade holder- special angle, includes right and left hand clamp screws, single-axis adjustment screw	each
7000-6-1	'Opti-Cal' Z-axis measurement, traceable to national standards	each
7000-7-1	Blade handling tool	each
7000-50-1	Tool kit - hexagonal drivers	each
7000-60-1	Transit crate, includes packaging expansion bags	each
7550-1-SS	Stainless steel blades - narrow, ultrasonically cleaned	pk/50
7550-1-C	Ceramic blades	pk/5

► EMS-002 Cryo Workstation

Economical, Universal Application Rapid Freezing Workstation

Overview

Ultrarapid freezing, when used in conjunction with appropriate accessory processing methods has long been recognized to provide reservation of ultrastructure, localization of soluble inorganic and organic species, and preservation of antigenicity that is superior to that obtainable through conventional chemical fixation techniques and the use of cryoprotectants. Furthermore, it is the only procedure currently available for capturing events that occur on timescales less than a few seconds. Successful ultrarapid freezing requires that heat be withdrawn so rapidly from an unfixed un-cryoprotected sample that no ice crystal damage is visible at the electron microscopic level of analysis. This is not a trivial undertaking, and until recently, the improvements gained through ultrarapid freezing were often paid for in terms of decreasing productivity. However, over the last several years, improvements in methodology and the introduction of refined equipment for the ultrarapid freezing of biological samples has significantly improved both the ease of application of technique and the yield of well preserved samples. The EMS-002 Cryo Workstation allows for a reliable virtually routine freezing of biological samples



1. Removable Drop Anvil Assembly
2. Specimen Holder
3. Stainless Steel Liquid Nitrogen Dewar
4. Cryogenic Temperature Controller
5. Drop Release
6. Removable Cryogen Holder for safe disposal of cryogen
7. Frozen Specimen Workstation

Applications:

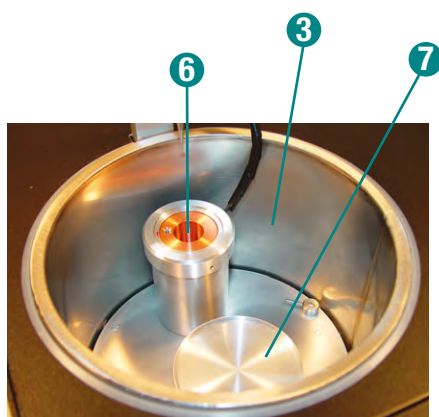
- Cryo-fixation of virus partials
- Cryo-fixation of isolated or assembled macromolecules
- Cryo-fixation of emulsions paints and polymers
- Cryo-fixation of suspension and tissues for Cryo-techniques such as freeze fracture/etch, freeze drying, freeze substitution.

Advantages:

- Economical, universal application rapid freezing unit.
- Plunge freezing with temperature controlled cryogen.
- Frozen samples handled under cold dry nitrogen atmosphere.
- Rapid set up and easy use.
- Reproducible results.
- High and low set points for cryogen control.

► Temperature Controller

This allows the user to set desired holding temperatures of the cryogen being used for the freezing process. Easy to use controller also has settable arms to alert the user that the cryogen is warming up and the unit needs attention before the cryogen reach is evaporation temperature.



► EMS-002 Cryo Workstation (continued)

► Optional Accessories

1. Freeze Substitution Module

Allows the EMS-002 to perform freeze substitution and progressive lowering of temperature (PLT) on a routine basis.

2. Cryo-TEM Transfer Interface

Allows the direct insertion of Gatan cryo-holder into the plunge freezer's liquid nitrogen dewar.

3. Climate Controlled Environmental Chamber

Inhibits air-drying and pre-cooling of samples prior to freezing. Allows easy sample blotting to achieve the optimal amount of sample on your TEM grid.

4. Metal Mirror Impact Freezing Fixture

Allows user to quickly change from the plunge freezing to impact freezing.

5. Diamond Anvil

Special freeze anvil with real diamond plate for rapid freezing and easier specimen removal. Does not require polishing like standard copper anvils.

6. Automatic Liquid Nitrogen Filling

Keeps constant LN₂ level in the Dewar automatically. (Note: To be used only in conjunction with basic plunge freezing or freeze substitution.)

7. Propane Transfer System

Allows the operator to efficiently transfer propane to the condensation chamber from the propane storage vessel.

8. Freeze Forceps

Special tweezers specifically for use with the plunge freezer that are self locking. Extra sets allow quicker turnaround when freezing multiple samples.

9. Muscle Biopsy Clamps

Clamps designed for human muscle biopsies to keep the muscle from contracting during fixation.

► Recycling and Operating Costs

The recycling time of the device is less than three minutes, just long enough for it to be ready when you finish processing the last sample. The operating cost is about \$0.47 per sample, depending on the price of liquid nitrogen. The device will operate for about two hours on 10 L of liquid nitrogen, including the initial cool down.

Specifications

Dimensions:	Width — 11 inches (279mm)
	Depth — 13 inches (330mm)
	Height — 14 inches (356mm)
Electrical:	100 VAC-240 VAC 50/60 Hz 8A
Temperature Range:	+30 to -200°C
Liquid Nitrogen Consumption:	1 to 2 L per hour
CryoGen Volume:	approximately 20 mL

► Process of Ultra-Rapid Sample Cooling

The EMS-002 achieves ultra-rapid cooling by quenching the sample in liquid propane or other suitable cryogen, cooled to near liquid nitrogen temperature. The EMS-002 accomplishes this by using a stainless steel vacuum insulated Dewar and copper condensation chamber. Liquid nitrogen is poured into the Dewar to a level determined by the user. The initial cooling of the cryogen condensation chamber takes about 15 to 20 minutes.

Gaseous propane is then admitted to the condensation chamber slowly enough to allow it to condense and fill the chamber with liquid propane. The propane is led to cool to near liquid nitrogen temperature supervised by the digital temperature controller while the sample is being prepared for freezing. The device requires only about 10 minutes to cool to operating temperature after the first filling of propane, and less than five minutes after subsequent fillings.

The operator can increase or decrease the rate of cooling by adjusting the level of liquid nitrogen in the Dewar. Heaters built into the chamber wall, powered by the temperature controller, evenly warms the propane above its melting point. The controllers' temperature is set for the kind of cryogen being used, for instance, 185°C for commercial grade propane.

Chemically pure propane (map. 190°C) can also be used, but it is significantly more expensive than commercial grade propane and confers no particular advantage. Ethane and a non-flammable cryogen, SUVA-124 produced by Dupont can also be used as a cryogen in this instrument. When using flammable cryogens like Propane & Ethane we recommend using the EMS-002 in a fume hood.

► Sample Preparation

The sample can be prepared using any favorite size EM Grid if the system is being used for Cryo-TEM or Panama hat-shaped specimen carriers for Freeze-Fracture or Freeze Substitution. Once the sample is applied to the EM grid for instance, the excess must be carefully blotted away with a small piece of filter paper. Remember, the goal is to form a thin meniscus of specimen across the holes in the grid. Once achieved, insert the specimen holder in the "Drop Anvil" of the EMS-002.

► Results and Techniques

The technique provides higher rates of cooling than can be achieved by plunging the sample into the cryogen by hand because of the high velocity and accuracy the sample enters the cryogen. The optimal plunging speed is approximately 100m per/sec it provides more efficient heat exchange. The freezing is fast enough to capture rapid events and labile structures that are not seen in chemically fixed material. The technique has been applied to many types of specimens: aqueous suspensions and emulsions, tissue culture cells, suspensions of a cells, and tissues. Specimens frozen with the EMS-002 may be freeze fractured, freeze substituted, frozen thin sectioned, or freeze dried. The samples may also be used for Cryo-SEM or Cryo-TEM.



➤ EMS-002 Cryo Workstation (continued)

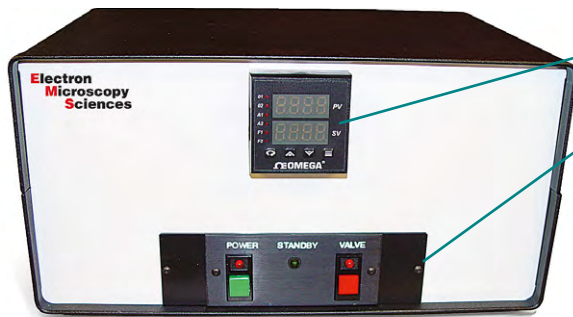
➤ Accessories

➤ 1. Freeze Substitution Module for EMS-002 Cryo Workstation Part # 34765

In the 1980s descriptive ultrastructure analysis essentially came to the end and microscopists found they needed to correlate structure with function to advance their research. About the same time biochemists and molecular biologists were able to see where molecules interacted with cellular membranes. It was essential to marry the work of the structural biologists to the functional biologists by preserving the ultrastructure in the antigenicity of the tissue. During this research it was determined early on that conventional methods of fixation using chemicals were unsuitable for such studies because of the extensive redistribution of proteins, extraction of cytoplasmic constituents, and destruction of cellular antigenicity.

Freeze substitution, which is the dissolution of freezing water (ice) in the frozen specimen at low temperature has turned out to be one of the most powerful techniques in electron microscopy. The dissolution of the ice within the specimen is achieved by substituting water molecules with molecules of an inorganic solvent like acetone, while simultaneously fixing the biological material with Osmium tetroxide and blocks staining with Uranyl acetate. This slow dissolution of the ice takes place over many hours at slowly increasing temperatures. Once the substitution process is complete the samples can be infiltrated and embedded with a wide range of Epoxies or Acrylics. It is even possible to perform a low temperature embedding at -50° Celsius using specialized resins. The end results are beautifully preserved specimens possessing both antigenicity for your immuno-localization studies and perfect structural relationship for descriptive ultrastructure analysis.

The EMS-002 Freeze substitution module is a simple cost-effective method to achieve freeze substitution. Once your samples are frozen on the EMS-002 Cryo Workstation the cryogen condensation module can be removed from the stainless steel Dewar and replaced with the substitution chamber. The freeze substitution controller will control the liquid nitrogen levels automatically as well as the substitution process itself. The user just has to monitor the systems progress during substitution and perform scheduled substitution media changes.



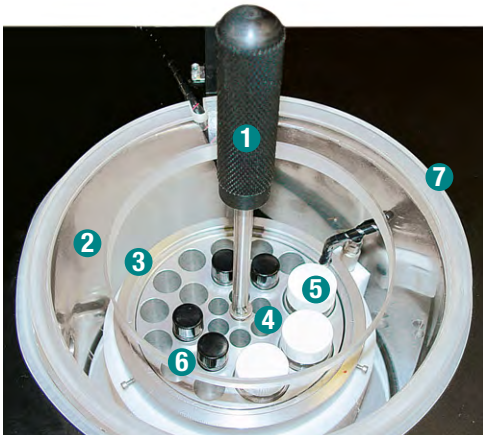
➤ Freeze Substitution Controller

1. Programmable Substitution Temperature Controller:

Comes preprogrammed from the factory to control precise ramp/soak times and temperatures critical to successful freeze substitution

2. Liquid Nitrogen Level Controller:

Since the substitution process runs over the course of many days using published protocols, the LN2 controller insures that LN2 levels inside the Dewar are maintained at a level appropriate for the process step being executed.



➤ Freeze Substitution Chamber

1. Transfer tool enables users move the substitution chamber in and out of the substitution chamber while at cryogenic temperatures.
2. Vacuum insulated stainless steel LN2 Dewar (Part of the Plunge Freezer)
3. Substitution chamber acts as the main heat sink and control interface for the substitution chamber.
4. Substitution holders large mass enhances temperature stability for the samples and media.

5. Substitution Media Vials Holders:

Allows users to store extra substitution media at the correct process temperature for solution exchanges as required by the protocol being used.

6. Specimen Vials Holders: Containers for the tissue being substituted as well as the substitution media.

7. Substitution Chamber Lid: Helps maintain Dewar temperature stability and a pure Nitrogen gas atmosphere. Also excludes water vapor from the substitution chamber.

➤ 2. Cryo-TEM Transfer Interface Part # 37000-T

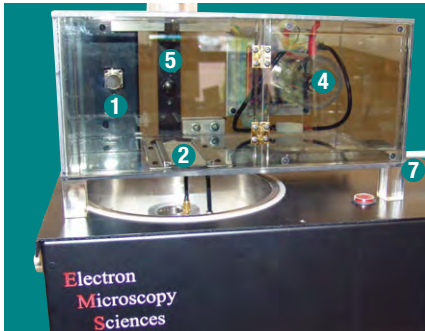
It is possible to directly transfer your vitrified samples using the Cryo-TEM transfer interface, along with your Gatan 3500 series ultra-low temperature, tilt rotate specimen holders. The transfer interface allows the direct insertion of Gatan cryo-holder into the plunge freezers liquid nitrogen dewar. This will allow easy cryogenic transfer of the vitrified sample directly to the microscope via the 3500 cryo-holder right from the work platform within the dewar. Please consult the EMS product manager for options as the transfer holder is not compatible with all possible plunge freezer configurations.



➤ EMS-002 Cryo Workstation (continued)

➤ 3. Environmental Chamber
Part # 37457

Some plunge freezing applications will require a controlled environment for the samples to be frozen in a satisfactory manner. The environmental chamber module can provide specific relative humidity and temperatures required for many types of samples. The dry nitrogen atmosphere below the environmental chamber allows us to precisely adjust the relative humidity, upwards, and easier to add water in this case. We choose to control the temperature then manually adjust the humidity by adding small quantities of water to the environment by vaporization. The vaporized water is quickly and evenly distributed throughout the chamber by a circulation fan. The integrated shutter mechanism prevents the sample from precooling before it is rapidly frozen.

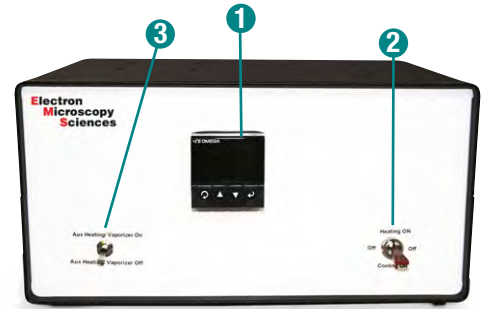


➤ Instrument Overview

1. **Temperature & Humidity Sensor:** Sends temperature & humidity data to controller.
2. **Baffle Comb:** Allows used to transfer frozen sample to be transferred to the plunge freezer's "Work Platform" without allowing the Dewar gas to enter the chamber while shutter is closed.
3. **Shutter:** Keeps the controlled atmosphere inside the Chamber till the sample is to be frozen. It also can prevent pre-cooling of the sample. (Not shown)
4. **Heating & Vaporizer:** This provides a good portion of the heat load. It also serves to vaporize added water if the humidity is too low.
5. **Vertical Mounting Bar:** Serves to anchor the Chamber to the Cryo Workstation.
6. **TEC (Thermo Electric Cooler):** This assembly has a solid state device at its center that heats & cools depending on the polarity of the voltage applied. Used for addition heating and cooling but its main function is to lower humidity if the humidity is too high.
7. **Shutter Re-set:** Plunger is pressed in firmly to lock the shutter in the closed position.
8. **Water Tube:** Is used to introduce tiny amounts of water into the Heating/Vaporizer assembly if the humidity inside the chamber is too low. (Not shown)

➤ Controller Front Overview

1. **Controller:** Used to maintain temperature inside of the chamber and MONITOR Humidity only.
2. **Heat/Cool Selector Switch:** Allows user to select additional heating for the chamber or cooling which can be used to reduce the humidity in the chamber.
3. **Aux Heating/Vaporizer Mode Switch:** Simple on-off switch to turn on the vaporizing chamber, rapidly adding water vapor to the environment.



➤ 4. Metal Mirror Freezing Kit Part # 37455

This technique has been widely used for fast freezing of very small samples where you only need 5 to 10um of good freezing while maintaining specimen orientation. Metal mirror freezing has been available for quite some time and was used extensively in conjunction with freeze fracture, and deep etch rotary shadow. In the traditional method, the sample was placed on top of a slice of aldehyde fixed lung hung upside down. Once mounted its accelerated onto the surface of a copper block that was cool to liquid nitrogen temperature. Some investigators even used liquid helium to achieve higher rates of thermal transfer between the copper block and sample.



➤ 5. Diamond Anvil Part # 37015

Special Freeze Anvil with real diamond plate for better rapid freezing and easier specimen removal. Does not require polishing like standard Copper anvils.

➤ 6. Automatic Liquid Nitrogen Filling Part # 37454

Keeps constant LN2 level in the Dewar Automatically. (NOTE: To be used only in conjunction with basic plunge freezing or freezing substitution.)

➤ 7. Propane Transfer System Part # 37015

Allows for the efficient transfer of propane to the condensation chamber from the propane storage vessel.

➤ 8. Freeze Forceps

Part # 37458

Special tweezers specifically for use with the Plunge Freezer that is "self-locking". Extra sets allow quicker turn around when freezing multiple samples.



➤ 9. Muscle Biopsy Clamps

Part # 37459

Clamps designed for human Muscle biopsies to keep the muscle from contracting during fixation. Now it is possible to improve the morphology of the sample by rapid freezing by plunging into liquid cryogen. Fits directly into the drop anvil on the Plunge Freezer.



Ordering Information

37000	EMS-002 Cryo Workstation Complete with Removable Drop Anvil Assembly, Stainless Steel Liquid Nitrogen Dewar, Cryogen Temperature Controller, Cryogen Holder, and Instructions. 110V-240V	each
37465	Freeze Substitution Module	each
37000-T	Cryo Transfer Face for TEM	each
37457	Environmental Chamber	each
37455	Metal Mirror Kit	each
37456	Diamond Anvil	each
37454	Automatic Liquid Nitrogen Filler	each
37015	Propane Transfer System	each
37458	Freeze Forceps	each
37459	Muscle Biopsy Clamps	each

Please see the following pages for our latest High-End Vacuum Equipment and Accessories

Cooling Stages.....1004–1005

The EMS Coolstage for SEM, LV or VP1004–1005

Recirculating Heaters and Chillers1006–1007

EMS 3500 Thermocirculator1006

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Coaters and Coater Targets Replacement Parts

EMS 450 Carbon Coater

The EMS 400 and 450 Carbon coaters have been replaced by the EMS150RE.

Parts and accessories for the EMS 450 are listed below.

Carbon

91045	Carbon String, 1 meter	meter
91046	Carbon Cord, 1 meter	meter

Replacement Parts

91013	Glass Cylinder 165mm (6")	EMS 450, 500, 550
91014	"L" Gaskets to suit 165mm (6") cylinder	
	EMS 450, 500, 550	1 pair

EMS 500, 550, 575, 650 and 675 Sputter Coaters and EMS 975 and 975S Large Chamber Turbo Evaporator

EMS is pleased to offer the 150 and 300 series sputter coater and combined carbon and sputter coater.

- EMS150R ES— a combined system with sputtering and carbon fibre coating replaces the EMS 500 and 550.
- EMS 150TS replaces the EMS 575X
- EMS 300TD replaces the EMS 575XD
- EMS 300RT and EMS 300TTreplace the EMS 600, EMS 650, and the EMS 675X

Parts and accessories for the EMS 575, 650, 675 and 975 are listed below.

Accessories

92045	EMS 50 Water Chiller
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Replacement Targets

EMS strives to maintain accurate pricing. However, due to fluctuations in precious metal prices, pricing on products containing precious metals is not guaranteed. We will contact you if there is a discrepancy.

91010	Gold Target	EMS 500, 550, 575T	each
91011	Gold/Palladium Target	EMS 500, 550, 575T	each
91012	Platinum Target	EMS 500, 550, 575T	each
91013	Chromium Target	EMS 575T	each
91014	Tungsten Target	EMS 575T	each
91030	Gold Targets*	EMS 650, 675X	x3
91031	Gold/Palladium Targets*	EMS 650, 675X	x3
91032	Platinum Targets*	EMS 650, 675X	x3
91013	Chromium Targets*	EMS 675X	x3
91014	Tungsten Targets*	EMS 675X	x3

(*Recommended change as set of three)

Replacement Parts

91033	Glass Cylinder 225mm (8")	EMS 650, 675X, 975, 975S
91034	"L" Gaskets to suit 225mm (8") cylinder	
	EMS 650, 675X, 975, 975S	1 pair

Replacement Source

91077	Carbon Rods (6.15mm Dia.),	EMS 975, 975S	12/pack
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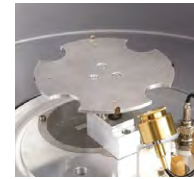
Selection Guide: Specimen Stages for EMS Equipment

The EMS line of specimen stages meets most requirements. All are easy-change, drop-in style (no screws) and are height adjustable (except rotary planetary stage). Examples:

Cat #	Stage Type	Description	Compatible Equipment
4500-1	50mm	Standard stage with six stub positions for 15 mm or 6.5 mm or 1/8" pin stubs (same as #3330, 6401, 6552)	All EMS Series
4500-2	Tilt	Rotate-tilt stage with six stub positions for 15 mm or 6.5 mm or 1/8" pin stubs. Tilts Up to 90° from horizontal (same as #3340, 4519, 6400-S, 6551)	All EMS Series
4500-3	4" Wafer	Adjusts to accept 2", 3", 4" wafers comes with 4500-6, a 4" stub holder to accept up to 18 1/8 pin stubs (same as #6549)	All EMS Series
4500-4	6" Wafer	Adjusts to accept 4" & 6" wafers comes with 4500-7, a 6" stub holder to accept up to 27 1/8 pin stubs (same as #6547)	EMS 300
4500-5	8" Wafer	Adjusts to accept 6" & 8" wafers comes with 4500-8, an 8" stub holder to accept up to 54 1/8 pin stubs	EMS300TT EMS300RT
4500-6	4" Stub Holder	A 4" stub holder to accept up to 18 1/8 pin stubs	All EMS Series
4500-7	6" Stub Holder	A 6" stub holder to accept up to 27 1/8 pin stubs	EMS300TT EMS300RT EMS300TD
4500-8	8" Stub Holder	An 8" stub holder to accept up to 54 1/8 pin stubs	EMS300TT EMS300RT
4500-9	4" Wafer & Offset Gearbox	A combination of 4500-3 and a small gearbox to offset the sample position Enable even coating of up to a 4" sample size. (same as #3360, 4522)	EMS150T EMS150R
4500-10	Fibre Stage	A stage accept single fibres or pins up to 1 mm diameter rotating horizontally to achieve all round coating	EMS150T EMS150R
4500-11	6" Square Wafer	Stage to accept 6" square wafer or Masks	EMS300TT EMS300RT
4500-12	Rota Cota	"Rota Cota" planetary stage with six stub positions for 15 mm or 6.5 mm or 1/8" pin stubs. Tilts up to 30° from horizontal (same as #4521, 6402, 6553)	EMS150T EMS150R
4500-13	8 Place Stub	8 places for 25 or 30mm Polished embedded samples. Includes a polished Brass Tally	All EMS Series
4500-14	14 Place Stub	14 places for 25 or 30mm Polished embedded samples. Includes a polished Brass Tally	All EMS Series
4500-15	9 Place Coverslip	A Stage to accept 9 20X20 cover slips. The top part of stage lifts off and has a mechanism to lift the cover slips for easy removal	All EMS Series
4500-16	4 Place 25mm Stub	4 Place 25mm Stub Stage with locking screws. May be fitted to 4500-12 rota cota stage	All EMS Series
4500-17	Slide Stage	Microscope slide stage for up to two 75 mm x 25 mm slides or eight stub positions for pin stubs. (same as #3370, 4520, 6403, 6554)	All EMS Series



4500-2 Tilt Angle



4500-3 4" Wafer



4500-12 Rotary Planetary



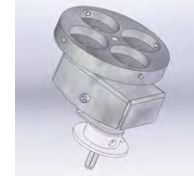
4500-13 8 Place Stub



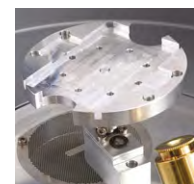
4500-14 14 Place Stub



4500-15 9 Place Coverslip



4500-16 4 Place
25mm Stub



4500-17
Glass Microscope

Why cool?

Low vacuum (LV) or variable pressure (VP) modes are now standard on most scanning electron microscopes (SEMs). For this reason it has become important to control water evaporation from wet specimens. Cooling such specimens reduces the loss of water by evaporation, or - depending on chamber pressure - can prevent it altogether.

Saturated vapour pressure of water decreases considerably with temperature. At room temperature, water will very quickly evaporate - causing considerable damage to specimen composition and ultra-structure. This is due to high forces of surface tension at the drying front as it passing through the specimen. In most biological systems this will result in distortion and collapse of membranes and other structures.

At 300Pa, the specimen temperature needs to be less than -9.5°C , and at 85Pa less than -25°C to stop water evaporation. Therefore, by cooling a specimen to -25°C , chamber pressures up to 85Pa can be used with little or no water loss by evaporation. In this way, changes in specimen structure can be minimised. In addition, being able to operate at higher vacuum gives a better signal-to-noise ratio and clearer images.

► The EMS Coolstage for SEM, LV or VP

Overview

The Coolstage is a Peltier-driven SEM cooling stage for scanning electron microscopy (SEM), low vacuum (LV) or variable pressure (VP) applications. The stage can be cooled to sub-zero temperatures for specimens that may be sensitive at ambient temperature, subject to beam damage, or may otherwise 'sublime' (lose water) at ambient temperatures.

There are three versions of coolstage - Standard, Enhanced and Ultra - to cover differing specimen requirements.

Features - Standard Coolstage

- Temperature range -30°C to $+50^{\circ}\text{C}$ at 300Pa
- Self contained cooling - no additional external cooling water needed
- Temperature accuracy $\pm 1.5^{\circ}\text{C}$ or 2% - whichever is greater
- Minimal image drift
- Cooling and heating rates of up to 30°C per minute
- Keypad control - with simultaneous display of actual and target temperature
- Supplied with SEM chamber port feedthrough - specify when ordering
- One-year warranty

Features - Enhanced Coolstage

- Temperature range -30°C to $+160^{\circ}\text{C}$ at 300Pa
- All other specifications as per Standard Coolstage

Features - Ultra Coolstage

- Temperature range -50°C to $+50^{\circ}\text{C}$ at 300Pa
- All other specifications as per Standard Coolstage

Product Description

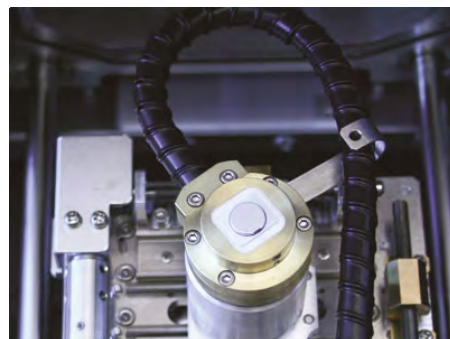
The Coolstage is a temperature-controlled specimen stage that can be fitted to any low vacuum (LV) or variable pressure (VP) scanning electron microscope (SEM).

The Standard Coolstage consists of a single stage Peltier device, onto which a thermally isolated specimen holder and dual temperature sensor is mounted. The Coolstage assembly is mounted onto the SEM stage using an adaptor plate specific to the microscope. Cooling pipes and electrical wires connect to the SEM feedthrough flange. External components are a recirculating water chiller and power supply case, and a compact keypad for digital temperature readout and control.

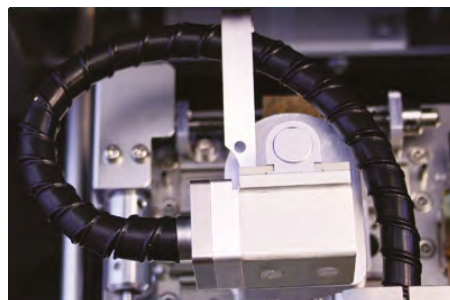
Compact, efficient cooling and temperature control

The temperature range of the Standard Coolstage is -30°C to $+50^{\circ}\text{C}$ at 300Pa. The specimen holder is water-cooled using a small, self-contained closed loop recirculating chiller that is normally positioned approx 2m from the SEM. A microprocessor controls and monitors the temperature of the cold stage. A small keypad is used to set the required temperature and display target and current temperatures.

The specimen holder has been designed to minimise image drift due to temperature change, giving a stable image at high magnification. An integrated RS-232 interface allows temperature to be set and read from the SEM.



Standard Coolstage. Range: -30°C to $+50^{\circ}\text{C}$ at 300Pa



Ultra Coolstage. Range: -50°C to $+50^{\circ}\text{C}$ at 300Pa



► The EMS Coolstage (Continued)

Rapid specimen exchange

To exchange a specimen it is necessary to increase the specimen stage temperature to ensure that condensation does not form on the specimen or specimen stage. The keypad controller has a convenient 'exchange' button that will automatically take the specimen holder temperature to a programmable temperature from between +5°C to +20°C. Typical cooling and heating rates are up to 30°C per minute.

When not in use, the major parts of the system can be left in situ and the cooling stage is very easily removed when reverting to 'normal' use. A convenient storage block is provided for Coolstage stage assembly and vacuum feedthrough for when the system is not in use.



Coolstage and vacuum feed through connected to the storage block (stage protected by plastic shutter)

Specifications

- Specimen size10mm Ø (adaptor stub for 12" Hitachi stubs can be supplied on request)
- Stage Temperature RangeNOTE: Higher vacuum will allow for cooler temperatures, compatible with high vacuum levels to 1x10⁻⁵Pa
Standard Coolstage: -30°C to +50°C at 300Pa with no external cooling water from SEM (at ambient +20°C)
Enhanced Coolstage: 30°C to +160°C at 300Pa with no external cooling water from SEM (at ambient +20°C)
Ultra Coolstage: -50°C to +50°C at 300Pa with no external cooling water from SEM (at ambient +20°C)
- Temperature display resolution-0.1°C
- Temperature stability+/- 0.2°C
- Temperature accuracy+/- 1.5°C or 2% (whichever is greater)
- Stage movementNormal x, y and z movements maintained. Tilt maintained for X-ray analysis (up to 45°). No rotation
- Working distanceAs on SEM, Coolstage is set to the SEM Eucentric height
- Operating voltage.....100V or 115V or 230V @ 100VA, voltage tolerance +/- 10%
- Size and weightOperation/display unit: 90mm L x 112mm W x 350mm H, 300g
 Power supply/cooling unit: 305mm L x 245mm W x 330mm H, 15kg
- Packed size and weight550mm L x 580mm W x 400mm H, 28kg
- Supplied with:Operating manual, one set of interconnecting cables and mains supply lead, storage block for specimen cooling unit when not in use, specimen holders: 15 x flat 10mm Ø stubs and 15 x dish 10mm Ø OD stubs



Coolstage and vacuum feed through connected to the storage block (with protection shutter open)



Dish-style specimen stub, showing flat bottom side (left) and dish side (right)

Ordering Information

90100	EMS Standard Coolstage	each
90101	EMS Enhanced Coolstage	each
90102	EMS Ultra Coolstage	each
90103	Flat specimen stubs, 10mm diameter	10/pk
90104	Dish style specimen stubs, 10mm external diameter	10/pk

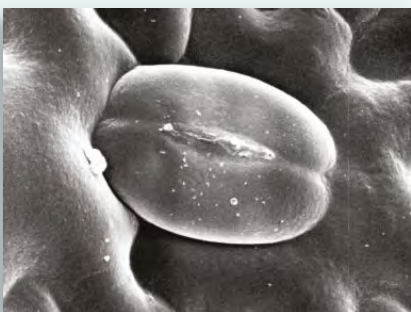
Using the EMS 3500 with Critical Point Dryers

The EMS 3500 will give controlled heating of EMS 3000 and EMS 3100 Critical Point Dryers. It is connected directly to the inlet and outlet of the EMS 3000 or EMS 3100 water jacket. The temperature of the circulating fluid is pre-set, typically set to 37°C (eg just above the critical temperature of carbon dioxide).



Mature Spruce Wood

Critical point dried block of mature spruce wood block, demonstrating transverse, tangential and radial views of tracheids and vessels.



Stomatal Pore on Xerophyte Leaf Surface

Critical point dried epidermis of a xerophyte (cactus), demonstrating raised stomatal pores.



Barley Leaf

Trichomes and stomatal pores on the epidermal surface of a barley (*Hordeum vulgare*) leaf. Some very fine wax crystalites are also just visible on the surface of the leaf.

► EMS 3500 Thermocirculator

The EMS 3500 Thermocirculator is a low cost, portable water circulating system for supplying a constant temperature supply for closed and open loop applications at near ambient to +60°C.

Features

- Precise control of heating
- Compact
- Robust and reliable
- No running water to waste
- Ideal for use with the EMS 3000 and EMS 3100 Critical Point Dryers



The EMS 3500 is suitable for open and closed loop applications and has all controls and liquid connections on the front panel. The temperature controller shows not only the 'set' temperature (between ambient and +65°C), but also the actual liquid temperature. The fluid is circulated by a glandless magnetic pump, through an aluminum reservoir.

A cooling coil is mounted in the liquid reservoir. This coil can be directly connected to the main water supply and is primarily used when temperature control near to ambient is required. The electronic control system features a zero voltage switching unit which minimizes mains electrical interference, enabling the EMS 3500 to be used and sited with other sensitive electronic instruments.

Specifications

Working temperature range	Ambient to +65°C
Heating rating	500W
Reservoir capacity	2.2L / 3.5 Pints
Pump type	Glandless magnetic drive
Pump motor	Shaded pole
Pump flow	270L/h (zero head) / 60 Gal/hr (zero head)
Pump pressure	0.25kg/cm ² / 3.5psi
Max pump head (unrestricted)	2.5m / 7.5ft
Size (unpacked)	330 x 280 x 150mm / 13 x 11 x 6"
Weight	8kg / 17.6lbs
Electrical	220-240V/50Hz, 115V/60Hz

Ordering Information

91095	EMS 3500 Thermocirculator	each
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► EMS 4800 Recirculating Heater/Chillers

Recommended for open and closed loop applications, offering simplicity, reliability and quiet operation. The range includes the EMS 4860, 4870, 4880 and 4890.

Features

- Precise temperature control
- Proven reliability
- Environmentally friendly- avoids running water to waste
- Quiet, efficient operation
- Low maintenance

Temperature control

Many instruments measuring physical properties depend on accurate control of temperature and in some processes optimum temperature is essential. With the EMS 4800 series, over-cooling (which affects efficiency) is prevented and the water temperature can be accurately controlled over the range -10 to +60°C.

A commonly misunderstood feature of refrigerated systems is in applications where the control temperature is other than at or near room temperature. When the instruments are to be operated at controlled temperatures below ambient, the extraction deteriorates significantly and, as a guide, the compounded change is 4% per degree Celsius. In practice, the refrigerant gas pressure has to be adjusted to optimize the performance at any particular temperature. However, the EMS 4800 series incorporate automatic adjustment valves in the systems.

The EMS 4800 series are of the 'closed loop' type and therefore efficiencies are dramatically improved compared with open bath models. They are simple to set up and to operate, and essentially maintenance free.

Choosing the correct heater/chiller

In order to optimize performance from a heater/chiller system, the correct specification must be selected for a particular application. To cool or heat any instrument or system it is important to obtain the following information from the manufacturer:

- Heat load to be dissipated to water, eg for an electron microscope: diffusion pump heater, lenses, etc
- Flow rate and size of tubing
- Minimum pressure

With this information, consult the Specifications below and select the appropriate heater/chiller. The basic heat load calculation formula is as follows:

$$\text{Flow rate} \times \text{weight of fluid} \times \text{specific heat} \times \Delta T = \text{Heat Extraction.}$$

Specifications

Heat Extraction Rates (in Watts)

	- 20°C	- 10°C	0°C	+10°C	+ 20°C
EMS 4860	75W	105W	180W	300W	420W
EMS 4870	125W	250W	500W	900W	1.2kW
EMS 4880	200W	425W	700W	1.6kW	2.2kW
EMS 4890	350W	600W	1.2kW	2kW	3kW
4.5kW Recirculator	700W	1kW	2kW	3kW	4.5kW
6kW Recirculator	800W	1.3kW	2.6kW	4.5kW	6kW

Model	EMS 4860	EMS 4870	EMS 4880	EMS 4890
Extraction rate at 20°C	400W	1.4kW	2.2kW	3kW
Temperature range	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C
Refrigeration (HP)	1/5	1/2	3/4	1
Heater rating	1kW	1.5/2.0kW	2.5kW	2.5kW
Max pump flow	450L/h	450L/h	900L/h	900L/h
200Gal/hr	200Gal/hr	275Gal/hr	275Gal/hr	
Tank capacity	1.2L	1.7L	2.3L	3.0L
Max pump pressure psi/bar	12/60psi	12/60psi	60psi	60psi
0.7/3bar	0.7/3bar	1.5/3bar	1.5/3bar	
Height	37cm	45cm	50cm	50cm
Width	32cm	38cm	45cm	45cm
Depth	46cm	61cm	62cm	62cm
Weight	40kg	62kg	70kg	82kg
Water connections	16mm hose or 1/8 BSP	16mm hose or 1/8 BSP	16mm hose or 1/8 BSP	16mm hose or 1/8 BSP
Temperature sensor	R.T. Probe	R.T. Probe	R.T. Probe	R.T. Probe



Some typical applications

Vacuum coating equipment

Critical point dryers
(EMS 3000 and EMS 3100)

Electron microscopes

Chromatography equipment

Electrophoresis baths

Environmental chambers

Crystal growth apparatus

Fermentation equipment

Interferometers

Photographic baths

X-ray equipment

Polarimeters, refractometers

...and many others

Optional Attachments

- High pressure pump for EMS 4860 and EMS 4870 (standard in EMS 4880 and EMS 4890)

- Water failure alarm

- Over and under temperature cut out

NOTE: Larger capacity heater/chillers (6kW and 12kW) are available on request - please contact us for further information.

- Custom-made heater/chiller units

Ordering Information

91098 EMS 4860 1/5 HP Recirculating Heater/Chiller

91099 EMS 4870 1/2 HP Recirculating Heater/Chiller

91090 EMS 4880 3/4 HP Recirculating Heater/Chiller

91095 EMS 4890 1 HP Recirculating Heater/Chiller

What is... Sputter Coating?

When a glow discharge is formed between a Cathode and Anode using a suitable gas (typically Argon), and Cathode target material (commonly Gold) the bombardment of the target with gas ions will erode this target material, this process being termed 'Sputtering'.

The resulting omni-directional deposition of sputtered atoms will form an even coating on the surface of the specimen. It will inhibit charging, reduce thermal damage, and improve secondary electron emission which are beneficial for Scanning Electron Microscopy.

The Cathode target material is commonly Gold. However, to achieve finer grain size, and thinner continuous coatings, it is advantageous to use cathode target materials such as Chromium. To achieve sputtering with this target material requires vacuums somewhat better than those achievable with a Rotary Vacuum Pump.



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We've added video content to our website to help you get to know our latest products even better!

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Techniques and Applications

Introduction

When a target is bombarded with fast heavy particles, erosion of the target material occurs. The process, when occurring in the conditions of a gaseous glow discharge between an anode and cathode is termed sputtering. Enhancement of this process for scanning electron microscopy (SEM) sample coating is obtained by the choice of a suitable ionization gas and target material. Sputtered metal coatings offer the following benefits for SEM samples:

- *Reduced microscope beam damage.*
- *Increased thermal conduction*
- *Reduced sample charging (increased conduction).*
- *Improved secondary electron emission*
- *Reduced beam penetration with improved edge resolution*
- *Protects beam sensitive specimens*

Increase in electrical conductivity of a sample is probably the single most common requirement for SEM, though all factors come into play with FEG SEM. Low voltage SEM operation can still benefit in many cases from a thin coating.

The development of Sputter Coater systems embodies significant empirical design, however, an understanding in classical terms of glow discharge characteristics enhance such designs and may assist in the comparison of differing systems.

Gaseous Condition

If an inert gas such as argon is included in a cathode gas tube, the free ions and electrons are attracted to opposite electrodes and a small current is produced. See **Figure 1**.

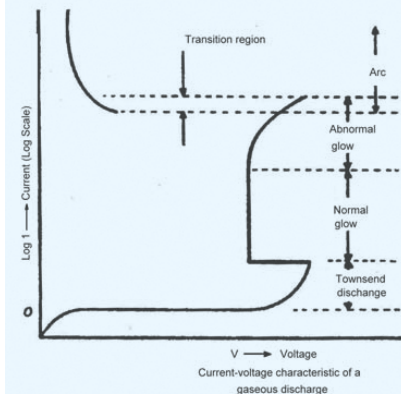
As voltage is increased some ionization is produced by collision of electrons with gas atoms, named the "Townsend" discharge. When the voltage across the tube exceeds the breakdown potential, a self sustaining glow discharge occurs - characterized by a luminous glow.

The current density and voltage drop remains relatively constant, the increase in total current being satisfied by the area of the glow increasing. Increasing the supply voltage increases current density and voltage drop, this is the abnormal glow region.

Further increase in supply voltage concentrates the glow into a cathode spot and arc discharge is apparent. The operating parameters of sputter coaters are within the glow discharge regions of the characteristic described.

Figure 1: Circuit to determine the current-voltage characteristics of a cold cathode gas tube

A = Ammeter V = Voltmeter



Glow Discharge

Once the condition for a sustained discharge is met, the tube exhibits the characteristic glow discharge, so called because of the associated luminous glow. It has been established that free ions and electrons are attracted to opposite electrodes producing a discharge - however for a discharge to be self-sustaining requires regeneration of the electrons by the positive ion bombardment of the cathode. This produces secondary electrons and enhances ionization. The resulting positive ion excess creates a positive space charge near the cathode. The voltage drop experienced is termed the cathode fall. If the discharge is established in a long narrow tube it exhibits the characteristics indicated.

The positive ion density in the "Crookes dark space" is very high; as a result a significant voltage drop is experienced between it and the cathode.

The resulting electric field accelerates the positive ions which produce secondary electron emission from the cathode.

These electrons accelerated in the direction of the anode cause ionization, generating positive ions to sustain the discharge. Subsequently, excitation of the gas results in intense illumination

Techniques and Applications

in the negative glow region. From this stage the electrons have insufficient exciting or ionizing energy, resulting in the "Faraday dark space". Towards the anode a small accelerating field can produce ionization and excitation, the gas again becoming luminous. See **Figure 2**.

Sputter Coating

It has been indicated that under conditions of glow discharge, ion bombardment of the cathode will occur. This results in the erosion of the cathode material and is termed plasma sputtering, with the subsequent omni-directional deposition of the sputtered atoms forming coatings of the original cathode material on the surface of the sample and work chamber.

This process is enhanced in sputter coaters for use in Scanning Electron Microscopy where one objective is to provide an electrically conductive thin film representative of the specimen to be viewed. Such films inhibit "charging", reduce thermal damage, and enhance secondary electron emission.

The most common arrangement for a D.C. (Direct Current) sputter coater is to make the negative cathode the target material to be sputtered (typically gold, platinum or with high vacuum sputter coaters, metals such as chromium and iridium), and to locate the specimens to be coated on the anode (which is usually "earthed" to the system, so the specimens are effectively at "ground" potential).

The desired operating pressure is obtained by a pump (usually a two-stage rotary vacuum pump, or a turbomolecular pumped "backed" by a rotary pump), with an inert gas, such as argon admitted to the chamber by a fine control (leak) valve.

Operating Characteristics

The glow discharge in sputtering is significantly dependent on the work function of the target material and pressure of the environmental gas. A range of target materials are used including gold, gold-palladium, platinum and silver. Although gold is still a common sputtering metal, having the most effective electrical conduction characteristics, it does however, have the largest grain size and is not always suitable for high resolution coating. For this reason gold-palladium and platinum are now widely used as their grain sizes are smaller than gold. Films with even smaller grain sizes can be achieved using metals such as chromium and iridium, but both require the use of a high vacuum (turbomolecular pumped) sputtering system.

The sputter head and sputter power supply should be effective over a range of anticipated target materials.

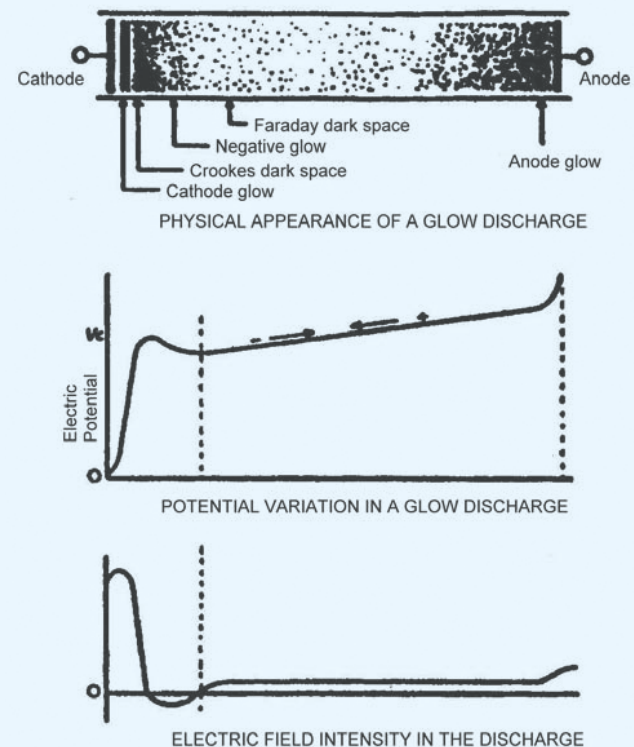
The deposition rate is current dependant, and if we operate in the correct glow region of the characteristic plasma discharge, as previously described, several fold changes in current should be available for a relatively small change in sputtering voltage. The deposition rate should not be sensitive to small changes in pressure which may be experienced in the system.

If the sputtering head is well designed and operating at low voltage and as a result, low energy input, then radiant heating from the target and high energy electrons (potentially the most significant sources of damage to delicate specimens) should be considerably reduced. There is also evidence to suggest that such a sputter head system may also produce finer grain size for a given target material.

The presence of an inert gas which will not decompose in the glow discharge is obviously desirable. Argon, having a relatively high atomic weight, provides a suitable source of ions for effective bombardment of the target material. Sputtering in air is best avoided.

The effectiveness is also dependent on the "mean free path" (m.f.p.) which is inversely proportional to pressure. If the m.f.p. is too short, insufficient

Figure 2



energy will be gained for effective bombardment and will inhibit movement of sputtered material from the target.

If the m.f.p. is too long, insufficient collisions occur and, in addition, the flow of sputtered material may change from diffusion in the gas to free molecular flow with a reduction in the effectiveness of omni-directional deposition.

If these characteristics for sputter heads are achieved, then it should not be necessary to cool the specimen stage for the majority of applications. If not, however, such cooling will only serve to reduce the baseline temperature, the thermal conductivity of most specimens we are considering being relatively poor.

For sensitive specimens pre-cooling (Peltier, water or cryo cooled) and subsequent reduction of the baseline may still be desirable and there is also evidence to suggest a reduction in grain size of the coating. It may be apparent that Scanning Electron Microscopy requires a versatile system without compromising performance. Specifically, fine grain size, uniform coating and low heat input. Consideration of these characteristics in design and development should enable a suitable coating system to be realised.

A major disadvantage of simple diode sputter coaters in SEM is the excessive amount of heat generated in the sample. To overcome this problem, permanent magnets are utilized to deflect the high energy electrons generated in the glow discharge away from the sample.

The magnetic lines of force cause enclosed loops at the target surface,

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increasing the interaction path length of the high energy electrons in the discharge. Deflection and retardation of electrons result in increased ion yield and sputtering efficiency.

It was indicated previously that while imperial design may be in evidence, it should now be apparent that effective production of positive ions for glow discharge is required. The sputter head and its associated power supply should be a primary objective of design and development.

All modern SEM sputter coaters use heads fitted with an arrangement of magnets and often an associated shroud assembly, with a disc target. Power supplies generally employ solid state switching for applied voltage control. See **Figure 3**.

The overall result is a low mean voltage head with low energy input. The possibility of thermal damage due to radiant heating and electron bombardment is considered negligible.

For a typical modern magnetron sputter coater

Vacuum	8 x 10 ⁻² to	2 x 10 ⁻² mbar
Sputtering Voltage	100V to	3Kv
Current	0 to	50mA
Deposition	0 to	25 nm/min
Grain size	Less than 5nm	
Temperature rise	Less than 10C	

It is, of course, possible to satisfy very precise parameters by the selection of target material, 'voltage' 'deposition', 'current' and 'vacuum'. Under these conditions, it is possible to achieve thin films to 10nm with grain sizes better than 2nm and temperature rises of less than 1°C.

Choice of Sputtering Material

As stated many times, metal coating is an indispensable technique for SEM. The development of high resolution FEG SEMs has brought about more wide spread use of specialized techniques such as Ion Beam Sputtering, Penning Sputtering, E-Beam Evaporation and Planar magnetron ion-sputtering. More lately Chromium coating has become the "fashionable" material to use. It offers a thin continuous film and emits less back scattered electrons than other sputter materials. However it is not free of its own problems. To operate it requires a high vacuum and ideally vacuum transfer (or vacuum storage) of the sample to avoid oxidation problem. Cr coated samples may often have a "see through" look as there is the possibility of images generated from electrons from sub surface structures. More recently iridium films have been shown to give excellent fine grain (sub nanometer) films that compare favorably with those generated with Cr. Both metals require high vacuum sputter coaters for

effective deposition.

Application data collected has shown that a high quality well designed rotary pumped magnetron sputter coater, such as the EMS 550X, is capable of producing a continuous Pt (platinum) film with a grain size in the order of 2 nm. It also has the benefit of being a good secondary electron emitter, unlike chromium. Some images of chromium show bright high contrast images. Many workers, and our own studies have led us to consider the possibility of each grain of chromium being oxidised before sample is coated and hence the film is not truly continuous and indeed each metal grain is individually charging. This is another reason to consider iridium as an alternative.

Silver as a sputter material is often ignored but is a very satisfactory method for ensuring conductivity of the SEM sample but has a major advantage the whole process is reversible as the metal may be removed by the neutral aqueous reagent known as "Farmers reducer". This enables many samples to be viewed and then returned to their original condition. Beware. ...Silver may form crystalline deposits on the surface of the sample in the presence of active Halogens

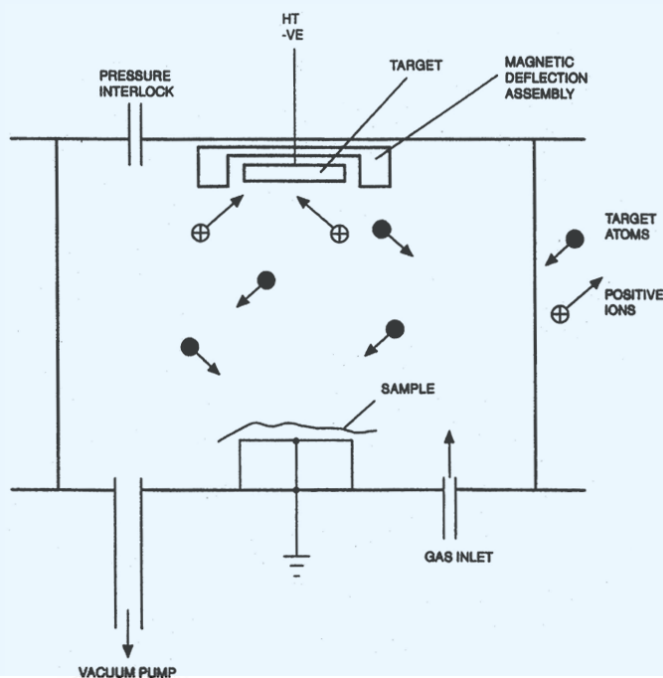
- *Sputtered silver offers smaller grain size than evaporated silver.*
- *Sputtered Gold and Silver have similar grain size but the silver has larger reticulation after storage.*
- *Silver is the most conductive metal known.*
- *Silver has a high secondary electron coefficient.*
- *X-ray emission lines are well separated from the biologically important sulphur and phosphorous.*
- *Cost effective.*

Gold/Palladium (80:20) targets are now a popular standard choice for the routine coating of a wide range of samples. The idea behind using this alloy is that the palladium will act as a physical barrier to the gold which will attempt to conglomerate into large islands and restrict ultimate resolution performance.

The minimal loss in secondary electron emission performance from the palladium is not seen as significant with current SEMs.

Other target choices are generally made based on the requirement for X-ray analysis of samples or back scattered electron detection.

Figure 3 – Diagram of a "cool" sputtering head



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Rates of Sputtering

A question regularly asked is what difference is there in sputtering rates for each of the target materials. The following list gives the variance of the materials in relation to gold, assuming gold to be: 1, it is impossible to give actual coating rates as this varies with sputtering conditions.

Au	Gold	1.0
Ag	Silver	1.2
Co	Cobolt	0.5
Cr	Chromium	0.5
Cu	Copper	0.7
Fe	Iron	0.5
Mo	Molybdenum	0.3
Ni	Nickel	0.5
Pd	Palladium	0.85
Pt	Platinum	0.6
Ta	Tantalum	0.2
W	Tungsten	0.2

Thickness of Coating

Experiments using interferometric techniques have shown that the thickness of Au/Pd coating sputtered in argon gas can be calculated at 2.5KV according to:

$$Th = 7.5 I t \text{ (angstroms)} \quad (V = 2.5KV, \text{ target to specimen distance} = 50mm)$$

t = time in minutes

I = current in mA

Th = thickness in angstroms

Average coating times will be of the order of 2 -3 minutes using V = 2.5KV and I = 20 mA

Platinum targets when fitted will give approximately half the deposition rate.

General Points for Improving Performance

1. Cleanliness, the work chamber must be kept clean! We advise that a separate carbon coater be used in applications where the maximum performance of the sputter coater is required

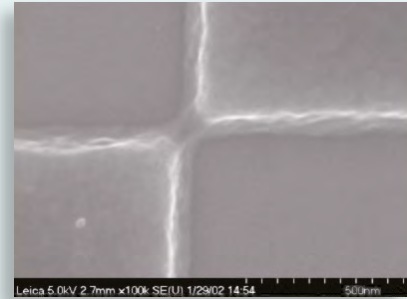
- Clean the glass chamber with hot soapy water and dry thoroughly, solvents can be used but we have found this unnecessary and having greater danger to health and safety. If the deposit is stubborn, use a kitchen scouring pad such as the green Scotch Bright variety.
- Use Isopropyl alcohol on metal surfaces, not acetone which has greater danger to health and safety. It will also take longer to out gas and reduce the vacuum performance.

2. Vacuum, Never leave the chamber under vacuum without isolating the roughing pump from the coater, this is usually done with a manual valve (Quorum high vacuum sputter coaters have useful "pump hold" facility that allows the vacuum chamber to be held under vacuum when the instrument is not in use). Failure to do so will increase the risk of suck back of hydrocarbons (pump oil) in to the sputter chamber and increase contamination.

- Always ensure the system is dry and pumping to its correct vacuum level before working with samples, failure to do so will result in poor sputter rate and contamination.
- Ballast rotary pumps on a regular basis and ensure they are serviced at regular intervals.

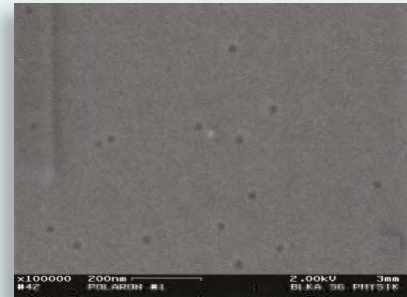
3. Sputter gas, Always use high purity argon gas of the grade known as "White spot" this will ensure fast sputter rate and good pump down time.

4. Rotary planetary specimen stages are essential for ensuring even coatings on specimens with irregular surfaces.



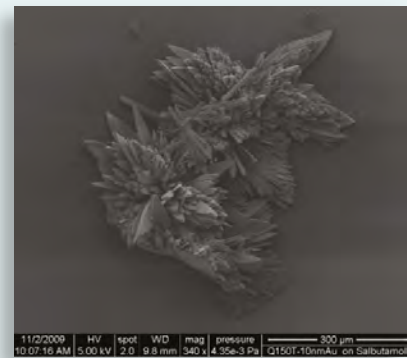
Gold/palladium coating of 6" wafer

This wafer was wafer-coated with 3nm of gold/palladium (Au/Pd) using the EMS 7640 Sputter Coater. Settings: 800V 12mA using argon gas and vacuum of 0.004 bar. Further tests revealed that coating was of an even thickness right to the edge of the 6" wafer. Work was done by Dr Jost Gabler of Gala Instrumente GmbH.



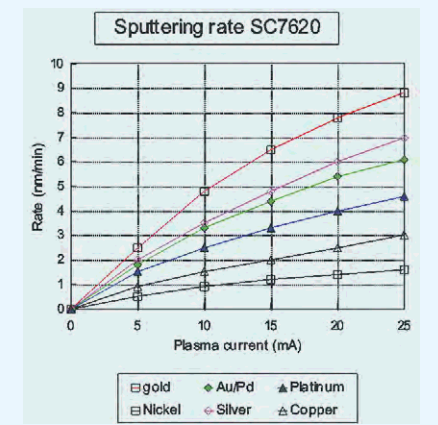
Platinum coating using SC7640

Borosilicate glass with surface imperfections (dark spots). Coated with 3nm of platinum (Pt) using the EMS 7640 Sputter Coater. Settings: 800V 12mA using argon gas and vacuum of 0.004 bar. Image provided by Gala Instrumente GmbH.



Salbutamol

Figure 4 - Sputtering Rates for the EMS 7620



Techniques and Applications

Silver as a removable coating for scanning electron microscopy

Acknowledgement: The following abstract and method results (introduction only) is reproduced by kind permission of A.A. Mills, Scanning Microscopy, Vol. 2, No.3, 1988 (Pages 1265-1271)

Abstract

A thin film of silver, applied by sputtering or vacuum evaporation, provides an excellent conformal conductive coating for scanning electron microscopy of insulating specimens. When no longer required it is easily removed with Farmer's Reducer - a dilute aqueous solution of potassium ferricyanide and sodium thiosulphate. No damage was apparent to fine structure in the calcite matrix of ostracode shells, or to other biological tissues. No problems have been encountered with grain in the silver film at magnifications up to x15,000, or in the storage of coated specimens in a desiccator for periods exceeding six months.

Introduction

Many specimens for which scanning electron microscopy (SEM) is invaluable are electrical insulators, for example microfossils and dried biological preparations. To promote the emission of secondary electrons, and to prevent charging of the surface (with consequent repulsion of both incoming and secondary electrons) it is usual to coat such specimens with a very thin layer of metal.

Nowadays gold (sometimes over a thin undercoat of carbon) is commonly employed for the majority of work, although refractory metals have been recommended for the very highest magnifications. These coatings are normally applied by sputtering in a glow discharge, for this technique is omni-directional and tends to give a fine-grained deposit, while the apparatus required is comparatively simple and inexpensive since a high vacuum is not required.

An alternative, older technique (which also allows aluminum to be deposited) is evaporation of a molten bead of the chosen metal in a high vacuum. The inherent directionality of this method means that specimens must generally be moved continuously by a rotating/nodding table.

Problems arise when it is desired to return a specimen to its original uncoated condition, for example to allow successive treatments or because too thick a coating has been accidentally applied. Even specimens which have been

correctly coated may be rendered unsuitable for subsequent optical and analytical examination, due to the highly reflective nature of the gold film and its interference with x-ray emission. For these reasons there is frequently a reluctance to allow SEM examination of certain material, eg type specimens and archaeological artifacts.

Removal of Gold and Aluminum Coatings

Attempts have therefore been made to remove the metal film by suitable reagents, which must obviously not attack the substrate. It is well-known that gold is recovered from siliceous ores by complexing with aqueous cyanide under oxidizing (aerobic) conditions, and two groups have independently utilized this reaction.

A major obstacle is the highly toxic nature of cyanides, necessitating efficient fume hoods and a high degree of supervision and control unwanted in most laboratories. A less objectionable reagent is ferric chloride in alcohol, but it requires some six hours on a gold/palladium film from a smooth PTFE surface, and appears likely to attack many specimens. Mercury amalgamates gold, but does not remove it completely and adds its own background.

Aluminum dissolves in weak acids and alkalis with the evolution of hydrogen. Sylvester and Bradley therefore hoped that soaking in a dilute solution of sodium hydroxide would enable this metal to be removed from calcite microfossils without damage to the matrix. Unfortunately, they were later obliged to acknowledge that insufficiently careful exposure to alkali could result in dissolution of fine structure.

Advantages of a silver film

Silver would appear to have much to commend it as an alternative to gold. It is the most conductive metal known, possesses a high secondary electron coefficient, and is readily applied by sputtering or evaporation to follow irregular contours better than any other material.

Unlike gold, its x-ray emission lines are well-separated from those of the biologically important sulphur and phosphorus. Its cost is only a fraction of gold and the platinum metals. The unique applicability of silver to photography has resulted in extensive research upon its complex ions and their solubility.

Quite early in the history of photography it was found that a dark, over-exposed negative could

be rendered less opaque ('reduced') by aqueous oxidizing agents in the presence of sodium thiosulphate. The metallic silver forms the Ag ion, which is promptly complexed by the thiosulphate so that still more silver dissolves. No gas is evolved. The negative would be removed from the reagent and thoroughly washed when a sufficient amount of silver had been abstracted from the image.

Materials and methods

One of the mildest of these 'reducers' is that formulated by Farmer in 1884, employing very dilute potassium ferricyanide as the oxidizing agent. As paper, albumen and gelatine were apparently unaffected, it was thought that this reagent might well prove suitable for dissolving silver from a variety of coated specimens without damage to the matrix. Ferricyanides do not possess the extreme toxicity of the simple cyanides, and may be purchased and used in the same way as ordinary laboratory and photographic chemicals.

Farmer's Reducer - the formulation used is based on that given by Jacobson:

Solution A

25g sodium thiosulphate (crystals)
250ml water
2 drops of Kodak 'Photoflo'

Solution B

10g potassium ferricyanide
100ml water

These solutions appear to be stable indefinitely at room temperature if kept in securely stoppered amber glass bottles. Immediately before use, the following mixture is to be prepared:

50ml water
50ml Solution A
3ml Solution B

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It was found that the resulting pale yellow solution had a pH of about 5, the same as the CO₂-equilibrated tap water used for its preparation. It was unstable, losing activity and color after about two hours at room temperature.

A neutral mixture may be prepared by substituting pH 7 phosphate buffer (conveniently prepared from a BDH tablet) for water in the above dilution. However, all the tests to be described in the paper were conducted with the ordinary solution prepared with tap water.

It should be noted that calcium carbonate has a significant solubility in water. In nature, calcite microfossils are protected against percolating groundwater by the sacrificial dissolution of fossils above and around them. Once removed from this environment to the laboratory, such fossils should presumably be washed only with distilled water that has been allowed to stand in contact with CaCO (eg marble chips) and filtered. Otherwise needles and similar fine structures will be particularly at risk.

This equilibrated 'hard' water could be used to prepare and dilute the Farmer's Reducer. A very brief final rinse in distilled water is probably permissible; the common practice of 'soaking overnight' is not.

Results — silver mirror on glass

A silver mirror was made by evaporating the metal on to a microscope slide cleaned with chromic acid. Sufficient was deposited to give a semi-transparent film: silvery when placed on a dark background and viewed by reflected light, but behaving as a blue filter when examined by transmitted light.

The coated glass slide was immersed in freshly-prepared Farmer's Reducer. The silver was gently dissolved in a controlled manner, as shown by the gradual and uniform loss of color in transmitted light, until none remained after three minutes. No gas was evolved. It was decided that a 10 minute immersion should allow an ample margin to deal with specimens with convoluted surfaces. The reagent had no effect upon gold films. Alloys of silver and gold have not been investigated.

Comparative Sputter Data

Iridium and other materials

Samples were coated using an EMS 575X Sputter Coater and were examined using a Hitachi S-5200 Field Emission SEM.

Gold



Magnification:	15,000 X	100,000 X	300,000 X
Coating Time:	10 seconds	10 seconds	10 seconds
Current Used:	20 mA	20 mA	20 mA

Gold/Palladium



Magnification:	15,000 X	100,000 X	300,000 X
Coating Time:	10 seconds	10 seconds	10 seconds
Current Used:	20 mA	20 mA	20 mA

Chromium



Magnification:	15,000 X	100,000 X	300,000 X
Coating Time:	30 seconds	30 seconds	30 seconds
Current Used:	100 mA	100 mA	100 mA

Iridium



Magnification:	15,000 X	100,000 X	300,000 X
Coating Time:	10 seconds	10 seconds	10 seconds
Current Used:	20 mA	20 mA	20 mA

No Coating



Magnification:	15,000 X	100,000 X	300,000 X
Coating Time:	N/A	N/A	N/A
Current Used:	N/A	N/A	N/A

Platinum



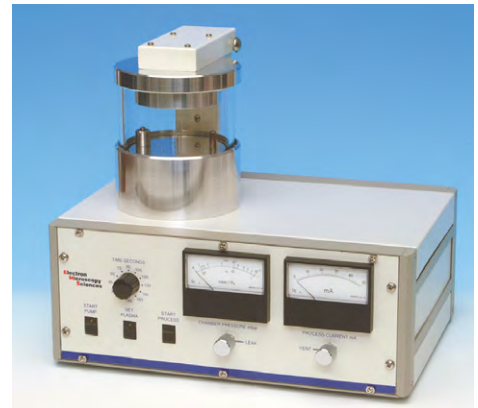
Magnification:	15,000 X	100,000 X	300,000 X
Coating Time:	N/A	N/A	N/A
Current Used:	N/A	N/A	N/A

► EMS 7620 "Mini" Sputter Coater/Glow Discharge

The EMS 7620 is a compact, low cost SEM sputter coater that comes complete with a glow discharge option as a standard. When combined with the optional carbon attachment EMS 7640-CF it makes the ideal low cost SEM sputtering and carbon coating system package. The EMS 7620 is robust, easy to operate and is backed up with a three-year warranty.

Features

- Low cost
- Simple operation
- Magnetic deflection sputter coating head
- Compact design
- Carbon fiber evaporation option
- Adjustable height specimen stage
- Easy to change sputter targets - gold/palladium (Au/Pd) standard
- Built to all the latest safety standards - features include positive break electro-mechanical interlock which ensures the sputter coating head is electrically isolated when the optional carbon attachment is in use
- Robust and reliable
- Three-year warranty
- Glow discharge as a standard



Easy operation

The EMS 7620 is ideally suited to the budget-conscious user who nonetheless demands quality results from an easy-to-use instrument. Designed for routine applications, the EMS 7620 uses a basic magnetron sputter head with a simple-to-replace disc target (gold/palladium (Au/Pd) as standard). The head is hinged for easy operation and fitted with electrical safety interlocks.

To prevent accidental damage the high voltage lead is shielded. The plasma current is variable by adjustment of the vacuum level using an argon leak valve with the plasma voltage pre-set. For maximum sputter coating efficiency the gas injector system ensures that argon gas enters the chamber close to the plasma discharge. Venting is to argon.

Fast cycle times

The 100mm/4" diameter Pyrex cylinder is mounted on an aluminium collar and sealed with O rings. The small vacuum chamber means pump-down times and cycle times are fast; it also allows a small economical rotary pump to be used.

The specimen stage is height-adjustable over a wide range and can easily be removed to accommodate larger specimens. The system is controlled manually by a 180-second timer with 15-second resolution. Pressure and plasma current are monitored by analogue meters.

Glow discharge (hydrophilisation)

A three-way switch on the front panel allows the EMS 7620 to be switched to glow discharge mode.

Freshly-made transmission electron microscopy (TEM) carbon support films tend to have a hydrophobic surface that hinders the collection of TEM sections from the surface of water baths and prevents the spreading of suspensions of particles in negative staining solutions. However, after glow discharge treatment with air, carbon film can be made hydrophilic and negatively-charged, thus allowing collection of TEM sections and easy spreading of aqueous suspensions.

Other possible treatments include magnesium acetate treatment to create hydrophobic and positively-charged surfaces. If alkylamine is used as a process gas, the carbon film surface will become hydrophobic and positively-charged, while using methanol as a process gas results in the surface becoming hydrophobic and negatively-charged. Such treatments can allow the optional absorption of selected biomolecules.

The EMS 7620 also comes complete with 1m x 12mm bore vacuum hose and fittings, and requires only the addition of a rotary pump with a capacity of 50L/m or greater - see Options and Accessories.

Specifications

Dimensions:.....340mm W x 130mm D x 250mm H (unpacked) excluding chamber

Site Requirements:

Electrical: Ensure that a suitable mains electricity supply (110VAC - 20A or 240VAC - 13A, frequency 50/60Hz) is available. Check that the voltage label attached to the side of the cabinet is suitable for the local voltage and frequency. The units are supplied for either 230V or 110V operation at 50/60Hz. The power rating is 250VA excluding the rotary pump. The rotary pump outlet is rated at 230V at 10A or 110V at 16A. The 240V pump outlet uses either a three-pin plug (404440310) or 110V standard US plug - both supplied.

Sputtering Gas: Ensure that a suitable gas supply is available, such as a commercial cylinder of argon gas (Zero Grade) fitted with a two-stage regulator, in order to deliver gas at a pressure of around 5-10psi (0.5bar).

Vacuum Pump: Ensure that a suitable vacuum pump is available. The work chamber has to be evacuated to less than 10-2mbar. This can be achieved in a reasonable time (depending on the cleanliness of the chamber) using a floor-mounted 50L/m or 90L/m two-stage rotary pump. Alternatively you can use a 30L/m desk-top mounted two-stage rotary pump, preferably incorporating an anti suck-back device and fitted with an oil mist filter on the exhaust port. Where a rotary pump is used, ensure that it has been filled with oil, in accordance with the manufacturer's instructions. The exhaust should be filtered or expelled to a safe area. All pumps we supply are fitted with an exhaust filter.

Carbon evaporation attachment (optional):The EMS 7640-CF Carbon Accessory Power Supply can be used in conjunction with the EMS 7640 'Mini' Sputter Coater. The units are supplied for either 230V or 110V operation at 50/60Hz. Ensure that a suitable mains electricity supply (110VAC - 20A or 240VAC - 13A, frequency 50/60Hz) is available. Check that the voltage label attached to the side of the cabinet is suitable for the local voltage and frequency.

Space requirement: 340mm W x 320mm D x 310mm H (including chamber and sputtering head). Weight: 14kg. Additional space is required for the rotary pump, which can be located either on the floor or on the bench with the coater.

Options and Accessories

A carbon coating accessory (EMS 7640-CF) which consists of an evaporation power supply and carbon fiber head is available. Fitting the optional carbon evaporation attachment is simple. The normal sputtering head is tilted back and replaced with the carbon fiber head. Connection is then made to the power supply. To ensure that the exposed sputtering head cannot be powered when the add-on carbon head is under vacuum, a positive-break mechanical interlock ensures electrical isolation of the sputtering head. We also offer a 'stand alone' SEM carbon coater, see the EMS 450X.

➤ EMS 7620 (continued)

Choosing a target

Gold/Palladium (Au/Pd): Supplied as standard. Has the same properties (sputtering rate, secondary electron yield, cost) as gold but the sputtered grain size is smaller.

Gold (Au): Gold sputter coating is still widely used in many laboratories

Platinum (Pt): The sputtered grain size is smaller than gold or gold/palladium. Platinum has a slower sputtering rate and is more expensive than gold or gold/palladium.

Silver (Ag): Compared to the other metals, it is relatively easy to remove silver. Therefore it is useful for museum and forensic specimens.

Palladium (Pd): Sometimes used instead of gold, gold/palladium and platinum for x-ray microanalysis.

All targets are 57mm Ø x 0.1mm thick (unless specified otherwise)

Ordering Information

Part number	Description
EMS 7620	'Mini' Sputter Coater
Supplied with: 91017-AP gold/palladium (Au/Pd) target, 1m length of 12mm bore flexible vacuum hose, 1 x KF25 hose adapter flange and fittings to fit a rotary pump, 1 x rotary pump plug, comprehensive operating instructions	
91017-Au	Gold (Au) target
91017-AP	Gold/palladium (Au/Pd) target
91017-Pt	Platinum (Pt) target
91017-Ag	Silver (Ag) target
91017-Pd	Palladium (Pd) target
91017-2-Au	Gold target (Au) 0.2mm thick
91017-2-AP	Gold/palladium (Au/Pd) target 0.2mm thick

Part number	Description	
91017-2-Pt	Platinum (Pt) target 0.2mm thick	each
91003	RV-3 two-stage rotary pump with oil mist filter (115/230V 50/60Hz)	each
96000	Replacement compact oil mist filter	each
96001	Replacement compact oil mist filter cartridge	each
91040	Carbon evaporation attachment EMS 7620	each



Optional carbon fibre evaporation attachment and controller



Optional carbon fibre evaporation attachment and controller (fitted)



➤ EMS 7620-CF Carbon Accessory Power Supplies

The 7620-CF carbon attachments are modular add-ons for our sputter coaters, allowing carbon fiber or carbon rod evaporation.

Each attachment uses the existing chamber and vacuum system of the sputter coater and is therefore a cost-effective and efficient method for the evaporation of carbon for SEM applications. Note that the diameter of the top plate will vary according to the chamber size of the sputter coater onto which it is being fitted. We also offer free-standing carbon evaporators - see the EMS 150R1 and EMS 150T.

The EMS 7640-CF, EMS 7640-CR and EMS 7620-CF can be used in conjunction with the EMS 7620 (EMS 7620-CF), EMS 500X, EMS 550X, EMS 575X, EMS 650X and EMS 675X sputter coaters. Sometimes it is also possible to retrofit one of the above onto our older models, Please contact us for information on compatibility.

The attachment consists of two components - a free-standing power supply and a carbon fiber or carbon rod head to suit the chamber size of the sputter coater onto which it is to be fitted.

The power supply is switchable between 10V/100A (for carbon rod evaporation) and 20V/50A (for carbon fiber evaporation). A vacuum interlock is provided to ensure safe operation of the sputter coater and carbon accessory system. Out-gas and coat switches are provided for complete control of the evaporation sequence.

Ordering Information

Sputter Coater	Attachment	Attachment
EMS 7620 Sputter Coater	Not Available	EMS 7620-CF
EMS 500X, EMS 550X, EMS 575X, EMS 675X	EMS 7640-CR	EMS 7640-CF

Carbon fiber cord

91046-1	Carbon fiber cord - standard grade - 1m	
91046-10	Carbon fiber cord - standard grade - 10m	
91046-100	Carbon fiber cord - standard grade - 100m	
91047-1	Carbon fiber cord - high purity - 1m	
91047-5	Carbon fiber cord - high purity - 5m	
91046	Carbon fiber cord - standard purity, fine strands - 1m	
91046-4	Carbon fiber cord - standard purity, fine strands - 10m	
91046-01	Carbon fiber cord - standard purity, fine strands - 100m	
70210-10	Shaped ('stepped') carbon rods - high purity - 3.05mm Ø x 50mm	pack of 10
70210-25	Shaped ('stepped') carbon rods - high purity - 6.15mm Ø x 50mm	pack of 10

NOTE: 3.05mm diameter carbon rods are used with the EMS 950X, EMS 450X and EMS 350. 6.15mm diameter carbon rods are used with the K975X and with most older Polaron-branded carbon evaporators.

Features

- Carbon rod or fiber
- Protection shutter
- Modular control electronics
- Interlocking for safe operation
- Three-year warranty

Specifications

Dimensions	235mm W x 350mm D x 175mm H.
Weight	15kg
Carbon source	Carbon fiber, carbon cord
Ammeter gauge	0-50A
Low voltage	25V
Out-gas current	Selectable for carbon fiber or carbon rod
Electrical supply	230V/50Hz (3A max), 115V/60Hz (6A max)

What is... Carbon Coating?

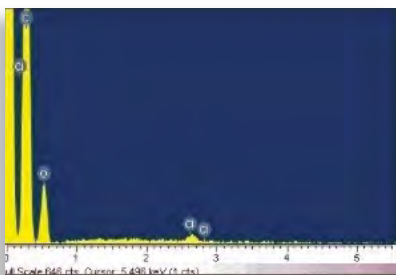
The use of carbon films in Electron Microscopy with their low background signal and relatively good electrical conductivity is well known. Thin films, nominally 5nm or 50 Angstroms, are used in TEM, while a range of somewhat thicker films, ranging from 50nm or 500 Angstroms, may be used in SEM for such applications as X-ray microanalysis.

Commonly, a high vacuum evaporator with carbon rods is used to achieve these coatings, and still has preferential applications. The use of carbon fiber however, has allowed a flash evaporation technique to be developed which can be suitable for a number of general EM requirements.



Pinus sylvestris (Scots pine)

Transverse section of *Pinus sylvestris* (Scots pine) in the first image shows the latewood portion of the growth ring. This surface shows latewood tracheids (transportation and structural cells) and also part of a ray (cells for storage of food substances). EDX spot analysis of the wood specimen using Oxford Instruments' INCA Energy shows a small chlorine peak, which results from treatment of the wood with a preservative - shown in the graph. The specimen charges excessively unless carbon coated. Other types of coating cannot be used due to the very low levels of chlorine used in the preservative, with which the wood is treated. With thanks to Oxford Instruments.



Techniques and Applications

Procedures for the preparation of TEM carbon support films

Section A. Preparation of normal carbon support films

NOTE: Process uses a diffusion-pumped vacuum evaporator, for turbomolecular-pumped systems please modify the process as appropriate. For optimum results, vacuum levels in the range of 5×10^{-6} mbar or better are recommended.

Step 1. Copper grids should be pre-cleaned by sonicating for 10 seconds in acetone, followed by 10 seconds of sonication in ethyl alcohol. Allow grids to dry on filter paper in a dust-free environment before use.

Step 2. Add 0.12g of formvar powder to 50ml of ethylene dichloride and mix well on a magnetic stirrer until dissolved. Pour the solution into a clean coplin jar.

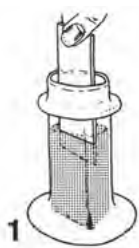
Step 3. Clean a glass slide with water and detergent. Rinse well to make sure that all of the detergent is removed and finally rinse in de-ionized water before drying with a paper towel. Blow off any lint on the slide with compressed air. Place the slide in a dry, dust-free environment such as on filter paper under an upturned beaker. If there are problems in getting the plastic film to be released from the slide (Step 5), using a slide that has not been as thoroughly cleaned might help.

Step 4. Dip the cleaned slide into the formvar solution (step 1 in picture) and touch edge to filter paper to drain off the excess fluid (step 2 in picture). Dry upright in a dust-free environment (this requires 5-10 minutes).

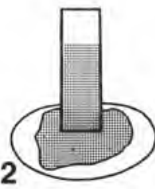
Step 5. Score the edges of the formvar film with an acetone-cleaned razor blade (step 3 in picture). Breathe on the slide to loosen the film, and slowly slide off onto a clean water surface by immersing the slide into the water at a -15° angle (step 4 in picture). Place grids, dull/rough surface down, onto good (uniform, grey color, un-wrinkled) areas of the film. Place a small piece of clean, white office paper onto the surface of the grids and film and allow the paper to soak up water. Pick up the paper, grids and film and place in a covered petri dish to dry.

Step 6. Carbon coat film according to directions (see Section C) to desired thickness - a light-brown color indicates a thickness of 100\AA .

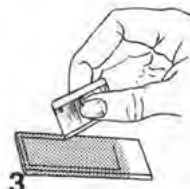
Step 7. Place the paper and coated grids onto a piece of filter paper that is soaked with ethylene dichloride in a covered petri dish. 30 minutes should be sufficient time to dissolve the Formvar film and not damage the carbon support. Remove the grids and paper and allow them to dry in a dust-free area.



1

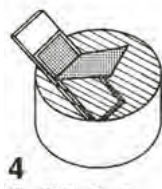


2



3

Figures from M. A. Hayat and S. E.



4

Figures from M. A. Hayat and S. E. Miller (1990). *Negative Staining*. McGraw Hill Publishing Co., N.Y. 253pp.

Section B. Preparation of perforated carbon support films

Step 1. Copper grids should be pre-cleaned by sonicating for 10 seconds in acetone, followed by 10 seconds of sonication in ethyl alcohol. Allow grids to dry on filter paper in a dust-free environment before use.

Step 2. Add 0.17g of formvar powder to 50ml of chloroform and mix well on a magnetic stirrer until dissolved. Pour the solution into a clean coplin jar.

Step 3. Clean a glass slide with water and detergent. Rinse well to make sure that all of the detergent is removed and finally rinse in de-ionized water before drying with a paper towel. Blow off any lint on the slide with compressed air. Place the slide in a dry, dust-free environment such as on filter paper under an upturned beaker. If there are problems in getting the plastic film to be released from the slide (Step 6), using a slide that has not been as thoroughly cleaned might help.

Step 4. Add about 50 drops of a 50% glycerol/water solution to the surface of the formvar solution. Place the tip of a probe sonicator onto the surface of the solution and sonicate until mixed. Sonication intensity should be great enough to 'violently' cause the solution to bubble. This often requires not much more than about five seconds. This should produce numerous holes that are 1-2 μm in diameter and suitable for use with frozen-hydrated specimens. Sonicating for longer periods of time produces smaller holes in the film.

Techniques and Applications

Step 5. Immediately after sonicating, dip the cleaned slide into the formvar solution (step 1 in first diagram) and touch edge to filter paper to drain off the excess fluid (step 2 in first diagram). Dry upright in a dust-free environment for about 5-10 minutes.

Step 6. Score the edges of the formvar film with an acetone-cleaned razor blade (step 3 in first diagram). Breathe on the slide to loosen the film, and slowly slide off onto a clean water surface by immersing the slide into the water at a -15° angle (step 4 in first diagram). Place grids, dull/rough surface down, onto good (uniform, grey colour, unwrinkled) areas of the film. Place a small piece of clean, white office paper onto the surface of the grids and film and allow the paper to soak up water. Pick up the paper, grids and film and place in a covered petri dish to dry.

Step 7. Place the paper with the film and grids onto a methanol-soaked piece of filter paper in a covered petri dish for about 30 minutes. This should perforate any pseudo-holes that may be in the films (these occur when a small drop of glycerol was present but it was not enough to perforate the film).

After allowing the paper and film to dry, the grids may be examined in a light microscope under phase contrast to determine the quality of the films.

Step 8. Carbon coat film according to directions (see Section C) to desired thickness - a light-brown color indicates a thickness of 100\AA .

Step 9. Place the paper and coated grids onto a piece of filter paper that is soaked with ethylene dichloride in a covered petri dish. 30 minutes should be sufficient time to dissolve the formvar film and not damage the carbon support. Remove the grids and paper and allow them to dry in a dust-free area.

Section C. Use of a shadow evaporator for carbon coating plastic films

Step 1. Turn shadow evaporator on: Turn both the main and mechanical pump switches on. Move the black-knobbed, manifold valve handle downwards to 'backing' position. Open the air inlet valve and CAREFULLY remove the implosion shield and bell jar. Set the bell jar upside down on the rest on the adjacent cabinet.

Step 2. Set up carbon coating apparatus: Plug one lead to ground ('E') and the other to '1' (see second diagram). Remove the cylindrical glass shield. Release the tension spring that holds the right carbon rod in place and remove the rod. File the edge of the left carbon rod flat with a piece of emery cloth. Replace the right rod with a fresh one or sharpen it by the procedure described below.

Step 3. Carbon rod sharpening procedure: Place the carbon rod in the chuck of the sharpener. Pull the rod out until its edge is aligned with the edge of the aligning arm and then tighten the chuck. Turn on the sharpener and run the first sharpener tool against the rod until a conical point is formed. Then run the other sharpener tool against the rod until a narrow point is formed. Turn off the sharpener and clean off all carbon dust. Put the newly sharpened rod in the chuck of the carbon coater and tighten. Replace the tension spring and then the glass shield.

Step 4. Set up grids: Place the grids and paper support on a piece of filter paper on top of the base of the carbon coating apparatus (see second diagram). Place a thumbtack alongside the slide. This provides a 'shadow' on the filter paper and helps you determine the relative thickness of the carbon coating.

Step 5. Diffusion pump warm up: Replace the bell jar and the implosion shield. Close the air inlet, and move the manifold valve handle slowly upwards to the roughing position. Allow the vacuum to reach 0.04 Torr on the bell jar gauge and then move the handle downwards to backing. IMPORTANT: Turn on the water supply. The water supply-line valve is located on the wall behind the shadow evaporator. Turn on the diffusion pump switch

and allow the pump to warm up for 15 minutes before continuing.

Step 6. Obtaining a high vacuum: Move the manifold valve handle slowly upwards to the roughing position and allow the vacuum to reach 0.04 Torr on the bell jar gauge. While waiting for the vacuum to recover, fill the baffle with liquid nitrogen. When the bell jar vacuum has reached 0.04 Torr, move manifold valve handle down to the backing position. Depress the metal guard beneath the red mains valve knob and move the knob handle upwards to the open position. Allow the vacuum to reach a minimum of 2×10^{-5} Torr or better.

Step 7. Carbon coating: Turn the electrode selector to #1. Turn the electrode switch on. Slowly turn the electrode current control knob until there is a slight glow at the point where the two carbon rods meet. Slowly increase the current until the rods become white hot. The proper current setting should be just before the point where the carbon starts to sputter. Frequently monitor the thickness of the carbon by turning down the current, checking the darkening of the filter paper and then turning the current back up again.

Step 8. Diffusion pump cool down: Turn down the electrode current control knob and turn off the electrode switch. Make sure the manifold valve is set to the backing position and close the mains valve. Open the air inlet, remove the implosion shield and bell jar and remove the grids. Then replace the bell jar and implosion shield, close the air inlet and move the manifold valve handle to the roughing position. Allow the vacuum to reach 0.04 Torr on the bell jar gauge, move the manifold valve handle to the backing position, turn off the diffusion pump, and allow the pump to cool for 20 minutes.

Step 9. Turn shadow evaporator off: Close the manifold and turn off the mechanical pump and main power switches. Turn off the cooling water.

Section D. Glow discharging carbon films

Step 1. NOTE: Place the very edge of your carbon coated grids along the edge of a piece of double-sided tape on a glass slide. This will help to prevent your grids from flying around inside the shadow evaporator when the air release switch is opened.

Step 2. Turn shadow evaporator on: Turn the main power switch on, turn on the mechanical pump and move the manifold valve handle (black knob) downwards to the backing position. Open the air inlet. CAREFULLY remove the implosion shield and bell jar.

Step 3. Set up glow discharge unit: Plug the lead into the proper receptacle (BNC connector). Place the glass slide with your grids on the unit and replace the bell jar and implosion shield. Close the air inlet, turn the butterfly switch by the current gauges to glow discharge and move the manifold valve handle slowly upwards to the roughing position. Allow the vacuum to reach 0.2-0.15 Torr on the bell jar gauge. The manifold valve may be turned to the closed position if the vacuum rises above 0.10 Torr.

Step 4. Glow discharging: Turn the electrode selector to position #1 and turn the electrode switch on. Slowly turn up the electrode current until there is a bright purple glow surrounding the glow discharge unit. Maintain this setting for approximately 10 seconds while monitoring vacuum. Turn off the electrode current control knob and the electrode switch. Move the manifold valve handle to the backing position. Turn the butterfly switch back to the evaporator setting.

Step 5. Turn shadow evaporator off: Slowly open the air inlet to prevent your grids from being blown around the bell jar. Remove the grids, replace the shields and then close the air inlet. Move the manifold valve to the roughing position. Allow the vacuum to reach 0.04 Torr on the bell jar gauge before moving the manifold valve handle to the horizontal (closed) position. Turn off the mechanical pump and the main switch.

► EMS150R Rotary Pumped Carbon and Sputter Coating System

EMS Series of Rotary Pumped Modular Coating Systems

Innovative and versatile Sputter Coater and Carbon Evaporator for SEM Applications

Quick Overview

The EMS150R is a compact rotary pumped coating system ideally suited for SEM and other coating applications. The EMS150R is available in three formats:

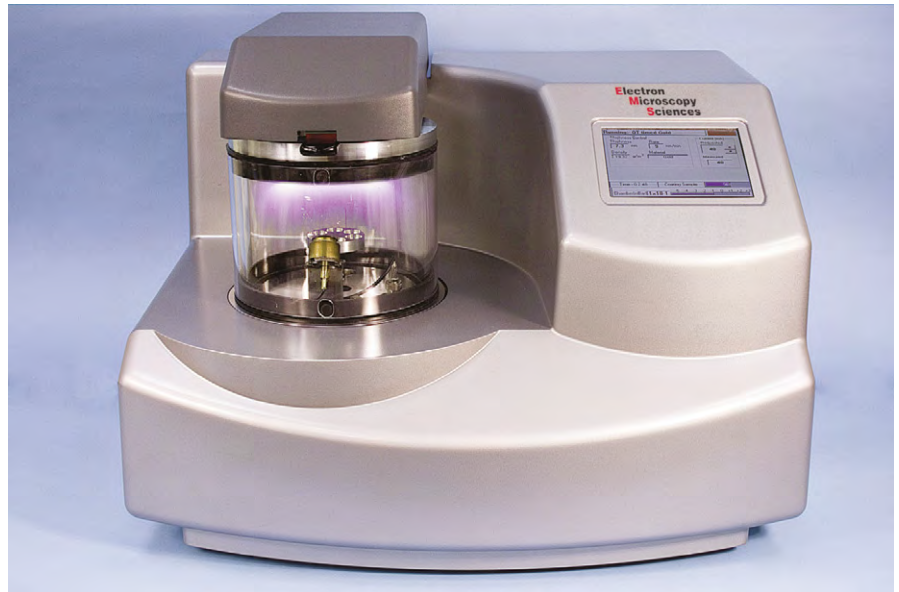
EMS150R S – a compact rotary pumped sputter coater, suitable for non-oxidising metals, such as gold (Au) and platinum (Pt)

EMS150R E – a compact rotary pumped carbon fibre coater suitable for SEM applications

EMS150R ES – a compact rotary pumped combined sputter coater and carbon evaporator

KEY FEATURES

- Metal sputtering or carbon evaporation - or both – in one space saving design
- Rotary pumped sputter coating – allows sputtering of a wide range of non-oxidising (noble) metals, such as gold (Au), platinum (Pt), silver (Ag) and palladium (Pd)
- Carbon fibre coating – ideal for SEM carbon coating applications (eg EDS and WDS)
- Advanced design carbon evaporation gun – simple operation, reproducible results
- Glow discharge option – for modification of sample surface properties (eg hydrophobic to hydrophilic conversion) or for cleaning / removal of contaminating surface residues
- Control of evaporation current profile – ensures consistently reproducible carbon films
- Repeatable thickness control using the film thickness monitor option
- Fully automatic touch screen control – rapid data input, simple operation
- Multiple, customer defined coating protocols can be stored – ideal for multi-user labs
- Automatic vacuum control, which can be pre-programmed to suit the process and material – no needle valve to adjust
- “Intelligent” recognition system – automatically detects the type of coating insert fitted
- Easy-to-change, drop-in style specimen stages (rotation stage as standard)
- Thick film capabilities – up to 60 minutes sputtering time without breaking vacuum
- Ergonomic one piece moulded case – easy maintenance and service access
- Ethernet with local FTP server connection – simple programmer updates
- Power factor correction – complies with current legislation (CE Certification) – efficient use of power means reduced running costs
- Three-year warranty



Product Description

Ideal for SEM applications

EMS150R is available in three formats: sputtering, carbon evaporation or both. Depending upon the selected configuration, the EMS150R can be a top-of-the-range sputter coater for scanning electron microscopy (SEM), a carbon coater suitable for SEM (eg EDS and WDS), or both, in a single easy to use system.



Color touch screen control

Molded case with color touch-screen

The EMS150R is presented in a custom molded, one-piece case. The color touch screen allows multiple users to input and store coating protocols. The case houses all the working components. Automatic bleed control ensures optimum vacuum conditions during sputtering.

The vacuum chamber has an external diameter of 165mm (6.5") and comes with an integral implosion guard. A variable speed rotary specimen stage is fitted as standard, with other stages available as options.

► EMS150R (continued)

Sputter coating, carbon coating or both

The EMS150R is available in three formats, each with a range of optional accessories:

- **EMS150R S** – a compact rotary pumped sputter coater, suitable for non-oxidising (noble) metals. A wide selection of sputtering targets is available, which are highly recommended for SEM applications.
- **EMS150R E** – a compact rotary pumped carbon fibre coater suitable for SEM applications (eg EDS and WDS). The system uses carbon fibre / cord as standard.
- **EMS150R ES** – a combined system with both sputtering and carbon fibre coating. The deposition inserts can be swapped in seconds and the intelligent system logic automatically recognizes which insert is in place and displays the appropriate operating settings.

Each of the above can be fitted with a range of optional accessories (eg glow discharge, carbon rod coating, film thickness monitor). See options for details.

Rapid data entry

At the operational heart of EMS150R is a simple color touch screen, which allows even the most inexperienced or occasional operators to rapidly enter and store their own process data. To further aid ease of use a number of typical sputtering and evaporation profiles are already stored.



Improved Tolerance to Out Gassing Substrates

The pump time out has been moved to a new level defined by "safe outgas threshold" parameter, this is user definable between 5×10^{-2} and 2 mbar.

Until now the system would limit the time to achieve operational vac of 1×10^{-3} to 10 minutes. With the new modification once the "Safe outgas threshold" has been achieved the system will pump continuously. Implemented from software version 2-0042 onwards.

Controlled Evaporation Process

This process can automate a metal evaporation process when using low power evaporation sources. It can be used with the FTM.

The use of key properties about the source and required termination allow the process to:

- **Bring the source current up to the point of evaporation.**
- **Ramp the current up at a controlled rate until evaporation is seen.**
- **Close the shutter and shut the evaporation PSU down when the specified thickness is seen.**
- **Check the source for open or short circuit when starting the process.**

This process will be available on the EMS150T with software version 2-0048 or later. Consideration should be made to the thermal effects of the evaporation source when using the FTM to control the process.

Improvements to the Pulse Carbon Rod Evaporation

Continued work on this process has found that the thickness deposited can be variable if the power applied to the rods is either too high or too low. With

the optimum current being a narrow margin between them. However, limiting the available voltage supplied to the rods increases this current window. This coupled with reducing the spigot diameter to work at a more optimum point in the PSU operation produces a more continuous spark which in turn produces a more repeatable thickness.

This improvement can be implemented by:

- **Software version 2-0046 or later implements the voltage limit. Note all the carbon rod profiles should be deleted if a unit is updated to this software version.**
- **The evaporation current should be set between 60 and 65A.**
- **The reduced spigot diameter of 1.2mm can be produced with the blue handle rod shaper.**

Maintenance

The intuitive touch screen interface features maintenance prompts which highlight:

- **Time of last clean**
- **Coating time since last cleaned**
- **System "on time"**
- **Time of last service**

Glow Discharge Attachment

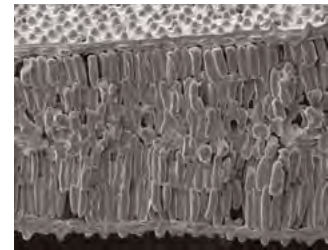
The primary application of glow discharge is as a technique for the surface modification, or 'wetting' or hydrophilisation of newly-evaporated transmission electron microscopy (TEM) carbon support films.

Freshly-made TEM carbon support films tend to have hydrophobic surfaces which inhibits the spreading of suspensions of particles in negative staining solutions. However, after glow discharge treatment with air, the carbon film is made hydrophilic and negatively charged, thus allowing easy spreading of aqueous suspensions. With subsequent magnesium acetate treatment the surface is made hydrophilic and positively charged.

In addition to glow discharge treatment using air, other process gases may be used to modify surface properties. For example, methanol as a process gas results in the surface becoming hydrophobic and negatively charged. Such treatment can facilitate the optional absorption of selected biomolecules



'Cool' sputtering. Optional film thickness monitor (FTM) fitted



Optional glow discharge attachment (for R S and R ES versions)

continued >>>>

► EMS150R Rotary Pumped Carbon and Sputter Coating System (continued)

Specifications

Instrument case	.585mm W x 470mm D x 410mm H (total height with coating head open: 650mm)
Weight	.28.4kg
Packed dimensions	.725mm W x 660mm D x 680mm H (36.8kg)
Work chamber	.Borosilicate glass 152mm Ø (inside) x 127mm H
Safety shield	.Integral polyethylene terephthalate (PET) cylinder
Display	.145mm 320 x 240 colour graphic TFT (Thin Film Transistor) display
User Interface	.Intuitive full graphical interface with touch screen buttons, includes features such as reminders for when maintenance is due and a log of the last ten coatings carried out
Sputtering target	.Disc style 57mm Ø. A 0.1mm thick gold target is fitted as standard. Q150R S and Q150R ES versions only
Specimen stage	.50mm Ø rotating stage with 6 stub positions for 15mm, 10mm, 6.5mm or 1/8" pin stubs. Rotation speed 8-20 rpm

Vacuum

Rotary pump	.Edwards RV3 50L/s two-stage rotary pump, with vacuum hose, coupling kit and oil mist filter
Vacuum measurement	.Pirani gauge fitted as standard
Typical ultimate vacuum	. 2×10^{-2} mbar in a clean system after pre pumping with dry nitrogen gas
Sputter vacuum range	.Between 3×10^{-2} and 5×10^{-1} mbar

Processes

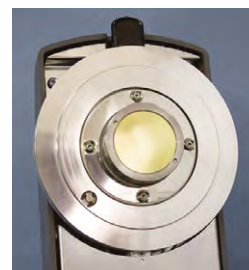
Sputtering	.0-80mA to a pre-determined thickness (with optional FTM) or by the built-in timer. The maximum sputtering time is 60 minutes (without "breaking" vacuum and with built in rest periods)
Carbon evaporation	.A robust, ripple free D.C. power supply featuring pulse evaporation ensures reproducible carbon evaporation from fibre, cord or rod sources. Current pulse for carbon cord: 1-60 Amps; current pulse for carbon rods with spigot size of 1.4mm Ø: 1-90 Amps
Glow discharge	.0-80mA operates in DC+ and DC- modes

Services and other information

Gases	.Argon sputtering process gas, 99.999% (R S and R ES versions). Nitrogen venting gas (optional)
Electrical supply	.90-250V ~ 50/60 Hz 1400 VA including RV3 rotary pump power. 110/240V voltage selectable
Conformity	.CE conformity
Power factor correction	.Complies with the current legislation (CE Certification) and ensures efficient use of power which means reduced running costs



Carbon fibre evaporation insert and automatic source shutter



Sputtering insert. Gold (Au) fitted as standard, but other metals available

Ordering Information

EMS150R S

4500	EMS150R S Rotary pumped sputter coater, includes an 57mm Ø x 0.1mm gold target
4501	Quick-release sputter insert for EMS150R S and EMS150R ES – suitable for non-oxidising (noble) metals. Supplied with A 57mm Ø x 0.1mm thick gold target as standard. For additional noble metal targets (eg Platinum, Gold / Palladium, Silver) see Sputtering Targets section
4502	Rotation stage, 50mm Ø with adjustable height for target to sample distances of 38mm-79mm (supplied with 2 mounting pillars). Note: this stage does not tilt – for tilting stage see Specimen Stages section

EMS150R E

4503	EMS150R E Rotary pumped carbon fibre evaporator, supplied with carbon fibre / cord
4504	Quick-release carbon fibre evaporation insert for EMS150R E and EMS150R ES – suitable for evaporation of carbon fibre and carbon cord
4506	Rotation stage, 50mm Ø with adjustable height for target to sample distances of 38mm-79mm (supplied with 2 mounting pillars). Note: this stage does not tilt – for tilting stage see Specimen Stages section

EMS150R ES

4507	EMS150R ES Rotary pumped sputter coater, includes an 57mm Ø x 0.1mm gold target, and carbon fibre evaporator, supplied with carbon fibre / cord
4508	Quick-release sputter insert for EMS150R S and EMS150R ES – suitable for non-oxidising (noble) metals. Supplied 57mm Ø x 0.1mm thick gold target as standard. For additional noble metal targets (eg Platinum, Gold / Palladium, Silver) see Sputtering Targets section
4509	Quick-release carbon fibre evaporation insert for EMS150R E and EMS150R ES – suitable for evaporation of carbon fibre and carbon cord
4510	Rotation stage, 50mm Ø with adjustable height for target to sample distances of 38mm-79mm (supplied with 2 mounting pillars). Note: this stage does not tilt – for tilting stage see Specimen Stages section

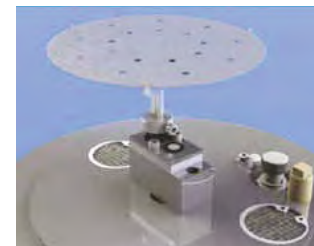
► EMS150R (continued)



Carbon fibre evaporation insert



Glow Discharge insert



Options and Accessories

A range of interchangeable, plug-in style coating inserts are available:

4511	Additional sputter insert for quick metal change (R S and R ES only). Note: this is an entire sputtering assembly; individual noble metal targets can also be purchased
4512	Carbon rod evaporation insert for 3.05mm Ø rods (R E and R ES only). Includes manual rod shaper and 3.05mm Ø carbon rod
4513	Glow discharge insert to modify surface properties (eg hydrophobic to hydrophilic conversion) or to clean surface residues (R S and R ES only). Can be retrofitted
4514	Additional standard glass chamber assembly
4515	Extended height vacuum chamber (214mm high – the standard chamber is 127mm high). For increased source to sample distance and for coating large specimens
4516	Rotating vacuum spigot allows more convenient connection of the vacuum hose to the rear of the EMS150R when bench depth is limited
4517	Film thickness monitor (FTM) attachment. Consists of a built in chamber mounted quartz crystal oscillator (includes crystal). As sputtered or evaporated material is deposited onto the crystal, so its frequency of oscillation is modified. This “modification” is used to measure and control the thickness of material deposited
4518	Spare quartz crystal

Specimen stages

The EMS150R has alternative specimen stages to meet most requirements. All are easy-change, drop-in style and are height adjustable (except 10360 rotary planetary stage)

4519	50mm Ø rotate-tilt specimen stage with adjustable tilt (up to 90 degrees) and height (37mm-60mm). Has six stub positions for 15mm or 6.5mm or 1/8" pin stubs. Stage rotation speed variable between 8 and 20rpm
4520	90mm Ø rotating specimen stage for glass microscope slides (up to two x 75mm x 25mm slides). Stage rotation speed variable between 8 and 20rpm
4521	Variable angle “Rotacota” rotary planetary stage with 50mm Ø specimen platform. Has six stub positions for 15mm or 6.5mm or 1/8" pin stubs. Stage rotation speed variable between 8 and 20rpm
4522	Flat rotation specimen stage for 100mm / 4" wafers, includes gearbox for increased coverage. Stage rotation speed variable between 8 and 20rpm

Carbon Supplies

4538	Carbon fibre cord - high purity - 1m	each
4539	Carbon fibre cord - high purity - 5m	each
4540	Carbon fibre cord - standard grade - 1m	each
4541	Carbon fibre cord - standard grade - 10m	each
4542	Carbon fibre cord - standard grade - 100m	each
4543	Carbon rods - 3.05mm Ø x 50mm length (shaped) pack of 10	each
4544	Carbon rods 3.05mm Ø x 300mm length (unshaped) pack of 10	each
4546	Manual rod shaper for 3.05mm Ø carbon rods	each

Sputtering Targets

4523	57mm Ø x 0.1mm Gold	each
4524	57mm Ø x 0.2mm Gold	each
4525	57mm Ø x 0.3mm Gold	each
4526	57mm Ø x 0.1mm Gold/Palladium (80/20%)	each
4527	57mm Ø x 0.2mm Gold/Palladium (80/20%)	each
4528	57mm Ø x 0.3mm Gold/Palladium (80/20%)	each
4529	57mm Ø x 0.1mm Platinum	each
4530	57mm Ø x 0.2mm Platinum	each
4561	57mm Ø x 0.3mm Platinum	each
4532	57mm Ø x 0.1mm Nickel	each
4533	57mm Ø x 0.1mm Silver	each
4534	57mm Ø x 0.1mm Palladium	each
4535	57mm Ø x 0.1mm Copper	each
4536	57mm Ø x 0.1mm Platinum/Palladium (80/20%)	each
4537	57mm Ø x 0.3mm Platinum/Palladium (80/20%)	each

Spare kits

4547	Two-year spares kit for EMS150R S Includes: 57mm Ø x 0.1mm gold target, standard glass chamber assembly quartz crystals, O-rings	each
4548	Two-year spares kit for EMS150R E Includes: carbon fibre / cord, standard glass chamber assembly, quartz crystals, O-rings, springs	each
4549	Two-year spares kit for EMS150R ES Includes: 57mm Ø x 0.1mm gold target, / carbon fibre / cord, standard glass chamber assembly, quartz crystals, O-rings, springs	each

► EMS 150T Turbo-Pumped Sputter Coater/Carbon Coater

The EMS150T is a compact turbomolecular-pumped coating system suitable for SEM, TEM and many thin-film applications. The EMS150T replaces previous the following models EMS575X and EMS950X.

The EMS150T is available in three formats:

EMS150T S — a high resolution sputter coater, suitable for oxidising and non-oxidising metals

EMS150T E — a high vacuum carbon coater for SEM and TEM applications

EMS150T ES — a high resolution sputter coater and high vacuum carbon evaporator

Features

- Metal sputtering or carbon evaporation - or both – in one space saving design
- Fine grain sputtering – for advanced high resolution FESEM applications
- High vacuum turbo pumping – allows sputtering of a wide range of oxidizing and non-oxidizing metals – suitable for SEM, high resolution FESEM and also for many thin film applications
- High vacuum carbon coating – ideal for SEM and TEM carbon coating applications
- Advanced design carbon rod evaporation gun – simple operation, reproducible results
- Control of evaporation current profile – ensures consistently reproducible carbon films
- Precise thickness control using the film thickness monitor option
- Fully automatic touch screen control – rapid data input, simple operation
- Multiple, customer defined coating schedules can be stored – ideal for multi-user laboratories
- Automatic vacuum control, which can be pre-programmed to suit the process and material – no needle valve to adjust
- “Intelligent” recognition system – automatically detects the type of coating insert fitted
- Easy-to-change, drop-in style specimen stages (rotation stage as standard)
- Vacuum shutdown feature – leaves the process chamber under vacuum when not in use – improved vacuum performance
- Thick film capabilities – up to 60 minutes sputtering time without breaking vacuum
- Ergonomic one piece molded case – easy maintenance and service access
- Ethernet with local FTP server connection – simple programmer updates
- Power factor correction – complies with current legislation (CE Certification) – efficient use of power means reduced running costs
- Three-year warranty

Ideal for SEM, high resolution FESEM and TEM applications

EMS150T is available in three formats: sputtering, carbon evaporation or both. Depending upon the selected configuration, the EMS 150T can be a



top-of-the-range sputter coater for high resolution scanning electron microscopy (SEM), a carbon coater suitable for SEM and transmission electron microscopy (TEM), or both, in a single easy to use system.

The ability of the EMS150T to rapidly sputter a wide selection of oxidizing and non-oxidizing metals also makes it an ideal platform for many thin film applications.



Molded case with color touch-screen

The EMS150T is presented in a custom molded, one-piece case. The color touch screen allows multiple users to input and store coating protocols. The case houses all the working components, including the efficient 70L/s air-cooled turbo molecular pump. Automatic bleed control ensures optimum vacuum conditions during sputtering.

The vacuum chamber has an external diameter of 165mm (6.5") and comes with an integral implosion guard. The EMS150T includes “vacuum shutdown” which enhances vacuum performance by allowing the chamber vacuum to be maintained when the system is not in use. A variable speed rotary specimen stage is fitted as standard, with other stages available as options.

Sputter coating, carbon coating or both

The EMS150T is available in three formats, each with a range of optional accessories:

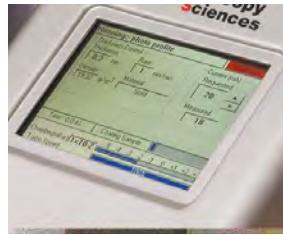
- **EMS150T S** – a high resolution sputter coater for oxidizing and non-oxidizing (noble) metals. A wide selection of sputtering targets is available, including iridium and chromium, which are highly recommended for FESEM applications.
- **EMS150T E** – a high vacuum carbon coater, ideal for the production of highly stable carbon films and surface replicas for transmission electron microscopy (TEM). The system uses economical 3.05mm diameter carbon rods.
- **EMS150T ES** – a combined system with both sputtering and carbon coating. The deposition inserts can be swapped in seconds and the intelligent system logic automatically recognizes which insert is in place and displays the appropriate operating settings.

Each of the above can be fitted with a range of optional accessories (eg metal evaporation, carbon fiber coating, film thickness monitor). See options for details.

➤ EMS 150T (continued)

Rapid data entry

At the operational heart of the EMS150T is a simple color touch screen which allows even the most inexperienced or occasional operator to rapidly enter and store their own process data. To further aid ease of use, a number of typical sputtering and evaporation profiles are already stored.



Ramped Carbon Evaporation (EMS150T E and EMS150T ES)

This profile is used to produce carbon coatings from a specifically shaped carbon rod. It can be used in place of the pulsed carbon rod process when a greater repeatability of the deposited thickness is required.

Implemented from software version 2-0039 onwards.

Generally, this process requires the use of the extended height chamber. However, the short chamber may be used for coating thicknesses greater than 12nm with default parameters. Additionally, if the short chamber is used the FTM will be inaccurate due to the close proximity of the high temperate rods.

Pulsed Cleaning for Aluminum Sputtering (EMS150T S and EMS150TES)

Aluminum is often difficult to coat due to its fast oxidizing properties. Also its oxidized layer is difficult to remove as it reduces the required target voltage to product a sputter current of 150mA. This increases the time required to clean the target.

However, the EMS150T now has a special profile for aluminum to cycle the plasma which reduces this cleaning time. The cleaning cycle is then auto terminated as its target voltage rises above 300V, thus preventing an already clean target coating the chamber excessively.

Implemented from software version 2-0041 onwards.

Improved Tolerance to Out Gassing Substrates

The pump time out has been moved to a new level defined by "safe outgas threshold" parameter, this is user definable between 5×10^{-2} and 2 mbar.

Until now the system would limit the time to achieve operational vac of 1×10^{-3} to 10 minutes. With the new modification once the "Safe outgas threshold" has been achieved the system will pump continuously.

Implemented from software version 2-0042 onwards.

Controlled Evaporation Process

This process can automate a metal evaporation process when using low power evaporation sources. It can be used with the FTM.

The use of key properties about the source and required termination allow the process to:

- Bring the source current up to the point of evaporation.
- Ramp the current up at a controlled rate until evaporation is seen.
- Close the shutter and shut the evaporation PSU down when the specified thickness is seen.
- Check the source for open or short circuit when starting the process.

This process will be available on the EMS150T with software version 2-0048 or later. Consideration should be made to the thermal effects of the evaporation source when using the FTM to control the process.

Improvements to the Pulse Carbon Rod Evaporation

Continued work on this process has found that the thickness deposited can be variable if the power applied to the rods is either too high or too low.

With the optimum current being a narrow margin between them. However, limiting the available voltage supplied to the rods increases this current window. This coupled with reducing the spigot diameter to work at a more optimum point in the PSU operation produces a more continuous spark which in turn produces a more repeatable thickness.

This improvement can be implemented by:

- Software version 2-0046 or later implements the voltage limit. Note all the carbon rod profiles should be deleted if a unit is updated to this software version.
- The evaporation current should be set between 60 and 65A.
- The reduced spigot diameter of 1.2mm can be produced with the blue handle rod shaper.

Glow Discharge Attachment

The primary application of glow discharge is as a technique for the surface modification, or 'wetting' or hydrophilisation of newly-evaporated transmission electron microscopy (TEM) carbon support films.

Freshly-made TEM carbon support films tend to have hydrophobic surfaces which inhibits the spreading of suspensions of particles in negative staining solutions. However, after glow discharge treatment with air, the carbon film is made hydrophilic and negatively charged, thus allowing easy spreading of aqueous suspensions. With subsequent magnesium acetate treatment the surface is made hydrophilic and positively charged.

In addition to glow discharge treatment using air, other process gases may be used to modify surface properties. For example, methanol as a process gas results in the surface becoming hydrophobic and negatively charged. Such treatment can facilitate the optional absorption of selected biomolecules

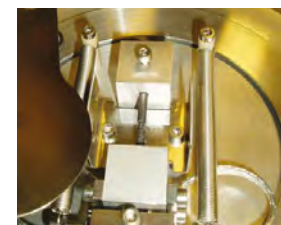
Processes

Sputtering: 0-150mA to a pre-determined thickness (with optional FTM) or by the built-in timer. The maximum sputtering time is 60 minutes (without 'breaking' vacuum and with built in rest periods).



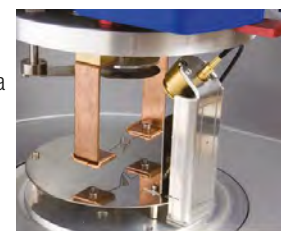
Standard Rotation Stage and FTM

Carbon evaporation: A robust, ripple free DC power supply featuring pulse evaporation ensures reproducible carbon evaporation from rod or fiber sources. Current pulse: 1-90A



Carbon Rod Evaporation Insert

Metal evaporation and aperture cleaning insert (option): For thermal evaporation of metals from filaments or boats. For cleaning SEM or TEM apertures a standard molybdenum boat (supplied) can be fitted. The metal evaporation head is set up for downwards evaporation, but upward evaporation can be achieved by fitting two terminal extensions (supplied). Evaporation times: up to four minutes.



Metal Evaporation Insert

► EMS 150T Turbo-Pumped Sputter Coater/Carbon Coater (continued)

Specifications

Instrument case: 585mm W x 470mm D x 410mm H (total height with coating head open: 650mm)

Weight: 33.4kg

Packed dimensions: 725mm W x 660mm D x 680mm H (42kg)

Work chamber: Borosilicate glass 152mm Ø (inside) x 127mm H

Safety shield: Integral polyethylene terephthalate (PET) cylinder

Display: 145mm 320 x 240 color graphic TFT (Thin Film Transistor) display

User interface: Intuitive full graphical interface with touch screen buttons, includes features such as a log of the last ten coatings carried out and reminders for when maintenance is due

Sputter target: Disc style 57mm Ø. A 0.3mm thick chromium target is fitted as standard. EMS150T S and T ES versions only

Vacuum

Turbomolecular pump: Internally-mounted, 70L/s air-cooled turbomolecular pump

Rotary pump: Edwards RV3 50L/s two-stage rotary pump, with vacuum hose, coupling kit and oil mist filter

Vacuum measurement: Pirani gauge as standard. A full range gauge (10428) is available as an option

Typical ultimate vacuum: 5×10^{-5} mbar in a clean system after pre pumping with dry nitrogen gas

Sputter vacuum range: Between 5×10^{-3} and 5×10^{-1} mbar

Specimen stage: 60mm Ø rotating stage. Rotation speed 8-20 rpm

Services and other information

Gases: Argon sputtering process gas, 99.999% (TS and TES versions) Nitrogen venting gas (optional)

Electrical supply: 90-250V ~ 50/60 Hz 1400 VA including RV3 rotary pump power. 110/240V voltage selectable

Conformity: CE conformity:

Power factor correction: Complies with the current legislation (CE Certification) and ensures efficient use of power, which means reduced running costs

Ordering Information

EMS150T S High Resolution Turbomolecular-Pumped Sputter Coater, inc. a 54mm Ø x 0.3mm chromium (Cr) target

EMS150T ES High Resolution Turbomolecular-Pumped Sputter Coater and Carbon Evaporator, including a 57mm Ø x 0.3mm chromium (Cr) target and high vacuum carbon rod evaporation insert for 3.05mm Ø carbon rods. NOTE: coating inserts are interchangeable

EMS150T E Turbomolecular-Pumped Carbon Evaporator, suitable for TEM and SEM applications. Fitted with a carbon rod evaporation insert for 3.05mm Ø carbon rods. Supplied with carbon rods (3.05mm Ø x 100mm) and a carbon rod shaper (manual operation)

Rotary pump requirements (must be ordered separately)

91003 Edwards RV3 50L/s two-stage rotary pump, with vacuum hose, coupling kit and oil mist filter

Options and Accessories

Including details of coating head inserts and specimen stages that are fitted as standard.

Coating Head Options

A range of interchangeable, plug-in style coating head inserts are available:

3200 Sputtering head insert suitable for oxidizing and non-oxidizing metals. Supplied with a 54mm Ø x 0.3mm thick chromium target as standard.

3210 Additional sputter insert for quick metal change. Note: this is an entire sputtering assembly, individual targets can also be purchased

3230 Carbon rod evaporation head insert (for 3.05mm Ø rods)

3240 Carbon rod evaporation head insert (for 6.15mm Ø rods). Note that EMS recommends 3.05mm Ø rods as they offer greater process control and are more economical (less wastage)

3250 Carbon fiber evaporation head insert

3260 Metal evaporation and aperture cleaning head insert, including the ability to evaporate upwards or downwards (T E and T ES versions only). Supplied with a pack of ten tungsten filaments and a molybdenum boat

3270 Extended height vacuum chamber (214mm high – the standard chamber is 127mm high). For increased source to sample distance and for coating large specimens

3280 Vacuum spigot allows more convenient connection of the vacuum hose to the rear of the EMS150T when bench depth is limited

3290 Film thickness monitor (FTM) attachment. Consists of a built in chamber mounted quartz crystal oscillator (includes crystal). As sputtered or evaporated material is deposited onto the crystal, so its frequency of oscillation is modified. This 'modification' is used to measure and control the thickness of material deposited

3300 Spare quartz crystals. Pack of three

3320 Full range vacuum gauge for low and high vacuum measurement (a low vacuum Pirani gauge is fitted as standard)

4513 Glow discharge inset to modify surface properties or to clean surface residues



Easy-to-change coating inserts



Sputter coater insert



Carbon fibre evaporation insert



Metal evaporation insert



Glow discharge attachment option

► EMS 150T (continued)

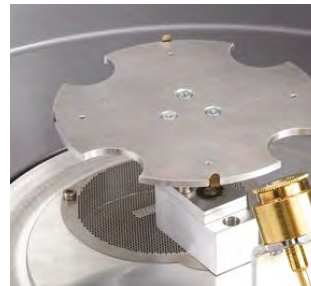
Specimen stages

The EMS150T has specimen stages to meet most requirements. All are easy-change, drop-in style (no screws) and are height adjustable (except rotary planetary stage): Please contact us for a quote.

3330	Rotation stage, 50mm Ø (supplied as standard). This stage only rotates – no tilt or height adjustment
3340	Rotate-tilt specimen stage with adjustable tilt (up to 90 degrees) and height (37mm-60mm). Tilt angle can be pre-set. 50mm Ø specimen platform with six stub positions for 15mm or 6.5mm or 1/8" pin stubs. Stage rotation speed variable between 8 and 20rpm
3350	Variable angle "Rotacota" rotary planetary stage with 50mm Ø specimen platform. Has six stub positions for 15mm or 6.5mm or 1/8" pin stubs. Stage rotation speed variable between 8 and 20rpm
3360	Flat rotation specimen stage for 100mm / 4" wafers, includes gearbox for increased coverage. Stage rotation speed variable between 8 and 20rpm
3370	Rotating specimen stage for glass microscope slides (up to two x 75mm x 25mm slides). Stage rotation speed variable between 8 and 20rpm. Includes gear box to allow optional FTM to be used



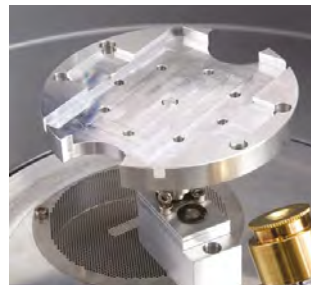
Tilt Angle Stage



4" Wafer Stage



Rotary Planetary Stage



Glass Microscope Stage



Carbon Evaporation Insert

Sputtering Targets

The EMS150T S and EMS150T ES are fitted as standard with a 0.3mm thick chromium sputter target. Other optional targets:

3410	57mm 0 x 0.1mm Gold	each
3411	57mm 0 x 0.1mm Gold/Palladium (80/20)	each
3412	57mm 0 x 0.1mm Platinum	each
3413	57mm 0 x 0.1mm Nickel	each
3414	57mm 0 x 0.1mm Silver	each
3415	57mm 0 x 0.1mm Palladium	each
3416	57mm 0 x 0.1mm Copper	each
3417	57mm 0 x 0.3mm Chromium	each
3418	57mm 0 x 0.5mm Tungsten	each
3419	57mm 0 x 1.5mm Chromium	each
3420	57mm 0 x 0.2mm Tungsten	each
3421	54mm 0 x 1.5mm Carbon	each
3422	57mm 0 x 0.1mm Aluminium	each
3423	57mm 0 x 0.1mm Platinum/Palladium (80/20)	each
3424	57mm 0 x 1.5mm Titanium	each
3425	57mm 0 x 0.3mm Platinum/Palladium (80/20)	each
3426	57mm 0 x 0.3mm Gold	each
3427	57mm 0 x 0.3mm Gold/Palladium (80/20)	each
3428	57mm 0 x 0.3mm Platinum	each
3429	57mm 0 x 0.5mm Titanium	each
3430	57mm 0 x 0.1mm Iron	each
3431	57mm 0 x 0.3mm Iridium	each
3432	57mm 0 x 0.1mm Cobalt	each
3433	57mm 0 x 0.1mm Tin	each
3434	57mm 0 x 0.1mm Molybdenum	each
3435	57mm 0 x 0.3mm Magnesium	each
3436	57mm 0 x 0.1mm Tantalum	each
3437	57mm 0 x 3mm Indium Tin Oxide (90/10)	each

Carbon supplies

3500	Carbon rods – 6.15mm 0 x 100mm length (unshaped)	10/pk
3510	Carbon rods – 6.15mm 0 x 50mm length (shaped)	10/pk
3520	Carbon rods - 3.05mm 0 x 50mm length (shaped)	10/pk
3530	Carbon rods 3.05mm 0 x 300mm length (unshaped)	10/pk
3540	Carbon fiber cord - high purity - 1m	each
3550	Carbon fiber cord - high purity - 5m	each
3560	Carbon fiber cord - standard grade - 1m	each
3570	Carbon fiber cord - standard grade - 10m	each
3580	Carbon fiber cord - standard grade - 100m	each
3590	Manual rod shaper for 6.15mm Ø carbon rods	each
3595	Manual rod shaper for 3.05mm Ø carbon rods	each
3540	Carbon fiber cord - high purity - 1m	each
3550	Carbon fiber cord - high purity - 5m	each
3560	Carbon fiber cord - standard grade - 1m	each
3570	Carbon fiber cord - standard grade - 10m	each
3580	Carbon fiber cord - standard grade - 100m	each
3590	Manual rod shaper for 6.15mm Ø carbon rods	each
3595	Manual rod shaper for 3.05mm Ø carbon rods	each

Other consumables and spare kits

3600	Metal evaporation basket - pack of 10 (for use with metal evaporation head)
3610	Two-year spares kit for EMS150T S Includes: chromium target, glass cylinder, carbon fibre cord, quartz crystals, O-rings
3620	Two-year spares kit for EMS150T E Includes: chromium target, glass cylinder, carbon fibre cord, carbon fibre - fine, carbon rods 3.05mm, quartz crystals, O-rings
3630	Two-year spares kit for EMS150T ES Includes: chromium target, glass cylinder, carbon fibre cord, carbon fibre - fine, carbon rods 3.05mm, quartz crystals, O-rings

► EMS150GB Turbo-Pumped Sputter Coater/ Carbon Coater – For Glove Box

Quick Overview

The EMS150GB is a modular glove box version of the highly successful EMS150T ES bench top turbomolecular-pumped coating system - suitable for SEM, TEM and many thin-film applications. The EMS150GB comes as standard with sputtering and carbon rod evaporation inserts and a rotating specimen stage. Options include a metal evaporation insert, glow discharge, a film thickness monitor (FTM), aperture cleaning insert and special stages to suit a range of specimen types.

Key Features

- Modular construction for mounting in glove boxes
- Integral glove box pressure monitoring
- Remote operation from a touch screen control panel
- Metal sputtering and carbon evaporation in one system
- Fine grain sputtering for advanced high resolution FE-SEM applications
- High vacuum turbo pumping - allows sputtering of a wide range oxidising and non-oxidising metals
- High vacuum carbon rod coating - ideal for SEM and TEM carbon coating applications (carbon fibre available as an option)
- Advanced "anti-stick" carbon rod evaporation gun – simple operation, reproducible results
- Control of evaporation current profile - ensures consistently reproducible carbon films
- Precise thickness control using the film thickness monitor option
- Fully automatic touch screen control – rapid data input, simple operation
- Multiple, customer defined coating schedules can be stored - ideal for multi-user laboratories
- Automatic vacuum control which can be pre-programmed to suit the process and material – no manual needle valve to adjust
- "Intelligent" recognition of system - automatically detects the type of coating insert fitted
- Easy-to-change, drop-in style specimen stages (flat rotation stage as standard)
- Vacuum shut down feature - leaves the process chamber under vacuum when not in use - improved vacuum performance
- Thick film capabilities - up to 60 minutes sputtering time without breaking vacuum
- Power Factor Correction - complies with the current legislation (CE certification) - efficient use of power means reduced running costs
- Three-year warranty

Product Description

The EMS150GB is single platform for sputtering and carbon rod evaporation. Metal evaporation using filament or boat sources is possible using an optional insert.

Depending upon user preference, the EMS150GB can be a top-of-the-range sputter coater for high resolution scanning electron microscopy (SEM), or a high vacuum carbon coater suitable for SEM and transmission electron microscopy (TEM). The flexibility of the system can be further expanded using a range of optional accessories.

The EMS150GB can rapidly sputter a wide selection of oxidising and non-oxidising metals making it ideal for many thin film applications.

The EMS150GB has an integral turbomolecular pump and additionally requires a suitable rotary pump or dry pump to "back" the turbomolecular pump (see Option and Accessories).

Flexible modular design

A modular design enables the vacuum chamber to be mounted through the base of the glove box or - when modification to the glove box floor is not possible - inside the glove box (optional feedthroughs are required).

A separate power supply housed in a rugged case is designed to be floor mounted and can be positioned conveniently beneath the glove box or bench. The touch screen user interface is housed in a robust stainless steel case and can be positioned outside of the glove box environment, if preferred.



EMS150GB mounted in a glove box

Options for glove box mounting:

Vacuum module mounted in the floor of the glove box

A cut-out is made in the floor of the glove box and the vacuum chamber fitted and sealed with the gasket supplied. External connections from the floor mounted power supply, vacuum pump and argon gas can then be made directly to the chamber.

OR

Vacuum module placed inside the glove box

The chamber assembly is placed inside the glove box and the power supply, vacuum pump and argon gas connections are made through two KF40 feedthroughs in the rear of the glove box.

Note: each EMS150GB is supplied with an accessory/configuration kit to suit either internally or externally mounted vacuum chambers. Additional kits can be designed on a case-by-case basis to allow the system to be adapted to various manufacturers' glove boxes. *Please contact EMS for more details.*

► EMS150GB Turbo-Pumped Sputter Coater/Carbon Coater – For Glove Box (continued)

Touch screen user interface

Enclosed in a stainless steel case and mounted at a convenient position outside the glove box, the touch screen allows multiple users to input and store coating protocols.

Vacuum module - including "vacuum shutdown" and glove box pressure interlock

The vacuum module houses all the working components, including the efficient 70L/s air-cooled turbomolecular pump. An automatic bleed control ensures optimum vacuum conditions during sputtering and a full range active gauge is fitted as standard to monitor the vacuum.

The EMS150GB includes "vacuum shutdown", a convenient feature which enhances vacuum performance by allowing the chamber vacuum to be maintained when the coater is not in use.

A unique feature of the EMS150GB is the integral pressure interlock switch. This independently monitors the pressure inside the glove box and shuts off the vacuum pump if the glove box atmosphere is unacceptably reduced due to a vacuum leak.

The vacuum chamber is 214mm high to allow for increased source to substrate distances required for coating large specimens. It has an external diameter of 165mm and comes with an integral implosion guard. The chamber assembly is easily removed to allow specimen exchange and chamber cleaning.

A variable speed rotary specimen stage is fitted as standard, with full height adjustment from 0 to 190mm above the base plate; other stages are available as options.

Sputter coating and carbon coating as standard, plus an option for metal evaporation

"Intelligent" Quick-change deposition inserts

The deposition inserts can be swapped in seconds and the intelligent system logic automatically recognises which insert is in place and displays the appropriate operating settings.

High resolution sputter coating

The EMS150GB features a high-resolution sputter coater insert (3200) for oxidising and non-oxidising (noble) metals. A wide selection of sputtering targets is available, including iridium and chromium, which are highly recommended for FE-SEM applications. Please see Options and Accessories for details of available metal targets.



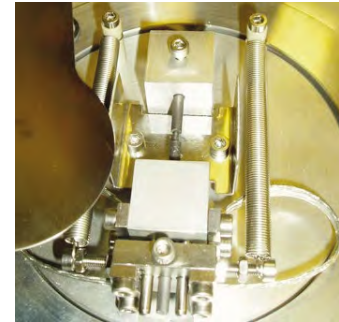
Touch screen control module



Vacuum chamber assembly

Carbon rod evaporation

The high vacuum carbon rod coating insert (3230) is ideal for the production of highly stable carbon films and surface replicas for transmission electron microscopy (TEM). The system uses economical 3.05mm diameter carbon rods and the advanced "anti-stick" carbon rod evaporation gun offers simple operation and reproducible results. A carbon fibre evaporation insert (3250) is available as an option (see Options and Accessories).



Carbon rod evaporation insert

Metal evaporation/aperture cleaning option

A quick change insert (3260) allows metal evaporation from tungsten baskets or molybdenum boats - ideal for thin film applications. For ease of set up in a glove box, the metal charge can be loaded into the evaporation source away from the vacuum chamber.

Each of the above configurations can be used with a range of optional accessories. See options and Accessories for details.



Metal evaporation insert option

Rapid data entry

At the operational heart of EMS150GB is a simple colour touch screen, which allows even the most inexperienced or occasional operators to rapidly enter and store their own process data. To further aid ease of use a number of typical sputtering and evaporation profiles are provided.



Carbon fibre evaporation insert option

Additional Information

Options and Accessories (including details the standard specimen stage)

Coating inserts included with the EMS150GB

A range of interchangeable, plug-in style coating head inserts are available:

- Sputtering head insert (3200) is suitable for oxidising and non-oxidising metals. Supplied with a 54mm Ø x 0.3mm thick chromium target (3417) as standard. For additional targets see "Ordering Information" section.

Note: changing sputtering targets is easy, but additional sputter head inserts can be purchased for even quicker coating material change - see (3210)

- Carbon rod evaporation head insert and accessories for 3.05mm Ø rods (3230)

Optional coating inserts

Carbon rod evaporation head insert for 6.15mm Ø rods (3240).

Note that EMS recommends 3.05mm Ø rods as they offer greater process control and are more economical (less wastage)

- Carbon fibre evaporation head insert (3250)

► EMS150GB Turbo-Pumped Sputter Coater/Carbon Coater – For Glove Box (continued)

- Metal evaporation and aperture cleaning head insert (3260), using tungsten wire baskets and molybdenum boats. Includes electrode extensions to allow upwards evaporation, if required. Note: when the electrodes are fitted some stage options cannot be used

Specimen stages

The EMS150GB has specimen stages to meet most requirements. All are easy-change, drop-in style (no screws) and are height adjustable (except rotary planetary stage).

- 6800-S rotation stage, 50mm Ø (supplied as standard). This stage only rotates – no tilt or height adjustment.
- 6801 rotate-tilt stage, 50mm Ø with height adjustment (target to stage height variable between 37mm and 60mm). The tilt angle can be pre-set.
- 6803 variable angle 'Rota-Cota' rotary planetary specimen stage with 50mm Ø specimen platform with six stub positions for 15mm or 6.5mm or 1/8" pin stubs.
- 3360 flat rotation stage for 4"/100mm wafers. Includes gear box which needs to be fitted when the optional FTM is being used or for coating over the full area of the stage.



4" wafer stage option



standard rotating specimen stage
and optional film thickness
monitor (FTM)

- 6804 rotation stage for glass microscope slides. Allows two 75 x 25mm slides to be coated.

Note: all rotation stages have rotation speeds that can be variable between 8 and 20 rpm.

Specifications

Vacuum module size	267mm W x 490mm D x 494mm H (total height with coating head open: 767mm)
Power supply size	310mm W x 357mm D x 262mm H
User interface size & weight	160mm W x 157mm D x 42mm.
Weight:	40kg
Packed dimensions	725mm W x 660mm D x 787mm H (44kg)
Work chamber	Borosilicate glass 152mm Ø (inside) x 214mm H
Safety shield	Integral polyethylene terephthalate (PET) cylinder
Display	145mm 320 x 240 colour graphic TFT (Thin Film Transistor) display
User interface	Intuitive full graphical interface with touch screen buttons, includes features such as a log of the last 100 coatings carried out and reminders for when maintenance is due
Sputtering target	Disc style 57mm Ø x 0.3mm thick chromium target is fitted as standard
Specimen stage	60mm Ø rotation stage. Rotation speed 8 ~ 20 rpm
For alternative stages see	Options and Accessories
Specimen shutter	An automatic shutter is fitted as standard to shield specimens during pre-sputtering of oxidising metals and protection during evaporation outgassing procedures

Vacuum

Turbomolecular pump	Internally mounted, 70L/s air-cooled turbomolecular pump
Rotary pump	5m ³ /hr-1 two-stage rotary pump with oil mist filter (order separately: 91003)
Vacuum measurement	An active full-range gauge is fitted
Typical ultimate vacuum	5x10 ⁻⁹ mbar
Sputter vacuum range	Between 5x10 ⁻³ and 5x10 ⁻¹ mbar

Interlocks

The EMS150GB is interlocked to prevent continuous pumping of the glove box in the event of a vacuum leak

Processes

Sputtering 0-150mA to a pre-determined thickness (with optional FTM) or by the built-in timer. The maximum sputtering time is 60 minutes (without "breaking" vacuum and with built-in rest periods)

Carbon evaporation A robust, ripple free, D.C. power supply featuring pulse evaporation ensures reproducible carbon evaporation from rod or fibre sources. Current pulse: 1-90A

Metal evaporation and aperture cleaning insert (option) For thermal evaporation of metals from filaments or molybdenum boat can be fitted. The metal evaporation head is set up for downwards evaporation, but upward evaporation can be achieved by fitting two terminal extensions (supplied). Evaporation times: up to four minutes

Services and other information

Gases	Quick-connect inlet for: argon sputtering process gas, 99.999% ("zero grade")
Nitrogen venting gas (no quick-connect – uses the glove box atmosphere as the source)	
Electrical supply	90-250V ~ 50/60 Hz 1400 VA including rotary pump power. 110/240V voltage selectable
Conformity	CE conformity: Power Factor Correction. Complies with the current legislation (CE Certification) and ensures efficient use of power which means reduced running costs

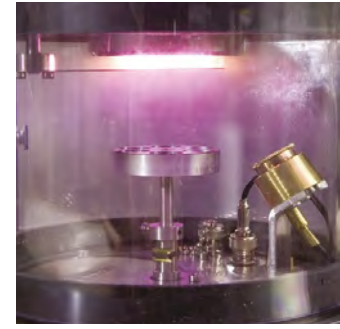
► EMS150GB Turbo-Pumped Sputter Coater/Carbon Coater – For Glove Box (continued)

Other options, including FTM and glow discharge

- 3270 extended height chamber (87mm higher than the standard stage) For tall specimens.
- 3290 Film Thickness Monitor (FTM). Consists of a controller and quartz crystal oscillator built into the EMS150GB and a vacuum feed though, chamber mounted crystal holder and quartz crystal. As sputtered or evaporated material is deposited onto the crystal, so its frequency of oscillation is modified. This 'modification' is used to measure and control the thickness of material deposited.
- 4513 glow discharge insert. Used to modify surface properties (eg hydrophobic to hydrophilic conversion).



Glow discharge attachment option



During sputtering, optional film thickness monitor (FTM) shown

Ordering Information

EMS150GB A modular, high resolution turbomolecular-pumped sputter coater/carbon rod evaporator for glove boxes. **Includes:** sputtering insert, 54mm Ø x 0.3mm chromium target, carbon rod evaporation insert, carbon rods (3.05mm Ø x 300mm) and carbon rod shaper (manual operation). Fitted with a rotation stage

Rotary pump requirements (needs to be ordered separately)	
91003	Edwards RV3 50L/s two-stage rotary pump, with vacuum hose, coupling kit and oil mist filter
6550	Diaphragm pump. A "dry" alternative to the standard 91003 oil-based rotary pump complete with vacuum hose, coupling kit and oil mist filter

Options and accessories

3230	Carbon rod evaporation head insert (for 3.05mm Ø rods)
3240	Carbon rod evaporation head insert (for 6.15mm Ø rods).
Note that EMS recommends 3.05mm Ø rods as they offer greater process control and are more economical	
3250	Carbon fiber evaporation head insert
3260	Metal evaporation and aperture cleaning head insert, including the ability to evaporate upwards or downwards. Supplied with a pack of ten tungsten filaments and a molybdenum boat.
3270	Extended height vacuum chamber (214mm high – the standard chamber is 127mm high). For increased source to sample distance and for coating large specimens
3290	Film thickness monitor (FTM) attachment. Consists of a built in chamber mounted quartz crystal oscillator (includes crystal). As sputtered or evaporated material is deposited onto the crystal, so its frequency of oscillation is modified. This 'modification' is used to measure and control the thickness of material deposited
3300	Spare quartz crystal.
3320	Full range vacuum gauge for low and high vacuum measurement (a low vacuum Pirani gauge is fitted as standard)
4513	Glow discharge insert to modify surface properties (eg hydrophobic to hydrophilic conversion) or to clean surface residues
3600	Metal evaporation basket - pack of 10 (for use with metal evaporation head)
3630	Two-year spares kit for EMS150GB

Includes: chromium target, glass cylinder, carbon fibre cord, carbon fibre - fine, carbon rods 3.05mm, quartz crystals, O-rings

Specimen stages

6790-S	Swinging arm stage drive, a stage drive and positioning mechanism which positions the stage under the correct target. Also provides rotation drive to the stage. Rotation Speed Max 38 rpm Min 14 rpm
6800-S	Rotating specimen stage for 6" (152 mm) wafers, with rotation variable between preset limits.
6801	Rotating 50 mm Ø specimen stage with adjustable tilt. The platform has six specimen stub positions for 15 mm, 10 mm, 6.5 mm or 1/8" pin stubs. The stage rotation speed is variable between preset limits. The target to stage height is variable between 0 mm and 42 mm for the standard stage. When used with the extended height cylinder the target to stage height would be an additional 87 mm.
6802	50 mm Ø variable height specimen stage with six stub positions for 15 mm, 10 mm, 6.5 mm disc stubs or 1/8" pin stubs. Stage rotation speed variable between preset limits.
Note: Target to stage height is variable between 10 mm and 53 mm for the standard stage. The stage is supplied with two mounting pillars; one provides 10 mm to 32 mm target to stage distance and the other 31 mm to 53 mm. An adjustable stop is used to set the height. When used with the extended height cylinder (optional accessory) the target to stage height would be an additional 87 mm.	
6803	50 mm Ø rotary tilting stage. A rotary planetary style stage with a variable tilt angle from horizontal to 30 degrees. The platform has six positions for either 6.5 mm, 10 mm and 15 mm disc stubs or 1/8" pin stubs. Rotation speed is variable between preset limits.
Note: depending upon specimen height, this stage may require the optional extended height cylinder.	
6804	A 90 mm Ø specimen stage for glass microscope slides (up to two 75 mm x 25 mm slides or a single 75 mm x 50 mm slide). The stage can alternatively accommodate up to six 1/8" SEM pin stubs. The stage rotation speed is variable between preset limits. A gear box is included to allow the optional FTM to be used.

► EMS300R T Triple Target, Large Chamber, Rotary-Pumped Sputter Coater

Innovative and versatile Sputter Coater and Carbon Evaporator for SEM Applications

Quick Overview

The EMS300R T is a large chamber, rotary-pumped coating system ideally suited for sputtering a single large diameter specimen (e.g. a wafer) up to 8"/203 mm or smaller, multiple specimens over a similar diameter.

The EMS300R T is fitted with three individual sputtering heads to ensure even deposition on a range of specimen types. The system is designed to sputter non-oxidizing (noble) metals, for example gold (Au), gold/palladium (Au/Pd) and platinum (Pt). It is fitted with three individual sputtering heads to ensure even sputtering deposition over a large diameter. Gold targets are fitted as standard.

Note: for sputtering both non-oxidizing and oxidizing metals please see the EMS300T T Large Chamber Turbo-Pumped sputter coater. For sequential sputtering of two different oxidizing or non-oxidizing metals please see the EMS300T D Large Chamber, Turbo-Pumped dual head sputter coater.

KEY FEATURES:

- **Large area sputter coating** – up to 8"/203 mm diameter
- **Triple sputtering head** – ensures even coating deposition of large specimens
- **Single target selection** – for economic coating of small specimens
- **Sputtering of a range of non-oxidising (noble) metals**, such as gold (Au), platinum (Pt) and silver (Ag). For oxidising metals see EMS300T T and EMS300T D
- **Precise thickness control using the film thickness monitor option**
- **Fully automatic touch-screen control** – rapid data input, simple operation
- **Multiple, customer-defined coating schedules can be stored** – ideal for multi-user laboratories
- **Coat logging** – details of the last 100 coatings available on screen
- **Automatic vacuum control** – can be pre-programmed to suit the process and material; no needle valve to adjust
- **Easy-to-change, drop-in style specimen stages (rotation stage as standard)**
- **Vacuum shut-down option** – leaves the process chamber under vacuum when not in use giving improved vacuum performance
- **Thick film capabilities** – up to 60 minutes sputtering time without breaking vacuum
- **Ergonomic one-piece moulded case** – allowing easy maintenance and service access
- **Ethernet with local FTP server connection** - simple programmer updates
- **Power factor correction** - complies with the current legislation (CE Certification), efficient use of power means reduced running costs
- **Three-year warranty**



Product Description

Ideal for sputter coating large specimens for SEM

The EMS300R T is suited for sputtering noble metals, such as gold (Au) and platinum (Pt) for the preparation of specimens for scanning electron microscopy (SEM).

Triple sputtering head

The EMS300R T is fitted with three individual sputtering heads to ensure even deposition of individual large specimens or multiple smaller specimens. Please note that it is not possible to sequentially sputter three different sputtering metals from each sputtering head – for sequential coating please see EMS300T D dual head coater..

For economical coating of small specimens "single target" mode can be selected.

Molded case with color touch screen

The EMS300R T is presented in a custom molded, one-piece case, allowing easy servicing access. The color touch-screen allows multiple users to input and store coating 'recipes'. The case houses all the working components, with an automatic bleed control valve that ensures optimum vacuum conditions during sputtering.

The vacuum chamber has an internal diameter of 283 mm/12" and comes with an integral implosion guard. The EMS300R T also includes 'vacuum shutdown', which enhances vacuum performance by allowing the chamber vacuum to be maintained when the system is not in use.

A variable speed rotary specimen stage is fitted as standard for 8"/203 mm and 6"/152 mm wafers, with other stages available as options, please see the Options and Accessories section below.



Triple sputtering head (closed)



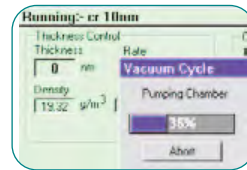
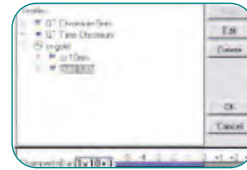
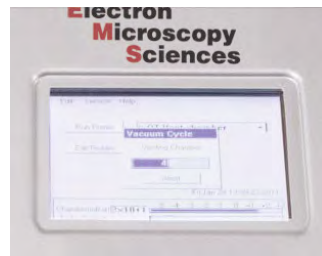
Triple sputtering head (open)



➤ EMS300R T (continued)

Rapid data entry

At the operational heart of the EMS300R T is a simple color touch screen, which allows even the most inexperienced or occasional operator to rapidly enter and store their own process data. To further aid ease of use, a number of typical sputtering and carbon coating profiles are already stored. For added convenience summaries of the last 100 coatings carried out can be viewed.



Maintenance

The intuitive touch screen interface features maintenance prompts which highlight:

- Time of last clean
- Coating time since last cleaned
- System 'on time'
- Time of last service

Improved Tolerance to Out Gassing Substrates

The pump time out has been moved to a new level defined by "safe outgas threshold" parameter, this is user definable between 5×10^{-2} and 2 mbar.

Until now the system would limit the time to achieve operational vac of 1×10^{-3} to 10 minutes. With the new modification once the "Safe outgas threshold" has been achieved the system will pump continuously. Implemented from software version 2-0042 onwards.

Controlled Evaporation Process

This process can automate a metal evaporation process when using low power evaporation sources. It can be used with the FTM.

The use of key properties about the source and required termination allow the process to:

- Bring the source current up to the point of evaporation.
- Ramp the current up at a controlled rate until evaporation is seen.
- Close the shutter and shut the evaporation PSU down when the specified thickness is seen.
- Check the source for open or short circuit when starting the process.

This process will be available on the EMS150T with software version 2-0048 or later. Consideration should be made to the thermal effects of the evaporation source when using the FTM to control the process.

Improvements to the Pulse Carbon Rod Evaporation

Continued work on this process has found that the thickness deposited can be variable if the power applied to the rods is either too high or too low. With the optimum current being a narrow margin between them. However, limiting the available voltage supplied to the rods increases this current window. This coupled with reducing the spigot diameter to work at a more optimum point in the PSU operation produces a more continuous spark which in turn produces a more repeatable thickness.

This improvement can be implemented by:

- Software version 2-0046 or later implements the voltage limit. Note all the carbon rod profiles should be deleted if a unit is updated to this software version.
- The evaporation current should be set between 60 and 65A.
- The reduced spigot diameter of 1.2mm can be produced with the blue handle rod shaper.

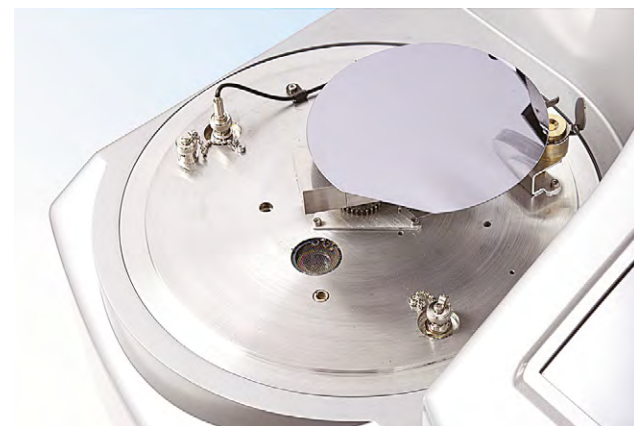
Additional Information

Options and Accessories (including details the standard specimen stage)

Specimen stages

The EMS300R T has specimen stages to meet most requirements. All are easy-change, drop-in style (no screws) and are height adjustable (except for the rotary planetary stage). Rotation speed is variable between preset limits:

- Flat rotation stage for wafers - for 8"/203 mm and 6"/152 mm/wafers (fitted as standard)
- Rotation stage – 50 mm Ø. This stage only rotates - no tilt or height adjustment is possible
- Rotate-tilt stage – 50 mm Ø with height adjustment (target to stage height variable between 30-80 mm). Tilt angle can be pre-set (horizontal to 30 degrees)
- Rotation stage for glass microscope slides



EMS300R T standard specimen stage shown with a 4" wafer. Optional film thickness monitor (1152) fitted

Other options

Extended height chamber – for taller specimens

Film thickness monitor (FTM) - this attachment consists of a controller and quartz crystal oscillator built into the EMS300R T and a vacuum feed-through, chamber-mounted crystal holder and quartz crystal. As sputtered or evaporated material is deposited onto the crystal, so its frequency of oscillation is modified. This 'modification' is used to measure and control the thickness of material deposited. Note: cannot be used when the coater is operated in "single target" mode.

continued >>>>

► EMS300R T Triple Target, Large Chamber, Rotary-Pumped Sputter Coater (continued)

Specifications

Instrument case	585mm W x 470mm D x 410mm H (total height with coating head open: 650mm)
Weight	36.4kg
Packed dimensions	725mm W x 660mm D x 680mm H (44.8kg)
Work chamber	Borosilicate glass 283mm ID x 127mm H
Safety shield	Integral polyethylene terephthalate (PET) cylinder
Display	145mm x 320mm x 240mm colour graphic thin film transistor (TFT) display
User interface	Intuitive full graphical interface with touch screen buttons, includes fea- tures such as a log of the last 100 coatings carried out and reminders for when maintenance is due
Sputter targets	Disc style 57mm Ø with thick depending upon the targets fitted. Three 57 mm Ø x 0.1 mm thick gold (Au) targets are fitted as standard.
Vacuum	
Rotary pump	50L/m two-stage rotary pump with oil mist filter. Vacuum measurement ..Pirani gauge
Typical ultimate vacuum	2×10^{-2} mbar in a clean system after pre-pumping with dry nitrogen gas
Specimen stage	Flat rotation stage for 200mm/8" and 150mm/6" wafers fitted as standard. Rotation speed is variable between preset options. For alternative stages see Options and Accessories

Processes

Sputtering	0-80mA to a pre-determined thick- ness (with optional FTM) or by the built-in timer. The maximum sputter- ing time is 60 minutes (without 'breaking' vacuum and with built-in rest periods)
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Services and other information

Gases	Argon sputtering process gas, 99.999% Nitrogen venting gas (optional)
Electrical supply	90-250V 50/60Hz 1,400VA including RV3 rotary pump power. 110/240V voltage selectable
Conformity	CE conformity: Power factor correc- tion. Complies with the current legis- lation (CE Certification) and ensures efficient use of power, which means reduced running costs

Ordering information

EMS300R T	Large-Chamber-Rotary-Pumped Sputter Coater, fitted with three sputtering heads to ensure even metal deposition. Include three 57mm Ø x 0.3mm gold (Au) sputter targets. A flat rotation stage for 8"/203 mm/ and 6"/152 mm wafers is fitted as standard	each
91005	Rotary pump requirements (needs to be ordered separately) Edwards RV5 90L/s two-stage rotary pump, with vacuum hose, coupling kit and oil mist filter	each

Specimen Stages

6400-S	Rotating 50 mm Ø specimen stage with adjustable tilt. The platform has six specimen stub positions for 6.5mm, 10 mm and 15 mm or 1/8" pin stubs. Stage rotation speed is variable between preset limits. No rotation is possible when in single target mode. Target to stage height is variable between 0 mm and 42 mm for the standard stage. When used with the extended height cylinder (optional accessory 10596) the target to stage height would be an additional 87 mm	each
6401	50 mm Ø variable height specimen stage with six stub positions for, 6.5 mm 10 mm and 15 mm disc stubs or 1/8" pin stubs. Stage rotation speed is variable between preset limits	each
6402	50 mm Ø rotary tilting stage. A rotary planetary style stage with variable tilt angle from horizontal to 30 degrees. The platform has six positions for either 6.5 mm 10 mm and 15 mm disc stubs or 1/8" pin stubs. Rotation speed is variable between preset limits.	each
	Note: depending upon specimen height, this stage may require the optional extended height cylinder	
6403	A 90mm Ø specimen stage for glass microscope slides (up to two x 75mm x 25mm slides or a single 75 mm x 50 mm slide). The stage can alternatively accommodate up to six 1/8" SEM pins stub. Stage rotation speed variable between preset limits. Includes a gear box to allow the optional FTM to be used	each

► EMS300R T (continued)



Options and Accessories

6404	Film thickness monitor (FTM) attachment. Including oscillator, feed-through, quartz crystal holder and one C5460 quartz crystal	each
6405	Spare quartz crystal	each
6406	Extended height vacuum chamber (214 mm in height - the standard chamber is 127 mm high). For increased source to specimen distance and for coating larger specimens	each
6407	Vacuum spigot allows more convenient connection of the vacuum hose to the rear of the Q300R T when bench depth is limited	each
6408	A lockable emergency stop (e-stop) switch which can be mounted on top of the system in a position easily accessible for the operator. It is provided with a key to release the knob after activation. Note: the addition of the e-stop does not inhibit or replace the normal On/Off switch function. The e-stop can be retrofitted to existing systems	each
6409	Coating shields. Shields can be fitted to protect large surfaces from coating deposition, easily removable for ease of cleaning	each
6410	Two-year spares kit for EMS300R T. Includes: 3 x 57mm Ø x 0.3mm gold (Au) target, standard glass chamber assembly, O-rings etc.	each
6411	6" Wafer Specimen Stage: A flat adjustable stage capable of accepting 6" or 101.6 mm wafers	each
6412	4" Wafer Stage : A flat 4 1/2" 102mm flat, drop in wafer stage which accepts 2, 3, 4 " Wafers	each
6413	Additional Standard Glass Cylinder Assembly	each

Sputter targets

NB: The EMS300R T is fitted as standard with three 0.3mm thick gold (Au) targets. Other optional targets are available (three required):

4523	57mm Ø x 0.1mm Gold	each
4524	57mm Ø x 0.2mm Gold	each
4525	57mm Ø x 0.3mm Gold	each
4526	57mm Ø x 0.1mm Gold/Palladium (80/20%)	each
4527	57mm Ø x 0.2mm Gold/Palladium (80/20%)	each
4528	57mm Ø x 0.3mm Gold/Palladium (80/20%)	each
4529	57mm Ø x 0.1mm Platinum	each
4530	57mm Ø x 0.2mm Platinum	each
4561	57mm Ø x 0.3mm Platinum	each
4532	57mm Ø x 0.1mm Nickel	each
4533	57mm Ø x 0.1mm Silver	each
4534	57mm Ø x 0.1mm Palladium	each
4535	57mm Ø x 0.1mm Copper	each
4536	57mm Ø x 0.1mm Platinum/Palladium (80/20%)	each
4537	57mm Ø x 0.3mm Platinum/Palladium (80/20%)	each

► EMS300TT Triple Target, Large Chamber, Turbo-Pumped Sputter Coater

Quick Overview

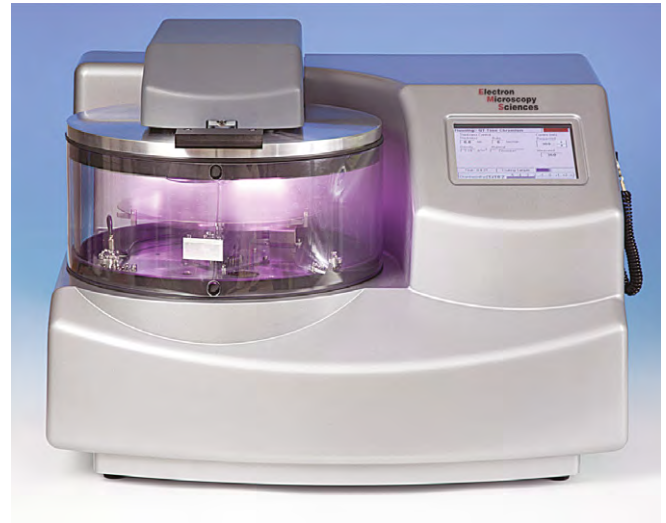
The EMS300T T is a large chamber, turbomolecular-pumped coating system ideally suited for sputtering a single large diameter specimen up to 8"/203 mm (for example a wafer) or smaller multiple specimens of a similar area.

The EMS300TT is fitted with three individual sputtering heads to ensure even deposition on a range of specimen types. The system is designed to sputter both oxidising metals e.g. chromium (Cr) and aluminium (Al) and non-oxidising (noble) metals such as gold (Au), gold/palladium (Au/Pd) and platinum (Pt). Chromium targets are fitted as standard.

If the requirement is for sputtering non-oxidising metals only then the EMS300R T large chamber, turbo-pumped sputter coater is the most suitable choice.

KEY FEATURES

- Large area sputter coating – up to 8"/203 mm diameter
- Triple sputtering head – ensures even coating deposition of large specimens
- Single target selection – for economic coating of small specimens for SEM
- Fine grain sputtering for advanced high resolution FE-SEM applications
- Coat logging – details of the last 100 coatings available on screen
- High vacuum turbo pumping - allows sputtering of a wide range of oxidising and non-oxidising metals suitable for SEM, high resolution FE-SEM and also for many thin film applications
- Precise thickness control using the film thickness monitor option
- Fully automatic touch-screen control – rapid data input, simple operation
- Multiple, customer-defined coating schedules can be stored – ideal for multi-user laboratories
- Automatic vacuum control – can be pre-programmed to suit the process and material; no needle valve to adjust
- Easy-to-change, drop-in style specimen stages (rotation stage supplied as standard)
- Vacuum shut-down option – leaves the process chamber under vacuum when not in use, giving improved vacuum performance
- Thick film option – up to 60 minutes sputtering time without breaking vacuum
- Ergonomic one-piece moulded case – enables easy maintenance and service access
- Ethernet with local FTP server connection – simple programmer updates
- Power factor correction – complies with the current legislation (CE Certification) – efficient use of power means reduced running costs
- Three-year warranty



Product Description

Ideal for sputter coating large specimens and thin film applications and SEM / FE-SEM

The EMS300T T is suited for sputtering a range of oxidising and non-oxidising (noble) metals for thin film applications and scanning electron microscopy (SEM). The range of target materials available is extensive and detailed in the Ordering Information section below.

High vacuum turbo molecular pumping

The EMS300T T is fitted with an internally mounted 70L/sec turbo-molecular pump, backed by a 50L/m two-stage rotary pump (which needs to be ordered separately). A Pirani vacuum measurement gauge (range: 1000 mbar to 5×10^{-4} mbar) is included, but a full range gauge (1000 mbar to 5×10^{-9} mbar) is available as an option.

Typical ultimate vacuum of around 5×10^{-5} mbar can be expected in a clean system after pre-pumping with dry nitrogen gas

Triple sputtering head – for an even, consistent coating

The EMS300T T is fitted with three individual sputtering heads to ensure even deposition of individual large specimens or multiple specimens. Please note that it not possible to sequentially sputter three different sputtering metals from each sputtering head, for sequential coating of two metals then the EMS300T D is a more suitable option. For economical coating of small specimens such a SEM stubs then "single target" mode can be selected.



Triple sputtering head with automatic shutter open



Triple sputtering head with automatic shutter closed

► EMS300TT (continued)

Molded case with color touch-screen

The EMS300T T is presented in a custom moulded, one-piece case allowing easy servicing access. The colour touch-screen enables multiple users to input and store coating 'recipes'. The case houses all the working components and includes an automatic bleed control that ensures optimum vacuum conditions during sputtering.



The vacuum chamber has an internal diameter of 283 mm/12" and comes with an integral implosion guard. The vacuum shutdown option can enhance vacuum performance by allowing the chamber vacuum to be maintained when the system is not in use.

A variable speed rotary specimen stage is fitted as standard and accommodates 8"/203 mm and 6"/152 mm wafers. Other stages are available as options for this coater, please see the Options and Accessories section for more information.

Rapid data entry

At the operational heart of the EMS300T T is a simple colour touch-screen, which allows even the most inexperienced or occasional operator to rapidly enter and store their own process data. To further aid ease of use, a number of typical sputter coating profiles are already stored. For added convenience summaries of the last 100 coatings carried out can be viewed.



Improved Tolerance to Out Gassing Substrates

The pump time out has been moved to a new level defined by "safe outgas threshold" parameter, this is user definable between 5×10^{-2} and 2 mbar.

Until now the system would limit the time to achieve operational vac of 1×10^{-3} to 10 minutes. With the new modification once the "Safe outgas threshold" has been achieved the system will pump continuously. Implemented from software version 2-0042 onwards.

Controlled Evaporation Process

This process can automate a metal evaporation process when using low power evaporation sources. It can be used with the FTM.

The use of key properties about the source and required termination allow the process to:

- Bring the source current up to the point of evaporation.
- Ramp the current up at a controlled rate until evaporation is seen.
- Close the shutter and shut the evaporation PSU down when the specified thickness is seen.
- Check the source for open or short circuit when starting the process.

This process will be available on the EMS150T with software version 2-0048 or later. Consideration should be made to the thermal effects of the evaporation source when using the FTM to control the process.

Improvements to the Pulse Carbon Rod Evaporation

Continued work on this process has found that the thickness deposited can be variable if the power applied to the rods is either too high or too low. With the optimum current being a narrow margin between them. However, limiting the available voltage supplied to the rods increases this current window. This coupled with reducing the spigot diameter to work at a more

optimum point in the PSU operation produces a more continuous spark which in turn produces a more repeatable thickness.

This improvement can be implemented by:

- Software version 2-0046 or later implements the voltage limit. Note all the carbon rod profiles should be deleted if a unit is updated to this software version.
- The evaporation current should be set between 60 and 65A.
- The reduced spigot diameter of 1.2mm can be produced with the blue handle rod shaper.

Maintenance

The intuitive touch-screen interface features a maintenance prompt facility, which highlights:

- Time of last clean
- System 'on time'
- Coating time since last cleaned
- Time of last service.

Additional Information

Options and Accessories (including details of the standard specimen stage)

Specimen stages

The EMS300T T has specimen stages to meet most requirements. All are easy-change, drop-in style (no screws) and are height adjustable (except the rotary planetary stage). Rotation speed is variable between preset limits.



The standard specimen stage is designed to hold a 6" or 8" wafer. This image shows the non-standard 4" wafer stage and wafer and optional film thickness monitor (1152)

- Flat rotation stage for wafers – for 8"/203 mm and 6"/152 mm wafers (fitted as standard).
- Rotation stage – 50 mm Ø. This stage only rotates - no tilt or height adjustment
- Rotate-tilt stage – 50 mm Ø with height adjustment (target to stage height variable between 30-80 mm). The tilt angle can be pre-set (horizontal to 30 degrees)
- Rotation stage for glass microscope slides

Other options

- Extended height chamber – for taller specimens
- Film thickness monitor (FTM) – the optional FTM attachment consists of a controller and quartz crystal oscillator built into the EMS300TT, a vacuum feed-through, chamber-mounted crystal holder and quartz crystal. Note: the FTM cannot be used when the coater is operated in "single target" mode.

continued >>>>

► EMS300TT Triple Target, Large Chamber, Turbo-Pumped Sputter Coater (continued)

Specifications

Instrument case	585 mm W x 470 mm D x 410 mm H (total height with coating head open -710 mm)
Weight	36.4kg
Packed dimensions	725 mm W x 660 mm D x 680 mm H (44.8kg)
Work chamber	Borosilicate glass 283 mm ID x 127 mm H
Safety shield	Integral polyethylene terephthalate (PET) cylinder
Display	145 mm x 320 mm x 240 mm colour graphic thin film transistor (TFT) display
User interface.....	Intuitive full graphical interface with touch-screen menus and buttons, includes features such as a log of the last 100 coatings carried out and reminders for when maintenance is due
Sputter target.....	Disc style 57 mm Ø with thickness depending upon the targets fitted. Three 57 mm Ø x 0.3 mm thick chromium (Cr) targets (TK8845) are fitted as standard.

Vacuum

High vacuum pumping	Internally-mounted, 70L/s air-cooled turbo-molecular pump
Rotary pump	50L/m two-stage rotary pump with oil mist filter.
Vacuum measurement	Pirani gauge

Typical ultimate vacuum .....	..5x10 ⁻⁵ mbar in a clean system after pre-pumping with dry nitrogen gas
Specimen stage	A flat rotation stage for 8"/203 mm and 6"/152 mm wafers fitted as standard. Rotation speed is variable between preset limits. For alternative stages see Options and Accessories

Processes

Sputtering0-80 mA to a pre-determined thickness (with optional FTM) or by the built-in timer. The maximum sputtering time is 60 minutes (without breaking vacuum and with built-in rest periods)
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Services and other information

Gases	Argon sputtering process gas, 99.999% Nitrogen venting gas (optional)
Electrical supply .....	..90-250 V 50/60Hz 1,400 VA including an RV3 rotary pump, 110/240 V, voltage selectable
Conformity	Power factor correction. Complies with the current legislation (CE Certification) and ensures efficient use of power, resulting in reduced running costs

Ordering information

EMS300 T	Large-Chamber-Turbo-Pumped Sputter Coater, fitted with three sputtering heads to ensure even metal deposition. Fitted with three 57mm Ø x 0.3 mm chromium (Cr) sputtering targets as standard (TK8845). A flat rotation stage (10826) for 8"/203 mm and 6"/152 mm wafers is also supplied	each
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Rotary pump requirements (needs to be ordered separately)

91003	Edwards RV3 50L/s two-stage rotary pump, with vacuum hose, coupling kit and oil mist filter	each
6548	XDS 5 Scroll Pump	each
6550	Diaphragm pump. A "dry" alternative to the standard 91003 oil-based rotary pump complete with vacuum hose, coupling kit and oil mist filter each	



Terms and Techniques

Carbon Fiber

Carbon fiber, normally in the form of a woven cord, can be used to thermally evaporate thin layers of carbon onto a substrate. The main application in electron microscopy (EM) is the production of thin, electrically-conducting coatings on scanning electron microscopy (SEM) specimens. Carbon fibre can be used for transmission electron microscopy (TEM) applications, but carbon rod is normally preferred due to superior control of the evaporation process.

Carbon Rods

Carbon (C) in the form of shaped graphite rods can be used to thermally evaporate thin layers of carbon onto a substrate. Common applications in electron microscopy (EM) include the production of carbon-coated transmission electron microscopy (TEM) grid support films and the making of TEM surface replicas. Carbon rod evaporation is also used to produce electrically-conducting surface coatings on scanning electron microscopy (SEM) specimens.



Edwards RV3 Rotary Pump
see page 956

► EMS300TT (continued)

Specimen Stages

6551	Rotating 50 mm Ø specimen stage with adjustable tilt. The platform has six specimen stub positions for 15 mm, 10 mm, 6.5 mm or 1/8" pin stubs. Stage rotation speed is variable between preset limits. No rotation when in single target mode. Target to stage height is variable between zero and 42 mm for the standard stage. When used with the extended height cylinder (optional accessory 10596) the target to stage height would be an additional 87 mm	each
6552	50 mm Ø variable height specimen stage with six stub positions for 15 mm, 10 mm, 6.5 mm disc stubs or 1/8" pin stubs. Stage rotation speed variable between preset limits	each
6553	50 mm Ø rotary tilting stage. A rotary planetary style stage with variable tilt angle from horizontal to 30 degrees. The platform has six positions for either, 6.5 mm, 10 mm, 15 mm disc stubs, or 1/8" pin stubs. Rotation speed is variable between preset limits. Note: depending upon specimen height, this stage may require the optional extended height cylinder	each
6554	A 90 mm Ø specimen stage for glass microscope slides (up to two 75 mm x 25 mm slides or a single 75 mm x 50 mm slide). The stage can alternatively accommodate up to six 1/8" SEM pins stub. Stage rotation speed is variable between preset limits. Includes gear box to allow optional FTM to be used.	each
6547	6" Wafer Specimen Stage: A flat adjustable stage capable of accepting 6" or 101.6 mm wafers	each
6549	A 4" 102mm flat drop-in-wafer stage which accepts 2", 3", and 4" wafers	each

Options and accessories:

6555	Film thickness monitor (FTM) attachment. Including oscillator, feed-through, is 127 mm high). quartz crystal holder and one quartz crystal	each
6556	Spare quartz crystal	each
6557	Extended height vacuum chamber (214 mm in height - the standard chamber For increased source to specimen distance and for coating large specimens	each
6558	A lockable emergency stop (e-stop) switch which can be mounted on top of the system in a position easily accessible for the operator. It is provided with a key to release the knob after activation. Note: the addition of the e-stop does not inhibit or replace the normal On/Off switch function. The e-stop can be retrofitted to existing systems	each
6559	Coating shields. Shields can be fitted to protect large surfaces from coating deposition - easily removable for ease of cleaning	each
6560	Vacuum spigot allows more convenient connection of the vacuum hose to the rear of the EMS300T T when bench depth is limited	each
6561	Full range, active vacuum gauge capable of measurement over the range of 1000 mbar to 5 x 10 ⁻⁹ mbar. Typical ultimate vacuum of system is 5 x 10 ⁻⁵ mbar. Note: gauge must be factory fitted	each
6562	Spares kit, including: spare standard glass cylinder, three chromium sputtering targets, vacuum tubing with coupling insert, argon gas tubing, three sputter head magnets, rotary pump oil mist filter and fuses	each

Sputter targets

NB: The EMS300T T is fitted as standard with three 0.3 mm chromium (Cr) targets. Other optional targets are available (three required):

3410	57mm Ø x 0.1mm Gold	each	3424	57mm Ø x 1.5mm Titanium	each
3411	57mm Ø x 0.1mm Gold/Palladium (80/20)	each	3425	57mm Ø x 0.3mm Platinum/Palladium (80/20)	each
3412	57mm Ø x 0.1mm Platinum	each	3426	57mm Ø x 0.3mm Gold	each
3413	57mm Ø x 0.1mm Nickel	each	3427	57mm Ø x 0.3mm Gold/Palladium (80/20)	each
3414	57mm Ø x 0.1mm Silver	each	3428	57mm Ø x 0.3mm Platinum	each
3415	57mm Ø x 0.1mm Palladium	each	3429	57mm Ø x 0.5mm Titanium	each
3416	57mm Ø x 0.1mm Copper	each	3430	57mm Ø x 0.1mm Iron	each
3417	57mm Ø x 0.3mm Chromium	each	3431	57mm Ø x 0.3mm Iridium	each
3418	57mm Ø x 0.5mm Tungsten	each	3432	57mm Ø x 0.1mm Cobalt	each
3419	57mm Ø x 1.5mm Chromium	each	3433	57mm Ø x 0.1mm Tin	each
3420	57mm Ø x 0.2mm Tungsten	each	3434	57mm Ø x 0.1mm Molybdenum	each
3421	54mm Ø x 1.5mm Carbon	each	3435	57mm Ø x 0.3mm Magnesium	each
3422	57mm Ø x 0.1mm Aluminium	each	3436	57mm Ø x 0.1mm Tantalum	each
3423	57mm Ø x 0.1mm Platinum/Palladium (80/20)	each	3437	57mm Ø x 3mm Indium Tin Oxide (90/10)	each

**What is...
Carbon Evaporation?**

The use of Carbon Evaporation is well known in Electron Microscopy for support films and replicas in TEM, and X-Ray Microanalysis and conducting coatings in SEM.

The films are continuous for thicknesses of 2nm (or 20 Angstroms) or more, and free of significant structure.

The most common form of deposition is from resistance heated carbon, or graphite rods, spectrographically pure. The rods are shaped to achieve a high current density at the point of contact of the rods with sufficient temperature being generated to cause the evaporation. At this point, the appearance being that of small, bright, glowing particles of carbon. To achieve the required vacuum condition of 1x 10⁻⁴ mbar, or better, requires the use of Diffusion or Turbo Molecular Pumps.



DNA strands



Pseudomonas fluorescens

► EMS 975 Large Chamber Turbo Evaporator & EMS 975S for Semiconductor Wafer Coating

The EMS 975 Turbo Evaporator is a multiple application system to enable a range of preparation techniques to be applied with the flexibility and module expansion capability to develop new methods and prepare new specimens.

The EMS 975 allows for carbon evaporation, metal evaporation from both baskets and crucibles and sputter coating option. A range of techniques can be practiced including carbon support films and replicas for TEM, carbon/metal evaporation, low angle shadowing and sequential layer coating using dual source evaporation and the sputter option can be used for a range of target materials.

The system flexibility is further enhanced by the use of a microcontroller, which readily allows the customer access to a range of options, but readily 'defaults' to optimum operating conditions, allowing both fully automatic and manual override as required. The unique loading rack out drawer system gives the user easy sample access with good sample size and the hinged lid assembly makes any other areas of the system readily accessible.

The unit has a turbo pump, externally mounted for convenience and easy exchange, and is backed up by a Rotary Vacuum Pump. The complete pumping sequence is under fully automatic control, achieving a high vacuum for evaporation.

The unit is bench mounted, with easy to use controls, and cannot be damaged by inadvertent use.

The EMS-975S is based on the EMS-975, however it has a special load lock door which allows the entry of 8" wafers with carbon coating, or other samples up to 140mm x 140mm square.



FEATURES

- Turbomolecular Pump.
- Automatic pumping sequence.
- Clean vacuum.
- Variable outgas control.
- Evaporation pulse button.
- Unique "anti stick" carbon rod gun evaporation assembly (patent pending).
- Rack out drawer sample loading system.
- Rotating plate specimen table with external accurate tilt control (option).
- Large sample capacity, 150mm (6") using drawer with up 200mm (8") for top loading.
- Sample holders range of options, including grid holders, stub holders.
- Carbon and Carbon/Platinum evaporation.
- Full range vacuum measuring system.
- Fast pumping cycle.
- Protective Polycarbonate Implosion Shield.
- Selectable evaporation supplies giving x 4 evaporation settings.
- Restricted or full vent control to avoid disturbances of samples.
- Microcontroller with LCD displays of status and customer data entry for control of systems.
- Modular electronics.
- Bench mounted unit.
- Sputter coating (option) for range of metal targets.
- Film thickness measurement for carbon and metal depositions.

Product Description

Coating sources

The EMS 975 is fitted with a carbon rod gun and metal filament/boat source which can also be used for cleaning TEM and SEM apertures. An optional sputtering source is available.

Work chamber

The borosilicate glass work chamber is 250mm diameter x 300mm and mounted on an aluminium support collar. A tough chamber implosion guard is included as standard. The chamber can accommodate specimens up to 8"/200mm in diameter. A unique rack-out specimen loading system gives the user easy specimen access and the hinged lid assembly makes other areas of the vacuum chamber readily accessible.

Menu-driven control

The menu-driven microcontroller allows the user access to a range of options, but readily 'defaults' to optimum operating conditions, allowing both fully-automatic and manual override as required.

Turbomolecular pumping and venting

The EMS 975 uses a modern 100L/s turbomolecular pump backed up by an external rotary vacuum pump (not included, see 91005) with the complete pumping sequence being under fully-automatic control.

The vacuum pump-down sequence is automatically controlled by the system microprocessor. Vacuum measurement is by a combined pirani/penning gauge and is displayed digitally.

Process gases (nitrogen for venting - if fitted - and argon for the optional EMS 350 sputtering attachment) are automatically controlled and can be programmed for use during coating sequences. The vent valve has an adjustable restrictor and programmable vent time to prevent disturbing specimens due to the inrush of gas at the end of the cycle.

A very useful feature of the EMS 975 is 'vacuum shut-down', which allows the process chamber to remain under vacuum when not in use. This helps to maintain a high level of system cleanliness and vacuum performance.

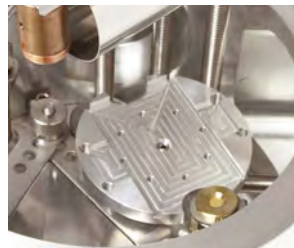


Typical chamber set up, showing carbon and metal evaporation sources, specimen stage and optional film thickness monitor (FTM)

► EMS 975 (Continued)

Specimen stages

The EMS 975 is fitted with an 80mm flat stage as standard, but this may be exchanged for optional holders, such as a 3mm grid holder, low-angle shadowing attachment and a rotary planetary stage (see Options and Accessories). Specimen holders are supplied with a bayonet fixing for quick exchange.



EMS 975 specimen stage and optional film thickness monitor (FTM)

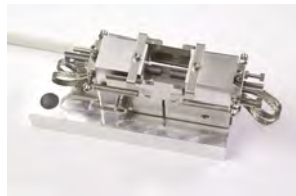


The rotary stage is mounted on a sliding access port on the side of the chamber. This allows the user to exchange specimens quickly without having to remove the glass chamber and disturb any coating set-up. The standard flat stage may be tilted. For rotary shadowing techniques, the standard stage can be tilted from 0° to +/- 180°.

EMS 975 specimen drawer with stage in specimen exchange position

Chamber base plate and evaporation power supplies

The EMS 975 is fitted with a 0-100A evaporation power supply with base plate terminals for carbon rod evaporation (14V/100A), evaporation from a metal filament (15V/35A), carbon string evaporation (25V/35A) and a terminal rated at 5V/35A for TEM and SEM aperture cleaning using a molybdenum (Mo) boat. A wide range of add-on options is available - see Options and Accessories.



Close up of EMS 975 carbon evaporation source. The 'anti-stick' design ensures smooth movement of carbon rods during evaporation



EMS 975 metal evaporation source fitted. NB: Can also be use to evaporate carbon fiber string

EMS 975S Thermal Evaporator

The EMS 975S is based on the EMS 975, but a special load lock door allows the loading of wafers up to 8"/200mm. Please contact us for more information.

SPECIFICATIONS

Dimensions and Weight	450mm (W) x 500mm (D) x 300mm (H). 65kg
Work Chamber	Borosilicate Glass 250mm (Dia.) x 300mm (H) with hinged top plate (can accommodate samples to 200mm) (8") in Dia.
Implosion Guard	Polycarbonate - readily removable for maintenance
Carbon source	Adjustable height with tilt control of 0-200°. Uses 6.15mm Ø carbon rods (source for 3.05mm Ø carbon rods can be fitted - please specify at time of ordering)
Metal source	Adjustable height with tilt control 0-200°. Supplied with pack of 10 B5230 tungsten specimen baskets
Specimen Stage	With tilt facility 0-45°
Vacuum Gauge range	Atm to 1 x 10 ⁻⁷ mbar
Operating Vacuum	Towards 1 x 10 ⁻⁵ mbar, typically achieved within 15 minutes
Low voltage evaporation supply	Pulsed or variable control. Selectable: 0-5V-15V-25V, out-gas current: 0-25A
Services	Nitrogen gas (if used for venting). Argon gas (if the optional sputtering attachment is fitted)
Vacuum pumping	100L/s turbomolecular pump. Requires a 50L/m 'backing' rotary pump with oil mist filter
Electrical supply	230V/50Hz (8A max including pump), 115V/60Hz (16A max including pump)

Supplied with Accessory kit including: carbon rods (6.15mm x 100mm), evaporation filaments, manual rod shaper and operating manual

Ordering Information

91090-C	EMS 975 Large Chamber Turbo Evaporator complete with carbon source	each
91090-S	EMS 975S Turbo Evaporator for Semiconductor Wafer Coating	each
91005	Rotary Vacuum Pump	each

Replacement Source

91077	Carbon Rods (6.15mm Dia.)	each
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Replacement Parts

91033	Glass Cylinder	each
91034	"L" Gaskets	each

Optional Accessories

91004-S	EMS 105 Aperture Cleaning Head	each
92060	EMS 190 Low Angle Shadowing	each



6.15mm diameter rods (left)
Carbon rod shaper supplied with the EMS 975 (above)

► EMS300TD Dual Target, Large Chamber, Turbo-Pumped Sputter Coater

Quick Overview

The EMS300T D is a fully automatic, free-standing sputter coater ideally suited for thin film applications and for conductive coating of scanning electron microscopy (SEM) specimens.

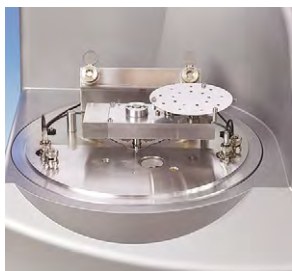
At the operational heart of the EMS300T D is a large chamber fitted with two independent sputtering heads. This “dual-head” configuration allows two different metals to be sequentially sputtered without the need to “break” vacuum. A dual channel film thickness monitor option is available.

The system is designed to sputter a wide range of metals, both non-oxidising (noble) metals such as gold (Au), silver (Ag) and platinum (Pt) and oxidising metals such as chromium (Cr) and aluminium (Al).

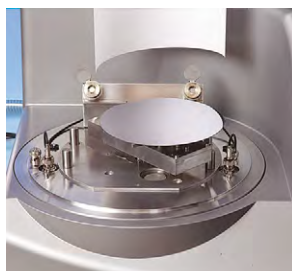
The EMS300T D sputter coater has a 300 mm x 127 mm work chamber. The specimen stage accepts substrates of 2”, 3” or 4” wafer sizes as standard and 6” wafers with an optional stage accessory. An optional extended height glass chamber is available to enable coating of larger specimens.

KEY FEATURES

- Fully automatic touch screen control - rapid data input, simple operation
- Dual sputter head – for sequential sputtering of two different metals
- Customer defined coating protocols
- Wide range of oxidising and non-oxidising targets available
- Fine grain sputtering for advanced high resolution FE-SEM applications
- Large chamber format
- Coat logging - details of the last 100 coatings available on screen
- Optional dual channel film thickness monitor (FTM) module
- High vacuum turbo pumping - allows sputtering of a wide range of oxidising and non-oxidising metals - suitable for SEM, high resolution FE-SEM and also for many thin film applications
- Automatic vacuum control - can be pre-programmed to suit the process and material - no needle valve to adjust
- Vacuum shut-down feature - leaves the process chamber under vacuum when not in use giving improved vacuum performance
- Thick film capabilities - up to 60 minutes sputtering time without breaking vacuum
- Ergonomic one-piece moulded case - easy maintenance and service access
- Ethernet with local FTP server connection - simple programme updates
- Power factor correction - complies with the current legislation (CE Certification) - efficient use of power means reduced running costs
- Three-year warranty



Standard rotating specimen stage - for 4” wafers or individual SEM mounting stubs. Shown with optional dual-channel film thickness monitor



Standard rotating specimen stage with 4” wafer and optional dual-channel film thickness monitor



Product Description

Ideal for thin film applications or for sputter coating large specimens for SEM/FE-SEM

The EMS300T D is suited for sputtering a range of oxidising and non-oxidising (noble) metals for scanning electron microscopy (SEM) and thin film applications. The range of target materials available is extensive and detailed in the Ordering Information section below. The EMS300T D sputter coater comes with a chromium (Cr) and a gold (Au) target as standard.

High vacuum turbo molecular pumping

The EMS300T D is fitted with an internally mounted 70L/sec turbomolecular pump, backed by a 50L/m two-stage rotary pump (ordered separately). A Pirani vacuum measurement gauge (range: 1000 mbar to 5×10^{-4} mbar) is included, but a full range gauge (1000 mbar to 5×10^{-9} mbar) is available as an option. Typical ultimate vacuum of around 5×10^{-5} mbar can be expected in a clean system after pre-pumping with dry nitrogen gas.

Dual head sputtering – for sequential sputtering

The EMS300T D is fitted with two independent sputtering heads to allow sequential sputtering of two different metals without the need to break vacuum. For example, a thin “seeding” layer of chromium followed by a deposition of gold. An automatic shutter mechanism is fitted to enable cleaning of oxidising sputter targets and to protect the second target and substrate during coatings. For single metal coating applications an individual target can be selected.

Specimen stages

The EMS300T D is fitted with a flat rotating specimen stage capable of accepting wafers up to 4” (102 mm) in diameter. The rotation speed is variable between preset limits and the stage to sputtering head distance can be adjusted between 25 mm and 71 mm. A range of optional specimen stages can also be fitted, please see the Options and Accessories section.

Moulded case with colour touch-screen

The EMS300T D is presented in a custom moulded, one-piece case, allowing for easy servicing and access. The colour touch screen enables user control of the coater functions (on various administrative levels) and multiple users to input and store coating ‘recipes’. The case houses all the working components and includes an automatic bleed control that ensures optimum vacuum conditions during sputtering. The vacuum chamber has an internal diameter of 283 mm/12” and comes with an integral implosion guard. The EMS300T D can also be fitted with the optional facility for

► EMS300TD (Continued)

vacuum shutdown, which enhances vacuum performance by allowing the chamber vacuum to be maintained when the system is not in use.

Rapid data entry

At the operational heart of the EMS300TD is a simple colour touch screen, which allows even the most inexperienced or occasional operator to rapidly enter and store their own process data. To further aid ease of use, a number of typical sputter coating profiles are already stored. For added convenience summaries of the last 100 coatings carried out can be viewed on the touch screen.

Improved Tolerance to Out Gassing Substrates

The pump time out has been moved to a new level defined by "safe outgas threshold" parameter, this is user definable between 5×10^{-2} and 2 mbar.

Until now the system would limit the time to achieve operational vac of 1×10^{-3} to 10 minutes. With the new modification once the "Safe outgas threshold" has been achieved the system will pump continuously. Implemented from software version 2-0042 onwards.

Controlled Evaporation Process

This process can automate a metal evaporation process when using low power evaporation sources. It can be used with the FTM.

The use of key properties about the source and required termination allow the process to:

- Bring the source current up to the point of evaporation.
- Ramp the current up at a controlled rate until evaporation is seen.
- Close the shutter and shut the evaporation PSU down when the specified thickness is seen.
- Check the source for open or short circuit when starting the process.

This process will be available on the EMS150T with software version 2-0048 or later. Consideration should be made to the thermal effects of the evaporation source when using the FTM to control the process.

Improvements to the Pulse Carbon Rod Evaporation

Continued work on this process has found that the thickness deposited can be variable if the power applied to the rods is either too high or too low. With the optimum current being a narrow margin between them. However, limiting the available voltage supplied to the rods increases this current window. This coupled with reducing the spigot diameter to work at a more optimum point in the PSU operation produces a more continuous spark which in turn produces a more repeatable thickness.



This improvement can be implemented by:

- Software version 2-0046 or later implements the voltage limit. Note all the carbon rod profiles should be deleted if a unit is updated to this software version.
- The evaporation current should be set between 60 and 65A.
- The reduced spigot diameter of 1.2mm can be produced with the blue handle rod shaper.

Maintenance

The intuitive touch screen interface features maintenance prompts which highlight:

- Time of last clean
- Coating time since last cleaned
- System 'on time'
- Time of last service

Additional Information

Options and Accessories (including details the standard specimen stage)

Specimen stages

The EMS300TD has specimen stages to meet most requirements. All are easy-change, drop-in style (no screws) and are height adjustable (except rotary planetary stage). Rotation speed is variable between 14 and 38 rpm:

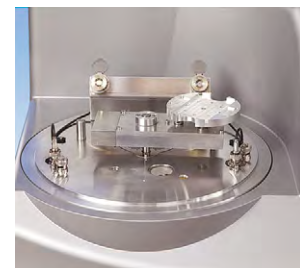
- Flat rotation stage for 4" (102 mm) wafers - fitted as standard
- Flat rotation stage for 6" (152 mm) wafers
- Rotation stage - 50 mm Ø. This stage only rotates - no tilt or height adjustment
- Rotate-tilt stage - 50 mm Ø with height adjustment (target to stage height variable between 30-80 mm). The tilt angle can be pre-set (horizontal to 30 degrees)
- Rotation stage for glass microscope slides

Other options

- Extended height chamber – for taller specimens
- Dual channel film thickness monitor (FTM) - the optional FTM attachment consists of a controller and quartz crystal oscillator built into the EMS300TD and a vacuum feed-through, two chamber-mounted crystal holders and quartz crystals. As sputtered material is deposited onto the crystal its frequency of oscillation is modified, this 'modification' is used to measure and control the thickness of material deposited



Rotary planetary stage and dual-channel film thickness monitor - both EMS300TD options



Optional specimen stage for glass microscope slides and dual-channel film thickness monitor option

continued >>>>

► EMS300TD Dual Target, Large Chamber, Turbo-Pumped Sputter Coater *(continued)*

Specifications

Instrument case	585 mm W x 470 mm D x 410 mm H (total height with coating head open-710 mm)
Weight	36.6 kg
Packed dimensions	725 mm W x 660 mm D x 680 mm H (44.8kg)
Work chamber	Borosilicate glass 283 mm ID x 127 mm H
Safety shield	Integral polyethylene terephthalate (PET) cylinder.
Display	145 mm x 320 mm x 240 mm colour graphic thin film transistor (TFT) display
User interface.....	Intuitive full graphical interface with touch-screen buttons, includes features such as a log of the last 100 coatings carried out and reminders for when maintenance is due
Sputter target.....	Disc style 57 mm Ø targets are fitted as standard, one 57 mm Ø x 0.3 mm thick chromium (Cr) target and one 57 mm Ø x 0.1 mm thick gold (Au) target, other targets are available

Vacuum

High vacuum pumping	Internally-mounted, 70L/s air-cooled turbomolecular pump
Rotary pump	50L/m two-stage rotary pump with oil mist filter.
Vacuum measurement	Pirani gauge (a full range gauge is available as an option)

Typical ultimate vacuum .....	..5x10 ⁻⁵ mbar in a clean system after pre-pumping with dry nitrogen gas
Specimen stage	Flat rotation stage for 4" (102 mm) wafers is fitted as standard. Rotation speed is variable between preset limits. For alternative stages see Options and Accessories.

Processes

Sputtering	0-80 mA to a pre-determined thickness (with optional FTM) or by the built-in timer. The maximum sputtering time is 60 minutes (without 'breaking' vacuum and with built-in rest periods).
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Services and other information

Gases.....	Argon sputtering process gas, 99.999% Nitrogen venting gas (optional).
Electrical supply	90-250 V 50/60Hz 1,400 VA including RV3 rotary pump, power. 110/240 V voltage selectable.
Conformity	Power factor correction. Complies with the current legislation (CE Certification) and ensures efficient use of power, resulting in reduced running costs

Ordering information

EMS300T D	Dual-Head, Large-Chamber-Turbo-Pumped Sputter Coater, supplied with 1 x 57 mm Ø x 0.3 mm chromium (Cr) and 1 x 57 mm Ø x 0.1 mm thick gold (Au) target. A flat rotation stage for 6" (152 mm) wafers is included.	each
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Rotary pump requirements (needs to be ordered separately)

91003	Edwards RV3 50L/s two-stage rotary pump, with vacuum hose, coupling kit and oil mist filter.	each
6550	Diaphragm pump. A "dry" alternative to the standard oil-based rotary pump. Complete with vacuum hose, coupling kit and oil mist filter.	each

Specimen Stages:

6790-S	Swinging arm stage drive, a stage drive and positioning mechanism which positions the stage under the correct target. Also provides rotation drive to the stage. Rotation Speed Max 38 rpm Min 14 rpm	
6800-S	Rotating specimen stage for 6" (152 mm) wafers, with rotation variable between preset limits..	each
6801	Rotating 50 mm Ø specimen stage with adjustable tilt. The platform has six specimen stub positions for 15 mm, 10 mm, 6.5 mm or 1/8" pin stubs. The stage rotation speed is variable between preset limits. The target to stage height is variable between 0 mm and 42 mm for the standard stage. When used with the extended height cylinder the target to stage height would be an additional 87 mm.	each
6802	50 mm Ø variable height specimen stage with six stub positions for 15 mm, 10 mm, 6.5 mm disc stubs or 1/8" pin stubs. Stage rotation speed variable between preset limits. Note: Target to stage height is variable between 10 mm and 53 mm for the standard stage. The stage is supplied with two mounting pillars; one provides 10 mm to 32 mm target to stage distance and the other 31 mm to 53 mm. An adjustable stop is used to set the height. When used with the extended height cylinder (optional accessory) the target to stage height would be an additional 87 mm.	each
6803	50 mm Ø rotary tilting stage. A rotary planetary style stage with a variable tilt angle from horizontal to 30 degrees. The platform has six positions for either 6.5 mm, 10 mm and 15 mm disc stubs or 1/8" pin stubs. Rotation speed is variable between preset limits. Note: depending upon specimen height, this stage may require the optional extended height cylinder.	each
6804	A 90 mm Ø specimen stage for glass microscope slides (up to two 75 mm x 25 mm slides or a single 75 mm x 50 mm slide). The stage can alternatively accommodate up to six 1/8" SEM pin stubs. The stage rotation speed is variable between preset limits. A gear box is included to allow the optional FTM to be used.	each

► EMS300TD (Continued)

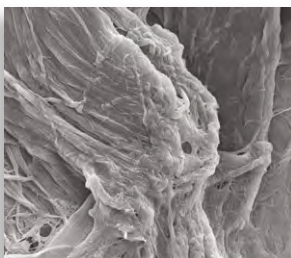
Options and Accessories

6805	Dual channel film thickness monitor (FTM). A fully integrated system using the Q300T D touch screen display for the control and display of all FTM functions. The FTM allows for the automatic termination of the metal sputtering process at a pre-selected thickness value. The rate for the sputtering processes is displayed in nm/min, with a resolution of 0.1 nm. Two FTM crystal holders are fixed in the chamber to give optimal position for both targets and to coat one material per crystal. Operating crystal frequency is in the 5 MHz to 400 kHz operating range. Includes two spare quartz crystals	each
6806	Spare quartz crystal.	each
6807	Extended height vacuum chamber (214 mm in height, the standard chamber is 127 mm high). Ideal for increased source to specimen distance and for coating of larger specimens.	each
6808	Vacuum spigot allows more convenient connection of the vacuum hose to the rear of the EMS300T D when bench depth is limited.	each
6809	A lockable emergency stop (e-stop) switch which can be mounted on top of the system in a position easily accessible for the operator. It is provided with a key to release the knob after activation. Note: the addition of the e-stop does not inhibit or replace the normal On/Off switch function. The e-stop can be retrofitted to existing systems.	each
6810	Full range, active vacuum gauge capable of measurement over the range of 1000 mbar to 5×10^{-9} mbar. Typical ultimate vacuum of the EMS300T D is 5×10^{-8} mbar. Note: this must be factory fitted.	each
6811	Coating shields. Can be fitted to protect large surfaces from coating deposition and can be easily removable for cleaning.	
6812	Spares kit, including: spare standard glass cylinder, one chromium (Cr) and one (Au) sputtering target, vacuum tubing with coupling insert, argon gas tubing, two sputter head magnets, rotary pump oil mist filter, FTM quartz crystal and fuses.	each

Sputter targets

NB: The EMS300T D is fitted with a 57 mm diameter 0.3 mm thick chromium (Cr) target and a 57 mm diameter 0.1 mm thick gold (Au) target as standard. Other optional targets are available:

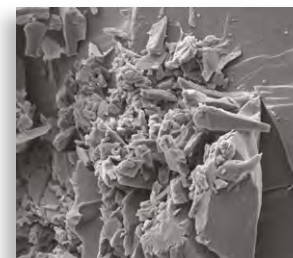
3410	57mm Ø x 0.1mm Gold	each	3424	57mm Ø x 1.5mm Titanium	each
3411	57mm Ø x 0.1mm Gold/Palladium (80/20)	each	3425	57mm Ø x 0.3mm Platinum/Palladium (80/20)	each
3412	57mm Ø x 0.1mm Platinum	each	3426	57mm Ø x 0.3mm Gold	each
3413	57mm Ø x 0.1mm Nickel	each	3427	57mm Ø x 0.3mm Gold/Palladium (80/20)	each
3414	57mm Ø x 0.1mm Silver	each	3428	57mm Ø x 0.3mm Platinum	each
3415	57mm Ø x 0.1mm Palladium	each	3429	57mm Ø x 0.5mm Titanium	each
3416	57mm Ø x 0.1mm Copper	each	3430	57mm Ø x 0.1mm Iron	each
3417	57mm Ø x 0.3mm Chromium	each	3431	57mm Ø x 0.3mm Iridium	each
3418	57mm Ø x 0.5mm Tungsten	each	3432	57mm Ø x 0.1mm Cobalt	each
3419	57mm Ø x 1.5mm Chromium	each	3433	57mm Ø x 0.1mm Tin	each
3420	57mm Ø x 0.2mm Tungsten	each	3434	57mm Ø x 0.1mm Molybdenum	each
3421	54mm Ø x 1.5mm Carbon	each	3435	57mm Ø x 0.3mm Magnesium	each
3422	57mm Ø x 0.1mm Aluminium	each	3436	57mm Ø x 0.1mm Tantalum	each
3423	57mm Ø x 0.1mm Platinum/Palladium (80/20)	each	3437	57mm Ø x 3mm Indium Tin Oxide (90/10)	each



10nm Au on Filter Paper



10nm Au on Salbutamol



10nm Au on Sugar

What is... Freeze Drying?

The application of freeze drying for specimen preparation for TEM and SEM is a well established practice.

Its application is to reduce the distortion which occurs when a wet specimen dries by normal evaporation. This distortion is due to the forces of surface tension going from a liquid to a vapor phase such as water to water vapor, commonly the situation in a Biological Specimen. However, if we freeze the specimen and maintain it frozen, then by applying a vacuum, we can obtain a situation where we can remove the frozen water by sublimation, avoiding the liquid phase, and reducing the distortion. This rate of sublimation is very much a function of temperature and vacuum, and associated drying time which is on the order of several hours or longer. Ideally freeze drying could be carried out at temperatures below the recrystallization of ice, which will require an inordinately long drying period. In practice, temperatures of -60°C have been found to give reasonable results under vacuums achievable with two stage rotary pumps, having ensured that good, fast freezing of the specimen has been carried out initially.

For particular applications, however, it can be necessary to freeze dry at temperatures below -80°C with lower sublimation rates for delicate specimens. This requires a better vacuum than can be obtained using a rotary vacuum pump. At normal temperatures and pressures the water in the specimen would dry by evaporation and would experience forces due to the effects of surface tension between the liquid and vapor interface, however, at pressures below the Triple Point, the solid phase can be changed to the vapor phase at a rate depending on the temperature, without the liquid being present. In the case of a frozen Biological Specimen where we are considering water (H_2O) from solid to vapor phase the Triple Point pressure is a relative vacuum. There are notable exceptions such as Carbon Dioxide (CO_2) where the Triple Point is higher than atmospheric pressure.

Techniques and Applications Freeze Drying Principles

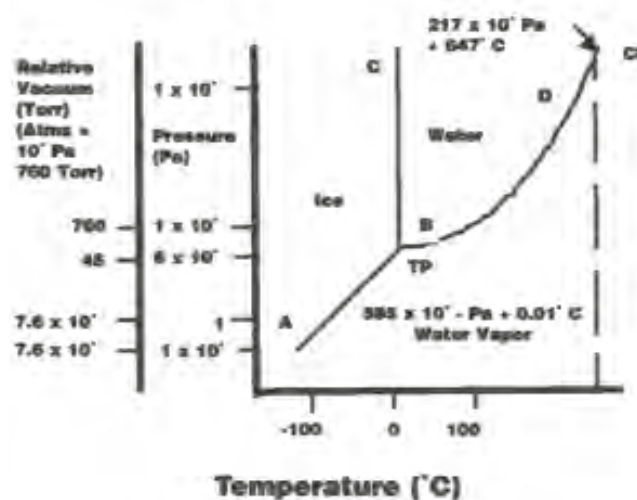
Sublimation consideration

The Figure shows the phase diagram for the ICE/WATER/WATER VAPOR system. The Curve A-B is termed the Sublimation Curve, at which the Solid and Vapor are in equilibrium. Similarly for Curve B-C the Melting Curve and B-D the Evaporation Curve, terminating at C-P the Critical Point. The point of intersection of the Curves T-P is called the Triple Point, at which the three phases exist in equilibrium. It has a unique value for pressure and temperature, and is a reference point, for which the Celsius temperature scale is now defined.

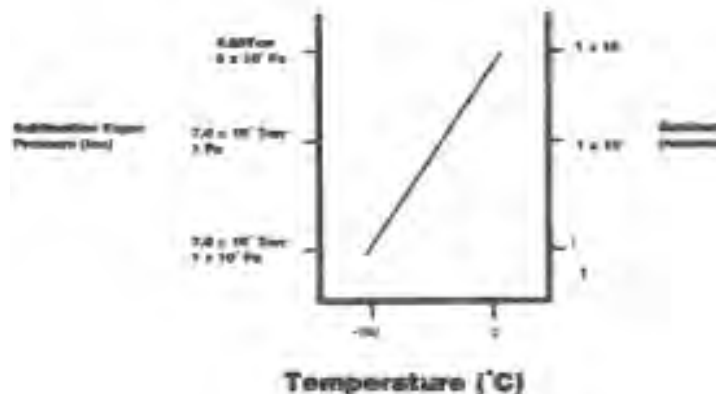
It should now be apparent that for any pressure in a system below the Triple point pressure, we can change water from the solid to vapor phase without the liquid phase being present, if the temperature at which we are allowed to do this does not have any restrictions.

In the freeze drying of Biological Specimens there are however limitations on the initial temperature to which the specimen should be allowed to warm when drying is commenced.

Phase Diagram (not to scale)



Sublimation Curve (Vacuum)



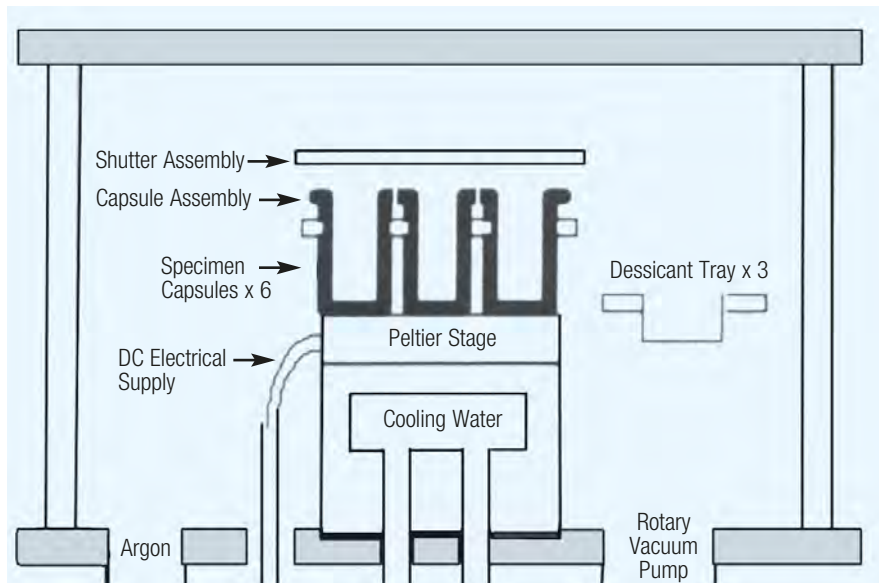
Techniques and Applications

In practice therefore, the system pressure (relative vacuum) used, is much lower than the Triple Point pressure. The Fig. gives an indication of the sublimation pressure (Saturated Vapor pressure at differing temperatures, and satisfactory freeze drying will be determined by this, and the partial pressure (Unsaturated Vapor pressure) of the water vapor in the vacuum system, which is required to be lower. The right hand scale gives an indication of Sublimation rates, (assuming partial pressure of H₂O is not limiting) which are totally temperature dependent.

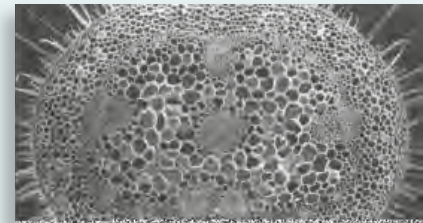
Freezing Considerations

The presentation and nature of a specimen prior to freeze drying depends on the user and the application. Irrespective of this, however, there is a pro-requisite for good (FAST) freezing, this is probably the most singularly influential factor on the final result, within the limitations previously considered of the drying routine.

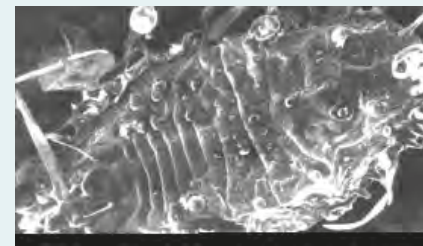
A range of cryogens and freezing techniques are being applied to the freezing of specimens, the understanding of the mechanisms of which, are still at an early stage. However, with exceptions, (Hyperbaric freezing containment of ice crystals is generally less than 20 micrometers from the surface, and Liquid Nitrogen (LN₂) usually readily available and unsophisticated in its application, should be satisfactory for a range of specimen freezing. The technique for its application is that of plunge freezing by hand or mechanical device.



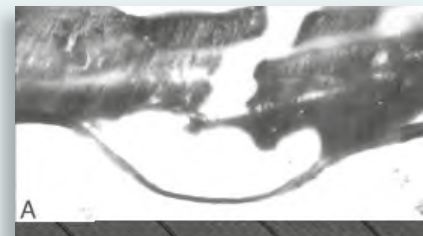
Cross-sectional View of Peltier Cooled Stage



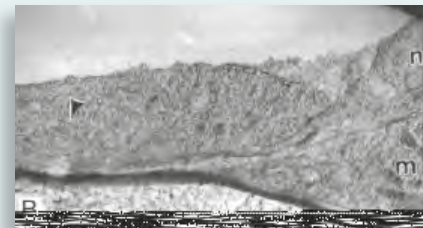
Cells of the petiole assumed their normal isodiametric shape after drying.



Scanning Micrograph of an Aphid, Freeze dried using the EMS 750 system and Sputter Coated with Gold. Aphids secrete wax ribbons of which show good preservation, normally 'Lost' in Drying methods involving solvents.



A. Preparation of ASM which has been cryo-sectioned and freeze dried at low vacuum, note rehydrated appearance.



B. Preparation of ASM which has been freeze dried under controlled conditions (using EMS 775). subcellular structures such as nucleus (n), mitochondria (m) and PER can be seen, Marker=1.µm

Photos courtesy of Dr. Alice Warley. Division of Ophthalmology, The Raines Institute, U.M.D.S., Lambeth Place Road London, SE 17EH

► EMS 750 Freeze Dryer

The EMS 750 Freeze Dryer operates at rotary pump vacuum using a 'Peltier' Thermoelectric stage, with drying temperatures of the order of -60°C , with back-up water cooling at a nominal 15°C . Both the Temperature and the Timer can be pre-selected, and the drying cycle will be completed automatically.

Provision is made at the end of the drying cycle to allow the specimen to assume room temperature, or be subsequently warmed prior to embedding. Disposable desiccant containers are located in the preparation chamber to enhance the water vapor removal, and with a suitable container, the vacuum chamber can be utilized to prepare liquid nitrogen 'slush' for fast freezing.

Features

- Thermoelectric cooling and heating.
- Convenient to use cold stage.
- Accurate temperature and time monitoring and control.
- Automatic drying cycle.
- Modular electronics.
- Clean line design.
- Polycarbonate safety shield.

Specifications

Instrument Case	450mm(W) x 350mm(D) x 175mm(H)
Work Chamber	Borosilicate Glass 165mm(Dia.) x 125mm(H)
Weight	18Kg
Specimen Stage	-60°C to $+60^{\circ}\text{C}$
Vacuum Gauge	ATM -1×10^{-2} mbar
Temperature Controller & Monitor	-90°C to $+90^{\circ}\text{C}$ Display Resolution to 0.1°C
Timer	0-999 Hours
Supply	115V 60Hz (12 Amp Max incl pump) 230V 50Hz (6 Amp Max incl pump)
Services	Water Cooling at nominal 15°C
Vacuum Pump (Recommended)	Complete with vacuum hose and oil mist filter 85L/Min
Size	470mm(L) x 150mm(W) x 250mm(H)
Weight	20Kg

Ordering Information

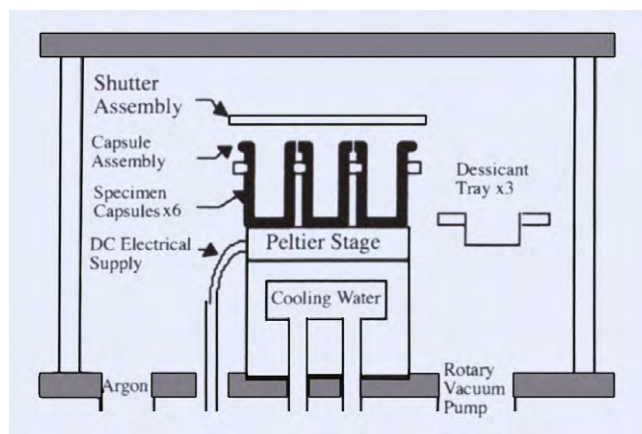
91080	EMS 750 Freeze Dryer complete with accessories	each
91005	Rotary Vacuum Pump	each

Replacement Parts

91013	Glass cylinder 165mm (6")	each
91014	"L" Gasket to suit 165mm (6") cylinder (1) pair	each
91085	Desiccant Containers (set of 3)	each
91086	Polystyrene Slushing Pot	each

Optional Accessories

91040	EMS 7640 Carbon Coating Attachment	each
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Cross-sectional View of Peltier Cooled Stage

► EMS 775 Turbo Freeze Dryer

The EMS 775 Turbo Freeze Dryer operates at temperatures down to -140°C and employs a Turbomolecular pumping unit, backed by a Rotary Vacuum pump. The lower temperatures are achieved by using a Liquid Nitrogen fed Cold Stage.

The pre-frozen specimens are admitted into the cooled stage of the drying chamber through a vacuum gate valve which interfaces to the specimen transfer chamber.

The system incorporates both Time and Temperature Control, and at the end of the drying period, the stage may be heated prior to specimen removal. The system also has facilities for purging with Nitrogen Gas.

For extended drying periods, an auto top-up device can be provided as an option to continuously 'fill' the chamber's liquid nitrogen dewar.

The option of a custom designed specimen freezing chamber to produce 'slushy' sub cooled liquid nitrogen is available which also interfaces to the specimen transfer chamber.

The option for a carbon or sputter coating attachment without breaking vacuum is available.

Features

- Programmable multi-segment sequence control with 10 times and 10 temperatures.
- Built-in penning head and gauge.
- Liquid Nitrogen fed cold stage.
- Vacuum gate valve to chamber.
- Vacuum specimen transfer chamber.
- Accurate time and temperature monitoring.
- Modular electronics.
- Clean line design.
- Polycarbonate safety shield.

Specifications

Instrument Case	450mm(W) x 350mm(D) x 175mm(H)
Work Chamber	Borosilicate Glass
Plus	165mm(Dia.) x 125mm(H)
Stainless Steel Base	110mm(Dia.) x 115mm(H)
Weight	42Kg
Specimen Stage	-140°C to $+40^{\circ}\text{C}$
Temperature Monitor	-140°C to $+40^{\circ}\text{C}$
Sequence Controller	10 times and 10 temperatures
Timer	0 to 999 Hours
Vacuum Gauge Range	1×10^{-2} mbar to 1×10^{-7} mbar
Operating Vacuum	1×10^{-2} mbar to 1×10^{-5} mbar
Turbomolecular Pump	60 litres/Sec (Ultimate vacuum 1×10^{-6} mbar)
Cooling	By liquid nitrogen conductive cooling from 1 liter dewar fitted to the chamber of the unit.
Chamber Dewar	1 Litre Capacity
Supply	115V 60Hz (12 Amp Max incl pump) 230V 50Hz (6 Amp Max incl pump)
Vacuum Pump	Complete with vacuum Hose and oil mist filter. 85L/Min
Size	470mm(L) x 150mm(W) x 250mm(H)
Weight	20Kg



Ordering Information

93123	EMS 775 Turbo Freeze Dryer complete	each
91005	Rotary Vacuum Pump	each
95126	Supply Dewar (25L)	each

Replacement Parts

91013	Glass Cylinder 165mm (6")	each
91014	"L" Gaskets to suit 165mm (6")	each
90032	Copper Discs	each

Optional Accessories

95128	EMS 170 Slushing Chamber	each
95127	EMS 175 Auto Top Up Unit +Controller	each
91040	EMS 7640 Carbon Coating Attachment	each

What is... Critical Point Drying?

Critical Point Drying is so named as it includes, as part of its process, the occurrence known as the continuity of state for which there is no apparent difference between the liquid and gas state of a medium, the surface tension between this interface reducing to zero. This occurs at a specific temperature and pressure with resulting density, and is known as the Critical Point. This condition of zero surface tension can be used to dry Biological Specimens, avoiding the damaging effects of surface tension.

In biological specimens we are mainly concerned with the removal of water. Unfortunately, the critical point for water of +374°C and 3212 p.s.i. is inconvenient, and would cause heat damage to the specimen. The most common and convenient transitional medium for critical point drying is Carbon Dioxide (CO₂), which has a critical point at 31°C and 1072 p.s.i. However, it is not miscible with water, and therefore, we have to involve a third medium, commonly Acetone, which is termed the intermediate fluid. We can now convert our transitional fluid, typically CO₂, from liquid to gas without surface tension at the critical point.



Mature Spruce Wood

Critical point dried block of mature spruce wood block, demonstrating transverse, tangential and radial views of tracheids and vessels.

Techniques and Applications

A summary of the critical point drying method

Critical point drying is an established method of dehydrating biological tissue prior to examination in the Scanning Electron Microscope. The technique was first introduced commercially for SEM specimen preparation by Polaron Ltd in 1971. The original design concepts, which included a horizontal chamber, are still embodied in the design of the EMS 3000 and EMS 3100 CPD models.

In recent years we have introduced two further models: the EMS 850, which features built-in chamber cooling and heating, and the EMS 850WM, which is designed for drying a 100mm/4" silicon wafer.

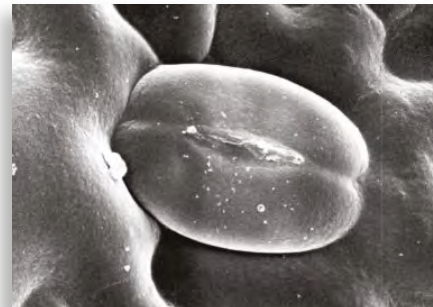
All three models have found general acceptance in many laboratories throughout the world. Together, these critical point dryers offer the user a choice most suited to the particular specimen preparation requirements.

The phase diagram shows the pressure to temperature ranges where solid, liquid and vapor exist. The boundaries between the phases meet at a point on the graph called the triple point. Along the boundary between the liquid and vapor phases it is possible to choose a particular temperature and corresponding pressure, where liquid and vapor can co-exist and hence have the same density. This is the critical temperature and pressure.

Critical point drying relies on this physical principle. The water in biological tissue is replaced with a suitable inert fluid whose critical temperature for a realizable pressure is just above ambient. The choice of fluids is severely limited and CO₂ is universally used today, despite early work with Freon 13 and nitrous oxide.

With CO₂ a critical point of approximately 35°C can be achieved at a pressure of around 1,200psi. Therefore if the water is replaced with liquid CO₂ and the temperature then raised to above the critical temperature, the liquid CO₂ changes to vapor without change of density and therefore without surface tension effects which distort morphology and ultra structure.

Since liquid CO₂ is not sufficiently miscible with water, it is necessary to use an intermediate fluid which is miscible with both water and liquid CO₂. In practice intermediate fluids commonly used are methanol, ethanol, amyl acetate and acetone.



Stomatal Pore on Xerophyte Leaf Surface

Critical point dried epidermis of a xerophyte (cactus), demonstrating raised stomatal pores.



Barley Leaf

Trichomes and stomatal pores on the epidermal surface of a barley (*Hordeum vulgare*) leaf. Some very fine wax crystallites are also just visible on the surface of the leaf.

The advent of Scanning Electron Microscopy (SEM) in the study of surface morphology in biological applications made it imperative that the surface detail of a specimen was preserved. Air (evaporative) drying of specimens can cause severe deformation and collapse of structure - the primary cause of such damage being the effects of surface tension. The specimen is subject to considerable forces, which are present at the phase boundary as the liquid evaporates. The most common specimen medium, water, has a high surface tension to air; by comparison that for acetone is considerably lower. The surface tension could be reduced by substitution of a liquid with a lower surface tension with thereby reduced damage during air-drying. However, the occurrence of what is known as 'continuity of state' suggests a drying technique for which the surface tension can be reduced to zero. If the temperature of liquefied gas is increased the meniscus becomes flatter indicating a reduction in the surface tension. If the surface tension becomes very small the liquid surface becomes very unsteady and ultimately disappears.

Techniques and Applications

Critical Point Drying Principles

When this 'critical point' is reached, it is possible to pass from liquid to gas without any abrupt change in state.

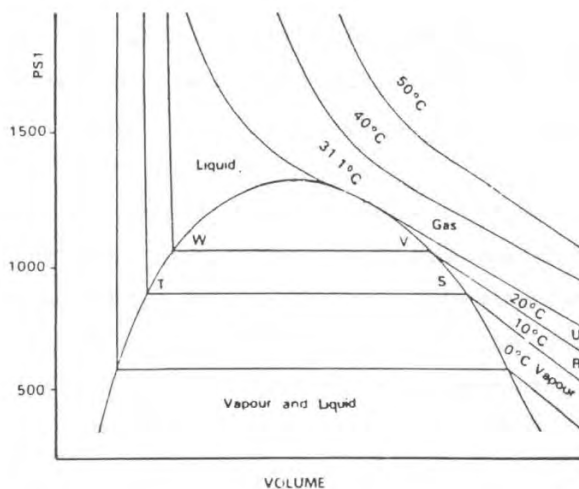
If a specimen had been in the liquid during this process it would have experienced a transition from a 'wet' to a 'dry' gas environment without being in contact with a surface, in this way avoiding the damaging effects of surface tension.

This is termed Critical Point Drying (CPD), the basis of which are the classic experiments carried out over 100 years ago during investigations on the liquification of gases.

The Critical Phenomena

The principle of the experiments, which were initially carried out using carbon dioxide (CO₂), was to measure the change in volume with the application of pressure, of a fixed mass of gas, while maintaining a constant temperature. This was repeated for a range of different temperatures.

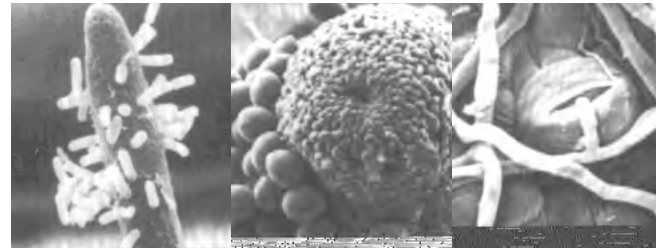
The results are best understood by considering the graph obtained from plotting pressure (P) against volume (V) for the series. This is shown in Figure 1; the curves obtained are termed 'isothermals'



Consider first the 10° C isothermal at low applied pressure. The CO₂ is gaseous (vapor) and generally exhibits the characteristics of a gas (Boyle's Law) over the range from 'r' to 's'. From point 's' a very slight increase in pressure results in a change from vapor state to the liquid state. This is the phenomena of saturation. From 's' to 't' the pressure is virtually constant while the volume is decreasing and at 't' the substance is all liquid.

From point 't' the graph becomes almost vertical indicating significant application of pressures for very little change in volume, liquids being virtually incompressible.

The 20° C isothermal has similar general characteristics, however there is less difference between points 'v' to 'w' compared to the difference between equivalent points 's' to 't' on the 10° C isothermal; these points representing the difference in volume occupied between the vapor phase and the liquid phase.



Fruit body neck
with spores adhering
to the sides

Bacteria adhering to
the tip of a fungus.

Powdery Mildew,
hyphal filament
on leaf surface.

This indicates that the densities of the saturated vapor and liquid are approaching each other, also the slight departure from the vertical 'w' shows the compressibility is greater than that at higher pressures. This shows that the properties of the liquid and gas states of the substance are becoming similar and will ultimately coincide. This in fact is realized at the 31.1° C isothermal, which does not show any horizontal discontinuity. The temperature at which this occurs is termed the *Critical Temperature* and has an associated *Critical Pressure and density* and hence for a particular mass of gas, a *Critical Volume*. If a liquid was heated in a closed system so that the critical pressure could be attained, at the critical temperature, any visible meniscus would disappear; the surface tension would be zero and it would not be possible to distinguish between the properties of a liquid or a gas. We therefore have continuity of state. Above this temperature the gas cannot be liquified by the addition of pressure and strictly speaking a substance should only be classified as a gas above its critical temperature, below this temperature where it could possibly be liquified by the application of pressure, it is more precisely termed a vapor.

The critical phenomena can be utilized as a drying technique as it achieves a phase change from liquid to dry gas without the effects of surface tension and is therefore suitable for delicate biological specimens.

However, it is not surprising that the initial investigations were on CO₂ as will be apparent from Figure 2, showing a table of critical constants for some common substances. Even the practical achievement of the critical conditions would not assist the biologist, as the specimens would suffer significant thermal damage if we attempted to apply the technique direct for the removal of water from specimens.

CRITICAL CONSTANTS

Substance	Temp. C	P.S.I
HYDROGEN	-234.5	294
OXYGEN	-118	735
NITROGEN	-146	485
CARBON DIOXIDE	+31.1	1072
CARBON MONOXIDE	+141.1	528
WATER	+374	3212

continues

Techniques and Applications

Critical Point Drying Principles (continued)

Therefore CO₂ remains the most common medium for the CPD procedure and is termed the 'Transitional Fluid'. However, CO₂ is not miscible with water and therefore water has to be replaced in the specimen with another fluid which is miscible with CO₂, this is termed the 'Intermediate Fluid'.

Ideally it will be able to replace the water in the specimen, and also serve as the 'Dehydration Fluid'. This is not exclusively the case, and additional steps may be used for particular circumstances.

However, where it is being utilized for both processes, texts may refer to it under the different headings, dehydration and intermediate, depending at what stage it is being used in the specimen preparation schedule. Prior to any of these stages chemical fixation of the specimen must be carried out (normally using glutaraldehyde -osmium procedures).

NOTE

The whole discipline of specimen preparation (chemical or vapor fixation) prior to the transitional stage is only mentioned in its most basic terms, procedures vary according to the type and nature of the specimens. Further references should be obtained.

a) Intermediate Stage

As mentioned previously this involves dehydration and intermediate fluids, the following is a possible schedule.

(Wet Specimen) H₂O ➔ Acetone ➔ CO₂ ➔ C.P.D. (Dry Specimen)

The specimen is usually processed through varying concentrations of dehydration fluid, culminating in complete replacement of the water with this intermediate fluid. Because it has a low surface tension the specimen is less likely to experience damage due to evaporation while transferring to the chamber, also being miscible with CO₂ (the Transitional Fluid) ensures satisfactory conditions after flushing (purging) for the CPD process to commence.

(Wet Specimen) H₂O ➔ Acetone ➔ 30%* 100% ➔ CO₂** ➔ CPD (Dry Specimen)

Note:

*50/60/70/80/90 typically 10 minutes each

** Flush Typically 3 times

The table (Figure 3) gives an indication of some intermediate fluids. (Water is 73 Dynes/cm.)

Critical point drying stages

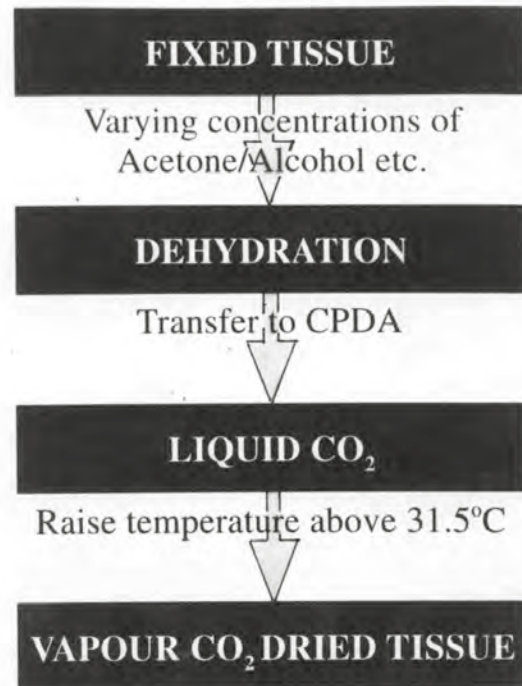


Figure 3: Dehydration Intermediate Fluids for CPD

SUBSTANCE	SURFACE TENSION (DYNES/CM)
ETHANOL	23
ACETONE	24
FREON (113)	19

Having transferred the specimen to the chamber in the Intermediate Fluid, the chamber is flushed several times to replace it with the Transitional Fluid. The process from which the complete techniques derives its name CPD can now be initiated.

CO₂ grades required for critical point drying

Generally speaking, the grade we recommend is 'normal' grade - that is the one most commonly offered by industrial gas suppliers.

In most parts of the world, 'normal' grade of CO₂, from the suppliers, is specified as 'N4.5' or 99.995% minimum purity with a maximum level of 50ppm of impurities.

There are, however, two other grades available by special order from most gas suppliers. One is 'N4.0' or 99.99% (less pure than 'normal' grade). The other is 'N5.5' or 99.9995% minimum purity. The N5.5 purity is easier to find in those parts of the world where there is high level of activity in electronics, since these customers often demand gases with higher purities.

We are not aware of anyone who has ever reported either superior results using N5.5 purity vs N4.5, or inferior results using N4.5 vs N5.5. However, we do want our customers to have the benefit of such detail about liquid carbon CO₂ procurement in the event they should ever find reason to believe that their particular specimens might benefit from the higher purity product.

Remember, the requirement is for LIQUID carbon dioxide and NOT gaseous carbon dioxide. For this reason a cylinder with an internal 'siphon' must be specified. A siphon cylinder is normally denoted by a white stripe painted along its length. No pressure regular is needed.

Techniques and Applications

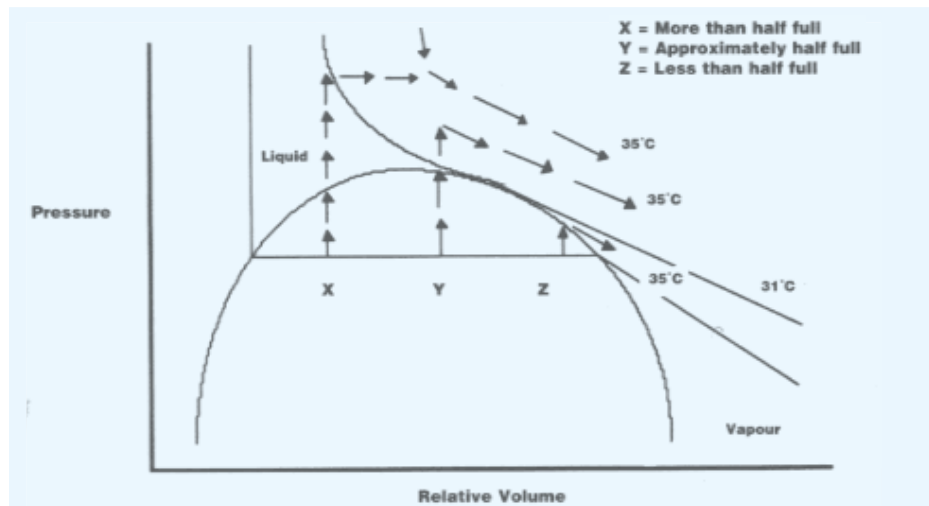
Critical Point Drying Principles (continued)

(b) Transitional Stage

As discussed previously (see Figure 1) the conditions for which the critical point passage can be obtained for CO₂ are 31.1°C and 1072 psi. However, it must be remembered that these isothermals are obtained from a fixed mass of gas and an applied pressure for a series of constant temperatures.

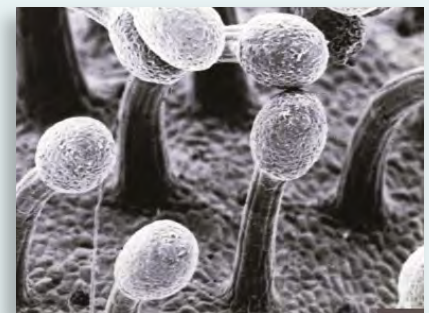
In the laboratory application of CPD we have a fixed volume which is filled with the transitional fluid. Some typical examples of which are given in figure 4.

Pressure is obtained by the effect of applying heat and while it can be readily appreciated that we can take a liquid from below its critical temperature and obtain the transition to gas above its critical temperature, an understanding of the relevant 'start' and 'end' points and the cycle involved is required in evaluating the design and performance of CPD equipment. It is still useful however, to utilize these CO₂ isothermals as indicated in figure 5 with the Superimposed 'arrows' showing differing conditions for the CPD device.



Starch Grains in Potato Tuber

Critical point dried fractured cell from the tuber of potato (*Solanum tuberosum*), demonstrating thin cell walls starch grains (amyloplasts).



Glandular Trichomes on Modified Leaf Surface of Butterwort

An insectivorous plant, the butterwort (*Pinguicula vulgaris*) has modified leaves which bear tiny granular trichomes which trap insects. The capitate head of the trichome then secretes protease enzymes to digest the insect parts.



Barley Root Tip

Critical point dried tip of barley (*Hordeum vulgare*) root, demonstrating root cap cells (calyptra) and slightly deformed (compressed) root hairs (Pili).

It is already acknowledged that these circumstances are not exactly comparable. For example, during operation of the CPD we would fill at CO₂ cylinder pressure and at ambient temperature: not at saturated vapor pressure. At a lower temperature decompression is as a result of venting and the subsequent reduction in mass of gas, not reduction in externally applied pressure. The relative volume is determined by the initial level of liquid in relationship to the total free volume available (this being the chamber plus sample "boat" etc.)

If we consider 'X' with the liquid CO₂ more than half filling the total available volume and we heat from 10°C to 35°C then we will make the transition from liquid to gas. The pressure rise will be rapid as the liquid will expand and the level will increase before the critical temperature is reached. This is termed 'going around' the critical point. Usually (as in the case of instruments supplied by Electron Microscopy Sciences) a pressure-bursting disc is employed to prevent excessive pressure increase.

For condition 'Y' with approximately a full pressure chamber, the liquid level will remain relatively constant, its density decreasing and that of the vapor increasing, and becoming the same when its critical temperature has been reached, together with the corresponding critical pressure.

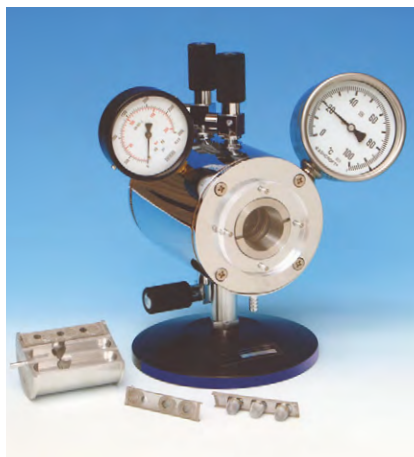
Looking at condition 'Z' with the pressure chamber less than half full. The level will fall and vaporization will occur before the critical temperature is reached, also the specimens may be uncovered and subjected to unwanted evaporation.

Ideally, we wish have a situation where the liquid fills the specimen chamber, while still only accounting for approximately 50% of the total volume available. This will ensure that specimens are not uncovered during initial flushing stages and in addition this should enable critical constants of temperature, pressure, and density to be achieved relatively simultaneously without excessive pressure or evaporation conditions occurring.

It is also advisable to maintain a temperature somewhat above the critical temperature during decompression, this will avoid the possibility of gas recondensing. It is also important to control the decompression rate itself as there is evidence that rapid pressure equalization can cause specimen.

► EMS 3000 and EMS 3100 Critical Point Dryers

The design of the EMS 3000 gives unequalled visibility of the critical point drying process and an unsurpassed view of the fluid level in the chamber. Unlike many of the more complex critical point dryer designs, it is much easier to see the phase change at the critical point.



EMS 3100

EMS 3000

The design of the EMS 3000 features a horizontal pressure chamber measuring 30.1mm internal diameter x 82mm in length. The chamber has an external water jacket for temperature control and specimens are introduced via a removable rear door. The front of the chamber is fitted with a 25mm diameter window which permits easy viewing of the liquid level.

EMS 3100

Where increased chamber volume is required, for either size or quantity of specimens to be dried, the large capacity model EMS 3100 is available. The chamber dimensions are 63.5mm internal diameter x 82mm in length, giving approximately three times the volume of the EMS 3000. The transfer boat will also accept three times the number of specimen baskets.



EMS 3000

FEATURES

- Proven reliability - over 6,000 critical point dryer installations world-wide
- Simple robust construction - easy to maintain - many critical point dryer users carry out their own routine maintenance
- Horizontal chamber and large viewing window - excellent visibility of the fluid level and drying process
- Large robust valves for draining of fluids, ingress of CO₂ and venting of gas - very durable; the rapid ingress of CO₂ helps prevent pre-drying of specimens
- Safety - every critical point dryer unit is pressure tested to 2,500psi and a certificate is issued. A pressure bursting disc is also fitted to safeguard against misuse
- Specimen handling - optional specimen holders for coverslips and TEM grids. Porous pots are available for fragile or very small specimens
- Three-year warranty

Temperature control

Dial gauges display pressure in the chamber and the temperature of water circulating through the jacket. Three pressure valves permit easy connection to the liquid CO₂ cylinder and allow liquid agitation and venting of the chamber. A source of hot running water is essential. Cooling is also useful, especially for sequential process runs or in hot climates.

The temperature of the EMS 3000 and EMS 3100 chamber is raised with a hot water supply. Mains water can be used but a more elegant method involves the use of the optional EMS 3500 Thermocirculator, which is connected directly to the inlet and outlet of the water jacket. The temperature of the circulatory fluid can be pre-set (eg at 37°C, just above the critical temperature).

A second alternative is the model EMS 4860 Recirculating Heater/Chiller, which can be used to pre-cool the chamber to below ambient prior to loading specimens and then to heat the chamber to the critical temperature.

Safety

Safety is, of course, an important consideration with all pressure vessels. Should critical pressure and temperature be inadvertently exceeded, a bursting disc is incorporated in the chamber support. The critical point drying chamber itself is tested to 2,500psi, which is approximately twice the working pressure. A guard is also fitted over the viewing window.

Specimen holder (boat)

An important feature is the design of the transfer boat. This permits specimens in the intermediate fluid to be transferred to the critical point dryer. On sealing the chamber, the intermediate fluid begins to drain and can be replaced with liquid CO₂. In this way the specimens are never allowed to dry out during the specimen loading and transfer stage of the process.

Both the EMS 3000 and EMS 3100 are supplied with a standard tissue holder (boat). The EMS 3000 comes with the EMS 3000-01 tissue boat and has a single slot with three tissue baskets. Specimens are loaded into each basket and the gauze lid moved laterally to seal the top.

The EMS 3100 is supplied with the EMS 3100-01 tissue boat and has three slots each with three tissue baskets, making a total of nine tissue baskets. Other choices of holders are listed below under Options and Accessories.

Bonded chamber seals – Nitrile or EPDM?

All models of EMS 3000 and EMS 3100 are fitted with a standard with nitrile bonded window and door seals. Nitrile is a good general material due to its ability to withstand attack by solvents, such as ethanol.



EMS 3000 Specimen Boat



EMS 3100 Specimen Boat

EMS 3000 and EMS 3100 (continued)

However, if acetone is used as the transition fluid then the EPDM seals have been found to be more resistant to chemical attack by that solvent.

If you are ordering an EMS 3000 or EMS 3100 and are planning to use acetone as the transition fluid, please state this on the order and EPDM bonded seals will be fitted.

For existing instruments, both Nitrile and EPDM bonded seal can be ordered as spare parts.

Options and Accessories

Glass microscope coverslip holder (option):

Specially adapted boats allow glass coverslips to be held firmly during drying. The EMS 3000-02 is designed for the EMS 3000 and has a maximum capacity of seven coverslips. Likewise, the larger EMS 3100-02 coverslip boat is available for the EMS 3100 'Jumbo' Critical Point Dryer and has a carrying capacity of 21 coverslips.



Coverslip Holder

TEM grid holder (option):

The EMS 3000-1 holder for 3.05mm grids and the EMS 3000-2 grid holder for 2.3mm grids can be used with all Electron Microscopy Sciences critical point dryers. Maximum number of grids is three.



TEM Grid Holder

Porous pots with lids (option):

EMS 800A solvent-resistant porous pots (12.7mm x 15.5mm) with lids are ideal for very small or very delicate specimens.



Porous Pots

For the EMS 3000 (NOTE: EMS 3000-01 is included as standard):

- EMS 3000-1 Specimen holder for 3.05mm grids
- EMS 3000-2 Specimen holder for 2.3mm grids
- EMS 3000-01 Specimen holder for tissue (boat)
- EMS 3000-02 Specimen holder for coverslips
- EMS 800A Porous pots with lids 12.7mm x 15.5mm (pack of 10) for micro-specimens
- EMS 3500 Thermocirculator for control of heating cycle
- EMS 4860 Recirculating Heater/Chiller to control heating and cooling cycle (please specify voltage)

For the EMS 3100 (NOTE: EMS 3100-01 is included as standard):

- EMS 3100-1 Specimen holder for 3.05mm grids
- EMS 3100-2 Specimen holder for 2.3mm grids
- EMS 3100-01 Specimen holder for tissue (boat)
- EMS 3100-02 Specimen holder for coverslips
- EMS 800A Porous pots with lids 12.7mm x 15.5mm (pack of 10) for micro-specimens
- EMS 3500 Thermocirculator for control of heating cycle
- EMS 4860 Recirculating Heater/Chiller to control heating and cooling cycle (please specify voltage)

Site Requirements

Site selection: The apparatus should be positioned in the laboratory with convenient access to:

- Hot and cold water supply (if the optional EMS 3500 Thermocirculator or EMS 4860 Recirculating Heater/Chiller are not used)
- Mains power supply (for EMS 3500 and EMS 4860 only)
- Fume cupboard or window, or an area of good ventilation
- Space for CO₂ siphon cylinder

CO₂ Cylinder: The EMS 3000 and EMS 3100 require a cylinder of liquid CO₂ fitted with a siphon tube (indicated by a vertical white stripe on the cylinder). If there is any doubt regarding the presence of a siphon tube, advice should be sought from the gas supplier.

Cylinder connection threads vary from country to country and even between manufacturers in the same country. For example, the transfer pipe supplied is fitted with ¼" British Standard Pipe (BSP) and 0.86" x 14 TPI union. These are standard threads for the UK and generally in the rest of the world, but will not fit cylinders in the USA.

An EMS 3000-US kit should be specified for use within the USA; this includes a transfer pipe adaptor which will fit USA cylinders. If it is deemed necessary to fabricate another transfer pipe, advice should be sought from a local supplier of high-pressure fittings.

Heating and cooling: Use a mixer to the laboratory hot and cold water outlets, terminating with a 6mm/¼" hose connection for the PVC tubing supplied. A 'Y' piece connected to the hot and cold water taps is also suitable.

The EMS 3000 and EMS 3100 require both hot and cold water during the operating cycle. Cooling facilitates filling of the work chamber with liquid CO₂, and heating is required to take the liquid above its critical point.

Good control of the water temperature is essential for good results, hence the recommended use of the EMS 3500 Thermocirculator or, more conveniently, the EMS 4860 Recirculating Heater/Chiller which gives precise control of cooling and heating.

Space requirement: A minimum bench space of approximately 230 x 230mm is required.

Ordering Information

EMS 3000	Critical Point Dryer Chamber dimensions: 30.1mm Ø x 82mm length	each
Supplied with:	EMS 3000-01 Specimen holder for tissue (boat) 1m liquid CO ₂ delivery tube O ring and L gasket set (including window and door bonded seals) Spare bursting disc and retaining copper (Cu) washer Steel bar for tightening/untightening the door Flat wrench (for removing the window retaining ring) Comprehensive manual Pressure test certificate	
EMS 3100	Large Chamber Critical Point Dryer Chamber dimensions: 63.5mm Ø x 82mm length	each
Supplied with:	EMS 3100-01 Specimen holder for tissue (boat) 1m liquid CO ₂ delivery tube O ring and L gasket set (including window and door bonded seals) Spare bursting disc and retaining copper (Cu) washer Steel bar for tightening/untightening the door Flat wrench (for removing the window retaining ring) Comprehensive manual Pressure test certificate	

► EMS 850 Critical Point Dryer with Thermoelectronic Heating and Adiabatic Cooling

The EMS 850 Critical Point Dryer is designed for use with CO₂, having first replaced any water in the specimen by a series of dehydration, often in the same fluid such as Acetone, which will also be the intermediate fluid.

(Wet Specimen)–Water–Acetone–30%–100%–CO₂–C.P.D.–(Dry Specimen)

The specimens for critical point drying are located in the pressure chamber of the EMS 850. The chamber is pre-cooled to allow it to be readily filled with liquid CO₂ from a gas cylinder. The chamber is then heated to just above the critical temperature with subsequent critical pressure being achieved. The CO₂ gas is vented through a needle valve, to avoid specimen distortion.

The EMS 850 is fitted with thermoelectronic Heating and Cooling and Temperature control of +5°C on Cooling, and +35°C on Heating. This ensures the critical point is accurately obtained, avoiding excess pressures or temperatures, or the need to rely on pressure relief valves to control pressure during the heating cycle. The chamber is vertical, with top loading, to ensure specimens do not become uncovered during the drying process, with a side viewing port to locate the meniscus for the correct level when initially filling the chamber.

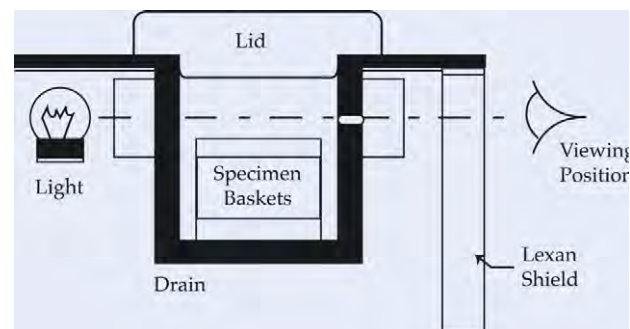
The EMS 850 is fitted with a fine let down needle as standard and flow gauge is no longer required.

Features

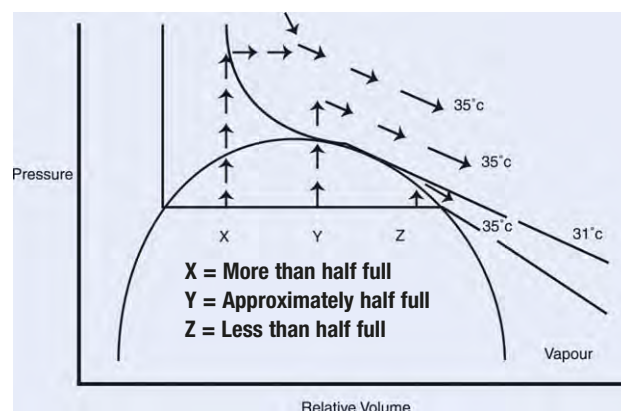
- Vertical chamber with top filling and bottom draining.
- Normal operating temperature 35°C pressure 1500 psi.
- Thermoelectric Peltier cooling and heating.
- Fine control needle valve pressure letdown.
- Illuminated chamber with side viewing port and protective 'Lexan' shield.
- Stirrer system for enhanced solvent exchange.
- Temperature monitoring and control with thermal cut-out protection.
- Pressure monitoring with pressure relief valve and rupture disc protection.
- Polycarbonate safety shield.

Specifications

Instrument Case	450mm (W) x 350mm (D) x 175mm (H)
Weight	12Kg
Specimen Chamber	30mm (Dia.) x 40mm (H) (Tested to 3000 psi)
Temperature Gauge	0-120°C
Thermal Cut-Out	40°C
Pressure Gauge	0-3000 psi
Pressure Relief	At 1500 psi
Rupture Disc	At 1900 psi
Peltier Cooling/Heating	+5°C to +35°C
Two On/Off Valves	Inlet/Outlet/Cool/Vent Needle Valve Letdown
Supply	115V 60Hz (6 Amp Max) 230V 50Hz (3 Amp Max)
Services	Requires CO ₂ gas cylinder direct connection by high pressure hose. (High pressure hose included with instrument.)



Cross-sectional view of chamber, showing meniscus viewing position.



Ordering Information

91090 EMS 850 Critical Point Dryer complete each

Replacement Parts

91091 Mesh Basket each

91092 Porous Spec Pots 10/pack

► EMS 850WM Large Chamber Critical Point Dryer

The EMS 850WM is compact, bench-top instrument designed to critical point dry a complete 150mm/6" wafer. A convenient wafer holder allows rapid transfer and ensures that pre-drying does not occur.



Features

- 170mm diameter chamber - optimized for wafer/MEMS drying
- Vertical chamber with top-loading and bottom draining - ensures specimens do not become uncovered during drying
- Thermoelectric heating - accurate temperature control
- Fine control needle valve pressure let down - precise control
- Temperature monitoring and control with thermal cut-out protection
- Pressure monitoring with safety cut-out for over pressure
- Three-year warranty

The EMS 850WM has built-in heating and water cooling using the EMS 4860 Recirculating Heater/Chiller. This combination will give temperature control of +5°C cooling and +35°C during heating. This ensures the critical point is accurately obtained, avoiding excess pressures or temperatures, or the need to rely on pressure relief valves to control pressure during the heating cycle.

The EMS 850WM has a vertical chamber which allows top-loading of specimens. A viewing port is fitted in the top plate for specimen observation. The specimen exchange mechanism is simple to use and ensures the specimen remains under liquid during loading.

Specimen handling

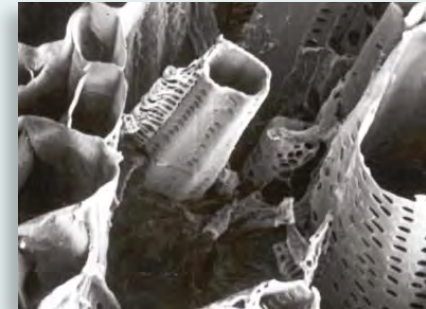
100mm or 150mm diameter wafers are held in a PTFE holding tray. The tray including wafer is immersed in acetone in order to remove all moisture from the specimen. After dehydration, the wafer and holder are transferred into the pre-cooled specimen chamber using the wafer transfer device. On completion of the critical point drying process, the wafer is removed from the chamber using the transfer device prior to further processing.

Ordering Information

91090-WM EMS 850WM Large Chamber Critical Point Dryer each

Requirements

EMS 4860 Recirculating Heater/Chiller (for cooling chamber) each
 EMS 3102 Carbon Dioxide bottle heating system each



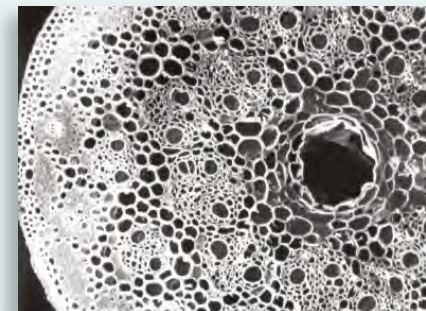
Mature Barley Root

Critical point dried transverse fracture of a mature barley (*Hordeum vulgare*) root, demonstrating central stele and surrounding cortical cells. Root hairs (Pili) are also obvious.



Aphid

Critical point dried aphid on a leaf surface.



Bamboo Stem

Transverse fracture of the stem of young bamboo (*Bambusa* sp), demonstrating xylem and phloem bundles and heavily thickened (lignified) epidermal and hypodermal cells.

► EMS 1050 Plasma Asher

The EMS 1050 consists of a solid state RF Generator and associated tuning circuits, a vacuum system with a solenoid controlled valve, a constant feed gas supply system, and a reaction chamber system which includes two semicircular electrodes and two piece pyrex chamber. The unit has one gas control as standard.

The solid state RF Generator is a solid state crystal controlled oscillator designed to provide up to 150 watts of continuous wave 13.56 MHz power to the reaction chamber. Maximum power transfer from the power supply to the reaction chamber is accomplished by matching the output impedance of the amplifier to the input impedance of the reaction chamber.

The gas supply system consists of the gas delivery system inside the reaction chamber. This delivery system is a glass tube sealed on the inner end and perforated along its bottom surface. Connections to the delivery tube are fastened with special clips to prevent the possible leakage of contaminants into the chamber.

The EMS 1050 is often used in Asbestos Specimen Preparation as a Low Temperature Ashing Technique.

FEATURES

- Automatic tuning of RF power.
- Built-in rotary vacuum pump.
- Barrel chamber with isotropic etching.
- Low temperature plasma ashing, etching, and cleaning. (0-150 watts RF)
- Vacuum monitoring.
- Dual flow gauge gas control.
- Accurate process timer.
- Needle valve vent control.
- Micro controller, with default settings programmable by the operator.
- Indication of settings by LCD display of status/entry.
- Indication of conditions during cycle, vacuum, power, time.
- Location bay for backing pump filled with special "oil".
- Sample carrier for convenient loading.
- Rack-out drawer loading door for ease of sample access.
- Polycarbonate safety shield.

Product Description

Built to withstand heavy use - 24 hours a day for some plasma ashing schedules - the EMS 1050 features microprocessor control with automatic operation and offers durability and simplicity of operation. Barrel systems plasma etch or plasma ash isotropically (in all directions) and are suitable for the majority of applications.

The EMS 1050 uses a low pressure, RF-induced gaseous discharge to modify specimen surfaces or remove specimen material in a gentle, controlled way. A significant advantage over alternative methods is that the plasma etching and ashing processes are dry (no wet chemicals needed) and take place at relatively low temperatures.

A wide range of surface modification methods are available, using a variety of process gases. Using oxygen (or air) as the process gas, the molecules disassociate into chemically-active atoms and molecules and the resulting 'combustion' products are conveniently carried away in the gas stream by the vacuum system.

Chamber, specimen handling and gas control

The EMS 1050 has a 110mm diameter x 160mm borosilicate glass chamber horizontally mounted with a slide-out specimen drawer and viewing window. Evacuation of the chamber is achieved by an optional 50L/m mechanical rotary vacuum pump. Ingress of reactive gases is controlled by two built-in flow-meters backed by solenoid valves.

NB: For applications where borosilicate glass needs to be avoided, the EMS 1050 can be fitted with a quartz chamber.



"Rack Out" Specimen Stage

Application Example

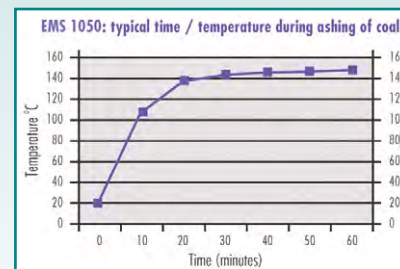
Low temperature plasma ashing of coal...

The EMS1050 can be used to remove the organic content from coal, leaving a residue of mineral and volatile components for subsequent analysis. The advantage of low temperature RF plasma ashing over other methods, such as heating in a muffle furnace (typically at 700°C), is that many more of the volatile components are retained.

In the following experiment oxygen gas was used with a forward power setting of 100W.

A thermocouple was introduced into the chamber via a vacuum feed through in the rear of the EMS1050 process chamber. The thermocouple was fixed with high temperature resistant tape to the base of a glass Petri dish and covered with approximately 5g of coal granules of approximately 1-2mm³ in size, covering the thermocouple tip to a depth of 1.5mm.

After one hour it was apparent that the temperature had reached a maximum 150°C.



► EMS 1050 (Continued)

Power, tuning and vacuum monitoring

RF power of up to 100W at 13.56MHz is available and can be infinitely controlled and pre-set to required values. Automatic tuning of forward and reflected power is standard. Forward power and vacuum levels are indicated by the digital display.

Automated microprocessor control

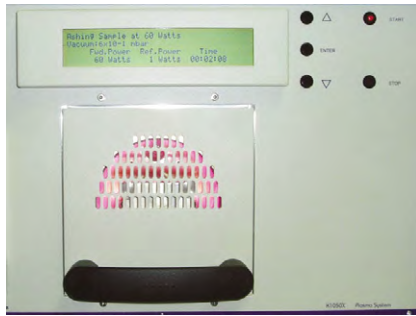
The EMS 1050 is fully automatic. Control parameters for time, power and vacuum are easy to preset and can be monitored and adjusted throughout the process run.

'Autotuning' of RF power for optimum control and reproducibility

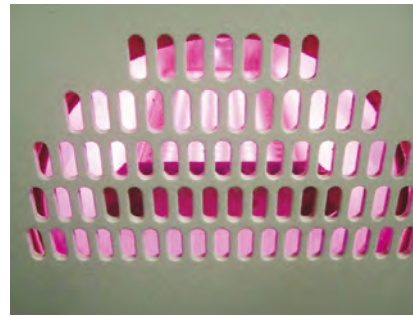
During the plasma process the 'autotune' facility ensures that the RF power is automatically impedance-matched to any variation in the system or loading. This means conditions in the chamber are maintained at their optimum - important as it gives faster reaction times, greater reproducibility of results and protects the power supply during the RF cycle.

Pumping options

A working system requires only the addition of a specified rotary pump. A fomblinised rotary pump (91005-F) is strongly recommended for safety reasons when applications involve the use of oxygen as a process gas. Where oil-based rotary pumps need to be avoided, we offer dry pumping options (see Specifications).



EMS 1050 during operation



EMS 1050 during operation - close up

Specifications

Instrument Case .....	.450mm(W) x 350mm(D) x 300mm(H)
Barrel Work Chamber	'Pyrex' 160mm(L) x 110mm(Dia.) (Borosilicate Glass as standard)
Weight .....	.25Kg
Plasma Output	Solid State Power Supply: 0-150 watts continuously variable at 13.56 MHz with Tuning Control of forward and reflected power to optimize RF power transfer
Vacuum Gauge	ATM to 1×10^{-6} mbar Full scale normal 0.5 mbar to 1.0 mbar
Digital Timer Unit	Displays elapsed time with range select: 0-99 min. 99 sec. 0-99 hours. Automatic termination of Ashing Process
Dual Gas Flow Gauge	Dual Needle Valve flow control selectable for 1,2 or both gases
Supply .....	.115V 60Hz (6 Amp Max) 230V 50Hz (3 Amp Max)
Services .....	.Process Gas at nominal 5 psi (0.33 bar)

CAUTION: For Oxygen or Corrosive Process Gases Vacuum Pump should use a Synthetic Oil 'Fomblin Oil', or similar.

Ordering Information

93000	EMS 1050 Plasma Asher	each
91005-F	Rotary Vacuum Pump (Fomblin)	each
6563	Capacitance Manometer	each
6564	Quartz Chamber and Door	each

Application Example



These two SEM micrographs show before and after results comparing identical areas of a metal photo litho plate on which extraneous lines can be visualised. Treatment in a barrel plasma reactor, with oxygen as the process gas, removed the ink - which is essentially a carbon pigment in a binder - without disturbing anything that was present underneath. Subsequent SEM examination shows a scattering of particulate material made up of irregular platelets 0.2 to 2µm in diameter. X-ray microanalysis gave a spectrum characteristic of a clay mineral.



This SEM micrograph shows a set of free-standing single crystal silicon wires for studying thermal transport. The wires were fabricated in silicon-on-insulator material using electron beam lithography and CF4 plasma etching in a barrel reactor. The wires are 40µm long, 1µm wide and 0.5µm thick and are suspended above a silicon substrate. (Image courtesy of the Microelectronics Research Centre, Cavendish Laboratory, University of Cambridge).

What is... Cryogenic Specimen Preparation?

In this instance we are referring to Frozen Hydrated Bulk Specimens for Scanning Electron Microscopy, commonly termed L.T.S.E.M. (Low Temperature Scanning Electron Microscopy). When Biological specimens are prepared by conventional methods, they may collapse and distort. In addition to which, there may be a loss of the diffusible elements that they may normally contain, and therefore affecting the validity of the X-Ray Microanalysis.

The use of L.T.S.E.M. offers a solution to this, and in addition allows viewing and analysis of 'liquid' specimens such as emulsions and suspensions, which was not previously practical. In preparing the specimen, we first want to freeze it as quickly as possible. This will reduce the morphological distortion important for structural observations, and also minimize any redistribution of solutes which is essential for X-Ray Microanalysis.

The aim of fast freezing is to reduce the size of ice crystals by reaching as quickly as possible the point at which recrystallization takes place, which is on the order of -130°C (for pure water), and maintaining the specimen below this temperature. Rapid freezing is commonly obtained by plunging the specimen into a cryogenic fluid. This is commonly liquid nitrogen, usually in the form of 'slushy' nitrogen at -210°C , and for the types of specimen we are considering, this has proved to be an effective cryogen.

Having frozen the specimen, we need to maintain it below -130°C (the recrystallization temperature) and prevent sublimation (below -130°C the rate of sublimation of ice is very low, of the order of 0.001nm/sec). We should, therefore, maintain the specimen with cryoprotection in a good clean vacuum to avoid contamination. Frozen specimens can subsequently be fractured, etched, coated with gold or carbon, using a preparation system, and then viewed and analyzed on the cold stage of the S.E.M.

Zoological



Frozen hydrated aphid

In comparison with the critical point dried aphid, this image shows that there is no distortion of the abdomen nor any other parts of the aphid following freeze drying.

Techniques and Applications

Cryo-SEM – the advantages

The Scanning Electron Microscopist is faced with the inescapable fact that liquid is a fundamental part of practically all lifesciences – and many materials – specimens. Since water occupies up to 98% of some animal and plant tissues it represents a most formidable specimen problem to most Scanning Electron Microscopists.

Cryo-SEM is a quick, reliable and effective way to overcome these not inconsiderable SEM preparation problems. Additionally the technique is widely used for observing 'difficult' samples, such as those with greater beam sensitivity and of an unstable nature. An important application, often overlooked, is the ability to use cryo-SEM to study dynamic processes (industrial or otherwise) by using a series of time resolved samples.

Naturally the advent of various "higher pressure" modes, such as VP, LV and ESEM has allowed such samples examined in SEM without resorting to freezing or drying methods. However, cryo-SEM is still by far the most effective method of preventing sample water loss, which will in fact occur at any vacuum level – even with Peltier stages fitted to the SEM and the careful addition of water vapor in the SEM chamber. Cryo-SEM also a number of additional advantages, including the ability to fracture and selectively remove surface water (ice) by controlled specimen sublimation.

Why choose cryo-SEM?

The limitations of conventional 'wet processing' include:

- Shrinkage and distortion
- Extraction of soluble materials
- Relocation of highly diffusible elements
- Mechanical damage (fragile specimens can be damaged during conventional processing)
- Slow (24 hours or longer)
- Toxic reagents are required (fixatives, buffers etc)

Advantages of cryo-SEM:

- Specimen viewed in fully hydrated state
- Soluble materials are retained
- Less relocation of highly diffusible elements
- Little or no mechanical damage
- Time lapse experiments and evaluating industrial processes at timed intervals
- Usually no exposure to toxic reagents
- Rapid process
- High resolution capability (compared to low-vacuum techniques)
- Extra information obtained by low-temperature fracturing (compared with conventional and low-vacuum methods)
- Good for liquid, semi-liquids and beam sensitive specimens
- Ability to selectively etch (sublimate to reveal information)
- Ability to 'rework' specimen (eg re-fracture and coat)

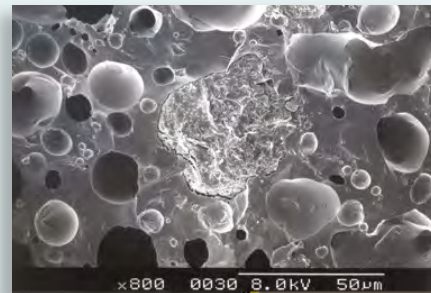
Botanical



Pollen of cactus *Zygodactylus truncatus*

Germinating pollen grains of *Zygodactylus truncatus*.

Foodstuffs



Chocolate Bar

Techniques and Applications

A summary of the cryo-SEM preparation technique

Cryo preparation techniques for scanning electron microscopy (SEM) have become essential for the observation of wet or 'beam sensitive' specimens. Using such techniques removes the need for conventional preparation techniques, such as critical point drying or freeze-drying, and allows observation of the specimen in its 'natural' hydrated state.

The specimen is rapidly cooled and transferred under vacuum to the cold stage of the preparation chamber, which is mounted onto the SEM chamber. The preparation chamber is pumped either with a rotary pump (PP2000) or by a specially designed turbomolecular pumping system (PP2000T). The specimen can be fractured, sublimated ('etched') to reveal greater detail, and coated with metal by sputtering or with carbon by thermal evaporation.

Finally, the specimen can be moved under vacuum into the SEM chamber where it is easily located on a cold stage specifically tailored to the SEM. At all stages of the procedure the specimen is maintained at a 'safe' temperature of typically lower than -140°C .

Typical applications

Biological sciences including botany, mycology, zoology, biotechnology and biomedical – plus economically import agricultural sciences.

More recently cryo-SEM is becoming an essential tool for pharmaceutical, cosmetics and healthcare industries, where it is used in basic applied research and for routine QA of many products, such as creams, cosmetics and drug delivery systems.

Cryo-SEM has long been a standard preparation method in the food industry. Of interest are multi-

phase products, such as ice cream, confectionery and dairy products.

Botanical: Cryo-SEM is the perfect method for highly hydrated botanical material.

Some specimen mounting techniques for cryo-SEM

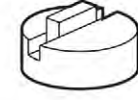
Surface mounting

This technique is used for leaf specimens etc. Roughen stub surface with fine emery paper. Specimen is laid on top of mounting media.



Edge mounting

This technique is used for edge observation and fracture. Roughen surface of stub with fine emery paper. Specimen is placed on its edge in a machined slot and secured with mounting media.

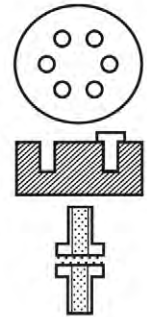


Film emulsion mounting

This technique is useful when a small specimen would be obscured by the Tissue-Tek mounting media, or when specimens need to be recovered. Specimens need to be slightly damp to use this method (good for nematode worms). The specimen is laid on surface so that its dampness slightly dissolves the film emulsion allowing the specimen to adhere to the film surface. Exposed unused film with the emulsion side uppermost is secured to the stub with mounting media. It may be useful to scrape off the protective coating of the film emulsion first to assist conductivity.

Rivet mounting

For liquids and for when specimens need to be frozen off the stub to achieve fast freezing rates. The rivet is placed in the hole and filled with liquid prior to freezing. If the specimen needs to be frozen away from the stub, two liquid-filled rivets are held together and then frozen prior to transfer onto the stub.



Alternative rivet mounting method

Pipette liquid sample into hole in sample stub



Place metal rivet or small piece of plastic tubing on top of hole (containing liquid sample).

Note: Small drop of "Super Glue" can be used to hold tube to stub.

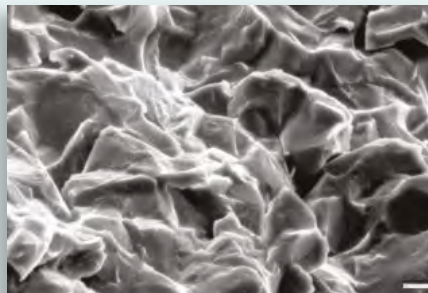


Freeze & transfer onto preparation chamber cold stage

Pipette liquid sample into tube

Result: clean surface fracture

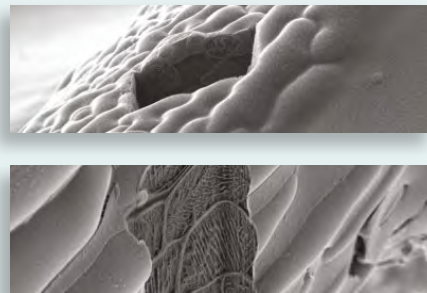
Geological



Wax crystals in gas oil

When cooled to a temperature below about 2°C , the waxes in fuel oils such as this tend to crystallize out. Wax crystal size and shape can be varied by altering the rate at which the oil is cooled.

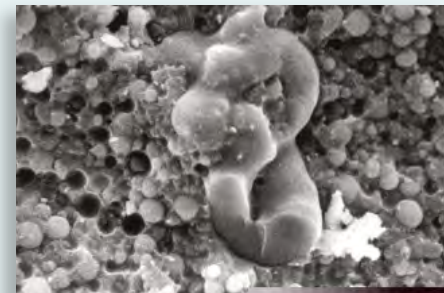
Cryo-DualBeam



Arabidopsis plant

Cryo-FIB/SEM. Image courtesy of Hannah Edwards and Arabidopsis plants provided by Darren Wells, Centre for Plant Integrative Biology, School of Biosciences, University of Nottingham, UK.

Polymers



Stable emulsion of a hydrophobic polymer

This image illustrates a stable emulsion of a synthetic liquid polymer dispersed in an aqueous continuous phase.



► PP3010T Cryo-SEM Preparation System

Quick Overview

The PP3010T is a highly automated, easy to use, column-mounted, gas-cooled cryo preparation system suitable for most makes and models of SEM, FE-SEM and FIB/SEM. The PP3010T has all the facilities needed to rapidly freeze, process and transfer specimens. The cryo preparation chamber is turbomolecular pumped and includes tools for cold fracturing, controlled sublimation and specimen coating. The specimen can then be transferred onto a highly stable SEM cold stage for observation. Cold trapping in the cryo preparation chamber and SEM chamber ensures the whole process is frost free. Specimen process times are typically between five and ten minutes.

Key Features

- High resolution performance
- Large 'recipe' driven touch screen interface
- Easy to use - extensive automation, on-screen help, videos, data logging and diagnostics
- Column-mounted preparation chamber - essential for frost-free transfer and ease of use
- Cold stage temperature down to -190°C , plus comprehensive cold trapping (not possible with conduction cooling)
- Turbo pumping system mounted off-column - less mass on the SEM
- Unsurpassed specimen visibility - large front window, top viewing ports, multiple LED chamber lighting
- Cameras in the preparation chamber and SEM - cumbersome binocular not needed
- Preparation chamber cooling - twenty-four hour hold time with a single fill of liquid nitrogen, allowing unattended overnight operation
- Automated start up, sublimation, and coating
- Fully compatible with SEM beam deceleration/stage bias modes up to 5kV
- Vacuum storage of the cryo transfer device; integrated valves enhances performance
- Typical vacuum when cold: 10-6mbar or better - specimen transfer into the SEM always high vacuum to vacuum
- Twin liquid nitrogen slushing and specimen handling system for pre-frozen specimens
- Fracturing/specimen manipulation device
- Prepdek™ workstation - self contained work area, extra bench space not required
- Specialized support backed up with a three-year warranty

See how it works... Learn how to do it...

We've added video content to our website to help you get to know our latest products even better!

Stop by and see what it's all about.



Product Description

The PP3010T is a great leap forward in cryo-SEM technology. It combines the highest quality results with unparalleled ease of use.

The PP3010T is a column-mounted, gas-cooled cryo preparation system suitable for use with SEM, FE-SEM and FIB/SEM instruments. Control is via a large and intuitive touch screen mounted on the spacious Prepdek™ workstation, giving the operator instant access to, and control of, all the key operating parameters.

Visibility is a key feature throughout the whole system. CCD camera images from the preparation chamber and the SEM are displayed on the control screen - the image can be expanded to full screen when required. Five preparation chamber viewing windows give unsurpassed visibility of the specimen and chamber interior.

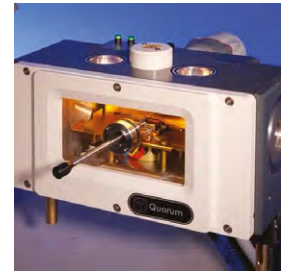
On-column preparation chamber with off-column cooling and pumping

The PP3010T conveniently combines the advantages of what are often referred to as 'on-column' and 'off-column' cryo preparation systems. The preparation chamber is directly attached to the SEM, but with the turbomolecular pumping and advanced SEM cooling system mounted remotely from the SEM. In this way, the mass and volume attached directly to SEM is kept to a minimum.

There are significant advantages of having the preparation chamber attached directly to the SEM. In particular, specimen transfer is always from high vacuum to high vacuum, which greatly reduces the risk of specimen contamination (frosting). In addition, it makes the system easier to use and allows the operator a more flexible approach to specimen preparation and observation. This is because during a single processing run it may be useful to move the specimen between the preparation chamber and the SEM cold stage - and vice versa - on a number of occasions.

Prepdek™ workstation and touch screen user interface

The Prepdek™ workstation has been designed to allow specimen mounting, freezing (and pre-frozen specimen manipulation) and transfer device storage on one ergonomically designed work surface. The control electronics are mounted in a sealed, but accessible, cabinet beneath the Prepdek™. A flexible LED light gives the user an excellent view of the preparation process.



Remotely mounted turbomolecular pumping system



► PP3010T Cryo-SEM Preparation System (continued)

Conveniently set into the Prepdek™ works surface is a pumped storage tube and allows the cryo transfer device to be stored under clean, dry vacuum conditions when not in use.

A variable position specimen shuttle mounting pillar gives a solid base for specimen mounting and includes a height gauge to ensure specimens are within the acceptable height range.

The control PC is mounted on a flexible arm and can be positioned to suit the user (eg angled towards the SEM operator during specimen observation - allowing key system parameters to be viewed at a glance).

The PP3010T is controlled using a 15" intuitive colour touch screen, mounted on the user-friendly Prepdek™ workstation. The touch screen allows user-defined 'recipes' to be rapidly entered and stored for instant future access. The screen can be set to suit different operator levels and preferences - eg analog or digital vacuum measurements.

CCD camera images of both the preparation chamber and SEM cold stages are displayed and can be expanded to fill the screen. Although many of the key steps in the specimen preparation process are automated (airlock pumping, sublimation, sputter coating, etc), further help is instantly available through user-friendly videos. These guide the operator through the system set-up and then each specimen processing step in a concise and logical way.

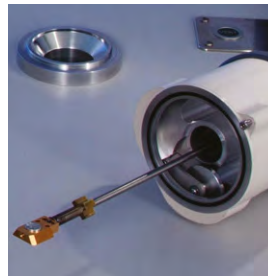
Handling and transferring specimens

The PP3010T Prepdek™ workstation is fitted with a slushy nitrogen freezing station, connected to the pumping system. Rapid freezing reduces ice crystal damage, which results in improved ultra-structural preservation.

For handling pre-frozen material, the Prepdek™ is also fitted with the Advanced Specimen Handling System, which allows specimens that have been frozen by alternative freezing methods (or stored field specimens) to be manipulated in liquid nitrogen and then transferred under vacuum into the PP3010T preparation chamber for subsequent processing and observation.

The vacuum transfer device is compact, vacuum tight and has a convenient bayonet connection to the specimen shuttle to ensure rapid transfer. In line with the automatic design of the PP3010T, when the vacuum transfer device is located on the preparation chamber, the airlock is automatically pumped.

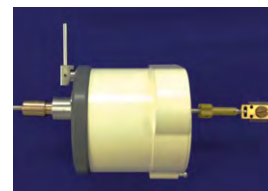
The PP3010T is supplied with universal 10mm specimen stubs with surface slots, holes and a flat area - useful for most specimen types, because the holes and slots can be used for liquids and to hold solid material for cross-section fracturing. Blank stubs are also included. A range of optional holders are available, including shuttles for large specimens and top-loading holders for high pressure freezing rivets and planchettes.



Specimen transfer device



When not in use, the cryo transfer device can be stored under vacuum in the pumped storage tube, located on the Prepdek® work surface



Transfer device, shuttle and universal specimen stub

Cryo preparation chamber

The PP3010T preparation chamber is connected directly to the SEM and includes facilities for preparing all types of specimens. The chamber is fitted with two fully integrated and interlocked gate valves. The outer load-lock valve includes a pumped airlock which accepts the cryo transfer device; the inner SEM valve ensures rapid high-vacuum to high-vacuum specimen exchange.

Specimen stage cooling is by an integral liquid nitrogen dewar which has an all-day run time (up to 24 hours) on a single fill (0.75L) of liquid nitrogen. The stage has a dovetail fitting to accept a cryo shuttle and specimen and can be precisely controlled over a temperature range from 100°C to -190°C or lower. Large gas cooled cold traps located above and below the specimen stage ensure clean, high vacuum conditions in the chamber.

High visibility

The PP3010T has superb chamber visibility. In addition to the large front window there are additional top and side windows. The specimen stage is lit by three LEDs, which avoids the problem of the fracturing knife 'shadowing' the specimen during cryo fracturing.

A CCD camera allows the specimen stage to be viewed on the control touch screen. Twin manipulators (actively cooled) are available and allow a range of specimen types to be fractured.

The PP3010T is fitted as standard with a front mounted fracturing/manipulation device. The ball-jointed mount offers flexible movement of the blade and allows the no.5 scalpel to be used both as a surface pick (probe) and a fracturing knife. Alternative blades can be fitted (not supplied).

An optional micrometer advanced fracturing tool (12145) is available (in addition to the standard side-mounted tool). Fractured fragments are captured in the large cold trap located below the specimen stage.

Automatic sublimation and sputtering

Sublimation and sputtering are fully automatic. The high resolution sputter coater is specifically designed for cryo applications and will give fine grain films that are essential for FE-SEM applications. A platinum (Pt) target is fitted as standard; other metals include gold (Au), gold/palladium (Au/Pd), chromium (Cr) and iridium (Ir). An optional carbon fibre evaporation head can be fitted.

An optional terminating film thickness monitor (FTM) is available. The system is fully integrated - no external control boxes.



Transfer device, shuttle and universal specimen stub



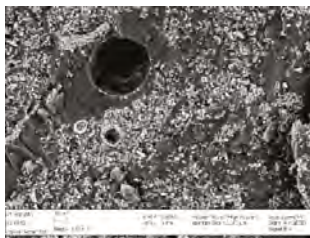
Transfer device, shuttle and universal specimen stub



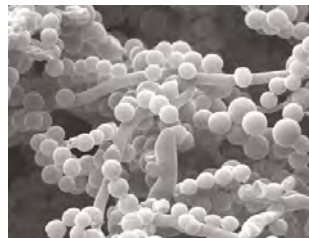
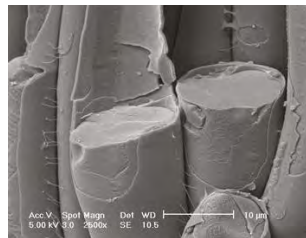
Transfer device, shuttle and universal specimen stub

► PP3010T Cryo-SEM Preparation System (continued)

Cryo-SEM Micrographs



Cross-section of oil/water/rock.

Cryo prepared image of blue stilton cheese (*Penicillium roqueforti*).

Cross-section through plant palisade cells.



Cross-section image through sunscreen (courtesy of FEI Company and University of Utrecht).

	Standard?		Standard?
Cryo preparation chamber (column-mounted)		Pumping system and controls	
Built-in liquid nitrogen cooling dewar with a twenty-four hour run time between fills	Yes	Remotely-mounted turbomolecular-pumping system (70L/s). Includes: anti-vibration base, vacuum buffer tank, vacuum valves and stainless-steel bellows connection to the preparation chamber. Typical preparation chamber vacuum: 10-6mbar	Yes
Two integral gate valves (loading and SEM) with appropriate electrical interlocks. Air lock pumping is automatically activated when the specimen transfer device is attached	Yes	Single 90L/m rotary pump required	Order separately
Variable temperature conduction cooled specimen stage (-185°C to 50°C)	Yes	System control and specimen handling	
Cold stage 'parking space' for a second specimen shuttle (allows a second specimen to be prepared in advance)	Yes	Control via a colour user touch screen monitor (15") mounted on the Prepdek™	Yes
Large anti-contaminator (cold trap) plates above and below cold stage	Yes	Multi-ability user interface screen (expert/novice)	
Robust micrometer-fed fracturing knife (actively cooled)	Option	Quick, easy overview of system status	
Side-mounted surface knife/probe (actively cooled). A range of scalpel blades can be fitted to suit different specimen requirements	Yes	User-definable 'recipes' can be stored	
Automatic sublimation (controlled and viewed on the touch screen)	Yes	Quick access to videos outlining preparation techniques and system maintenance	
Fully automatic, high resolution sputter coater with platinum (Pt) target. (Other targets, including gold (Au), gold/palladium (Au/Pd), chromium (Cr) and iridium (Ir), are available as options.)		Fully automatic sputtering	
Sputtering controlled and viewed on the user touch screen	Yes	Automatic sublimation	
High purity argon gas canister (1L)	Yes	Quick, easy overview of system status	
Carbon fiber evaporation head and power supply	Option	CCD camera image of preparation chamber and microscope chamber	
Large front viewing window (138 x 73mm) plus top and side viewing ports	Yes	Twin liquid nitrogen slushing and specimen handling system - ideal for handling pre-frozen specimens. Mounted on the Prepdek™	Yes
Preparation chamber camera (CCD) mounted on a side port	Yes	System electronics stored in a ventilated, sealed unit under the Prepdek™	Yes
Viewing port shutter - automatically closes during sputtering to ensure the port window is clear of sputtered material	Yes	Specimen shuttles (x2). E7449-9 multi-specimen stubs (pack of 10) and E7402 blank aluminium (Al) stubs (pack of 10). Other shuttles and stubs available - see Ordering Information	Yes
Vacuum transfer device	Yes	Installation and training	
Chamber illumination - three LEDs	Yes	Installation and training at the customer site	Contact EMS
SEM cooling dewar, SEM cold stage and cold trap (anticontaminator)		Support and other information	
Gas-cooled nitrogen cold stage assembly (-190°C to 50°C). Temperature stability of > 1°C	Yes	Comprehensive start-up kit with key spares	Yes
Separate gas-cooling circuits for SEM stage and SEM anti-contaminator	Yes	Three-year warranty	Yes
CHE2000 12L capacity, off-column cooling dewar with run time between fills of up to 24 hours	Yes	SEM column interfaces and SEM stage adaptor (tailored to each microscope)	Yes
SEM CCD camera- viewed on the system control screen	Yes	Some options and accessories (see Ordering Information for full list)	
LED lighting (interlocked)	Yes	Terminating film thickness monitor (FTM)	Option
		Self-pressurising LN2 dewar and regulator (for storage and venting)	Option
		Carbon fiber evaporation head	Option
		Wide range of specimen holders and specimen stubs	Option

Cryo preparation chamber pumping

The preparation chamber is pumped by a remotely-positioned 70L/s turbomolecular pumping system. Typical preparation chamber vacuums during operation are in the region of 10⁻⁶mbar or better.

Positioning the turbomolecular pump away from the SEM ensures total elimination of mechanical vibration and significantly reduces the cryo system mass that is connected to the SEM. A vacuum buffer tank allows the rotary pump to be automatically switched off for most of the time. The pumping system is connected to the preparation chamber by flexible stainless-steel bellows.

A 1.389L/s rotary vacuum pump is required to "back" the turbomolecular pump and for slushing and rough pumping operations. The rotary pump can be located up to five metres from the system, allowing remote location if required. Dry pumping alternatives are available.

SEM cold stage, cold trap and cooling system

A highly stable, thermally isolated, liquid nitrogen gas-cooled stage attaches to the SEM stage. The SEM stage and cold trap are cooled by two separate cold gas circuits - both capable of reaching temperatures down to -190°C. This configuration allows the operator to select stage and cold trap temperatures that are optimised for specific specimens. For example, for some non-biological materials it is useful to hold the specimen at very low temperatures - a cold stage temperature of -175°C and a cold trap temperature of -190°C.

The SEM cold stage has a temperature range of +100°C to -190°C and a temperature stability of < 1°C.

Off-column cooling

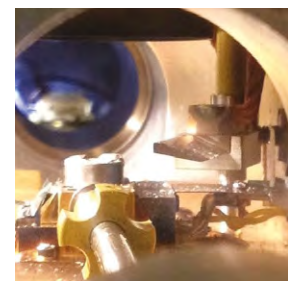
The cold nitrogen gas-cooling dewar for the SEM stage and cold trap is remotely positioned (typically on the floor behind the SEM). The system will run for up to 24 hours between fills.



Plunge freezing in slushy nitrogen.



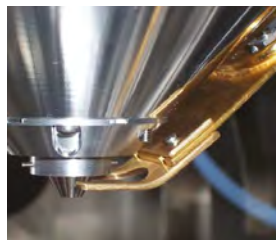
Cryo preparation chamber with cryo transfer device fitted



View during specimen transfer



Nitrogen gas cooled cold stage—temperature range down to -190°C



Gas-cooled SEM cold trap (temperatures down to -190°C). Tailor-made to suit each SEM



CHE3010 heat exchanger and dewar. During operation the heat exchange is inserted into the dewar. Typically hold times are up to 24 hours

Ordering Information

For a full quotation, including on-site installation and customer training, please contact us.

PP3010T	Cryo-SEM preparation system for SEM, FE-SEM and FIB/SEM applications. Including: column-mounted cryo-preparation chamber with off-column turbo pumping system. SEM cold stage and cold trap, Prepdek™ workstation with dual freezing and specimen manipulation facilities, automatic sputtering and sublimation. Touch screen user interface mounted on the Prepdek™ workstation. Transfer device, 2 x AL200077B and 1 x 10246 specimen shuttles, E7449-5 and E7402 specimen stubs. Microscope interfaces, start-up kit, mounting media and operation manual	each
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Pumping

The PP3010T requires one 90L/m rotary pump (dry pumps available on request).

91005	RV5 90L/m 115/230V 50/60Hz rotary vacuum pump with oil mist filter	each
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Options and accessories

PP7450	Pressurised dewar (75L) for LN2 storage and venting gas supply	each
10998	Carbon fibre evaporation head including 1m high purity carbon fibre	each
10999	Film thickness monitor (FTM)	each
12145	Micrometer controlled fracturing device with tool steel blade. Note: the standard ball-joint mounted fracturing tool is fitted as standard. The 12145 can be fitted in addition	each
13061	Two-years spares/consumables kit	each

Specimen holders

10245	Top-loading specimen shuttle for planchettes	each
10246	Top-loading specimen shuttle, to take a 10mm stub	each
10247	Top-loading specimen shuttle for rivets (vice style)	each
E7433	Rivet holder specimen stub, screw-down style (for use with 10246)	each
E7449-5	Universal specimen stub with surface holes and slots (pack of 5)	each
E7401	Specimen stub shuttle (spare)	each
E7402	Aluminum (Al) stubs (pack of 10)	each
E7403	Copper (Cu) stubs (pack of 10)	each
E7405	Screw down stub for thin, hard specimens	each
E7406	Copper (Cu) stubs with 3 x 3mm slots (pack of 5)	each
E7407	Copper (Cu) stubs with 1 x 3mm slot (pack of 5)	each
32816510	Brass rivets for fracturing liquids (pack of 100)	each

Sputter targets and carbon fibre

E7400-314A	Gold (Au) target 0.008" thick	each
E7400-314B	Gold/palladium (Au/Pd) (80:20) target 0.2mm thick	each
E7400-314C	Platinum (Pt) target 0.008" thick	each
E7400-314IR	Iridium (Ir) target 0.008" thick	each
E7400-314CR	Chromium (Cr) target 0.3mm thick	each
91047-1	Carbon fiber cord - high purity - 1m	each
91047-5	Carbon fiber cord - high purity - 5m	each

► SECADOR™ DESICCATOR CABINETS

Pick the SECADOR™ DESICCATOR CABINET that suits your lab!

Contemporary design – Fits every laboratory's budget.

- Patented dehumidifying module – protects anhydrous and hygroscopic materials.
- RH reduced to < 25% - protects any components requiring controlled storage conditions.
- Patented sealed construction- airtight, dust and moisture-free storage.
- Portable and stackable – use on bench-top or in special storage areas, small footprint.
- Automatic desiccant regeneration.
- Built-in hygrometer – quick check on RH levels.
- Transparent – easy viewing of contents.
- Embedded UV protection – blocks 99% of UV light – protect cabinet for longer service life.
- Superior chemical resistance –resists staining.
- Carrying handles – easily transported.
- Rugged construction – durable – crack resistant.
- Sturdy latches and provision for locks – secure, tamper evident storage.
- Contemporary design – attractive appearance.
- Larger units offer adjustable shelves.
- Smaller units have a stackable compact design.
- Excellent pricing – fits every lab's budget.
- Made in the USA.

► SECADOR™ 1.0 DESICCATOR CABINET

- Built-in hygrometer – Quick check on RH levels.
- Transparent for easy viewing of contents.
- Superior chemical resistance – Resists staining.
- Patented sealed construction – Airtight.
- Stackable - Small footprint.

One latch – Volume is 0.75 cu. Ft – 1 shelf
 Size: 8.4" (H) x 13.4" (W) x 16.3" (D) (21.3 x 34.1 x 41.4cm)



Cat.#	Description	Qty
71225-00	SECADOR™ 1.0 Desiccator Cabinet, Color Clear	each
71225-06	SECADOR™ 1.0 Desiccator Cabinet, Blue End Caps	each
71225-07	SECADOR™ 1.0 Desiccator Cabinet, Color Blue	each

► SECADOR™ CARRYING CASE

- Carrying handle – Portable convenience

Two latches, airtight. Available in clear and blue
 Volume 0.75 cu. Ft – 2 shelves
 Size: 14.7" (H) x 8.4" (W) x 16.3" (D) (37.3 x 21.3 x 41.4cm)

Cat.#	Description	Pack
71226-10	SECADOR™ Desiccator Carrying Case, Color Clear	each
71226-20	SECADOR™ Desiccator Carrying Case, Color Blue	each

► SECADOR™ 4.0 DESICCATOR LARGE - VERTICAL

► A. SECADOR™ 4.0 AUTODESICCATOR CABINET - Vertical

The superior dehumidification performance of the Autodesiccator model makes it a natural choice for more perishable and expensive products that require constant low humidity. Totally automatic, continual desiccation with silica beads, and generation every 20minutes, keeps RH level in the SECADOR™ 4.0 Desiccator at a constant level. No long regeneration lag between cycles – minimal change from opening the cabinet door. Two fans guarantee continuous airflow within the Cabinet, and continuous exhaust of humid air.



- Hygrometer, autodesiccator module.
- 3 shelves, 4 positions, 2 latches. Volume: 2 cu. Ft.
- Reduces RH from 75% to <25% in ≈ 8 hours.
- Maintains RH level within narrow range.
- Size: 20.4" H x 13.4" W x 16.3" D (51.8 x 34.1 x 41.4cm).

Cat.#	Description	Qty
71227-15	SECADOR™ 4.0 Autodesiccator Vertical, Clear, 115v	each
71227-16	SECADOR™ 4.0 Autodesiccator Vertical, Blue End Cap, 115v	each
71227-17	SECADOR™ 4.0 Autodesiccator Vertical, Blue, 115v	each
71227-20	SECADOR™ 4.0 Autodesiccator Vertical, Clear, 220v	each
71227-26	SECADOR™ 4.0 Autodesiccator Vertical, Blue End Cap, 220v	each
71227-27	SECADOR™ 4.0 Autodesiccator Vertical, Blue, 220v	each

► B. SECADOR™ 4.0 DESICCATOR CABINET - Vertical

- Non-electric.
- Hygrometer. 3 shelves, 4 shelf positions.
- 2 latches. Volume: 2 cu. ft.
- Size: 20.4" H x 13.4" W x 16.3" D (51.8 x 34.1 x 41.4cm).



Cat.#	Description	Qty
71227-00	SECADOR™ 4.0 Desiccator Vertical, Color Clear	each
71227-06	SECADOR™ 4.0 Desiccator Vertical, Blue End Caps	each
71227-07	SECADOR™ 4.0 Desiccator Vertical, Color Blue	each

- SECADOR™ 4.0 DESICCATOR LARGE - HORIZONTAL
- A. SECADOR™ 4.0 AUTODESICCATOR CABINET-Horizontal



- Hygrometer, Autodesiccator module
- 2 shelves, 2-positions, 2 latches. Volume: 2.0 cu. ft.
- Reduces RH from 75% to < 25% in ≈ 8 hours
- Maintains RH level within narrow range
- Size: 13.4" (H) x 20.4" (W) x 16.3" (D) (34.1 x 51.8 x 41.4cm)

Cat.#	Description	Pack
71228-15	SECADOR™ 4.0 Autodesiccator Horizontal, Clear, 115v	each
71228-16	SECADOR™ 4.0 Autodesiccator Horizontal, Blue End Cap, 115v	each
71228-17	SECADOR™ 4.0 Autodesiccator Horizontal, Blue, 115v	each

- B. SECADOR™ 4.0 DESICCATOR CABINET - Horizontal

- Non-electric
- Hygrometer. 3 shelves, 4 shelf positions
- 2 latches. Volume: 2 cu. ft.
- Size: 13.4"(H) x 20.4"(W) x 16.3"(D) (34.1 x 51.8 x 41.4cm)



Cat.#	Description	Pack
71228-00	SECADOR™ 4.0 Desiccator Horizontal, Color Clear	each
71228-06	SECADOR™ 4.0 Desiccator Horizontal, Blue End Caps	each
71228-07	SECADOR™ 4.0 Desiccator Horizontal, Color Blue	each

➤ SECADOR™ DESICCATOR SHELVES

To convert your Model 4.0 Secador™ Autodesiccator Cabinets or Secador™ Desiccator Cabinets from the Horizontal configuration to the Vertical, or from Vertical configuration to Horizontal, all you need is a new set of shelves.

Cat.#	Description	Pack
71229-10	Horizontal Shelves 2 needed to convert to Horizontal	each
71229-20	Vertical Shelves 3 needed to convert to Vertical	each

➤ Desiccator Cabinet – Low Temperature

Dry, dust-free storage for use in refrigerators, freezers or at room temperature. These durable cabinets are made from 6.35mm (¼") acrylic. Gasket airtight doors are 9.5mm (¾") acrylic with full-length hinges and stainless steel twist locking latches. Choose from easy viewing clear units or dark bronze for light sensitive materials. Both offer deep, slide-in trays with perforated bottoms and are available in three sizes.



Cat.#	Color	Height x Width x Depth, cm (in.)	No. of trays	Pack
71220	Clear	22.86 x 22.86 x 40.64 (9x9x16)	2	each
71220A	Bronze	22.86 x 22.86 x 40.64 (9x9x16)	2	each
71222	Clear	17.78 x 17.78 x 25.4 (7x7x10)	2	each
71222A	Bronze	17.78 x 17.78 x 25.4 (7x7x10)	2	each
71221	Clear	30.48 x 30.48 x 30.48 (12x12x12)	3	each
71221A	Bronze	30.48 x 30.48 x 30.48 (12x12x12)	3	each

➤ Desiccator Cabinet 1

Good for compact areas. It is see through from all sides. The door is air tight when closed and when it is opened it slides into a hide away compartment beneath the cabinet. Safely stackable up to five high. Inside measurements: 8¼"(L) x 7"(W) x 5"(H) (21 x 18 x 13 cm) Outside measurements: 9¼"(L) x 8½"(W) x 6½"(H) (23 x 21 x 17cm).



71215	Desiccator Cabinet 1	each
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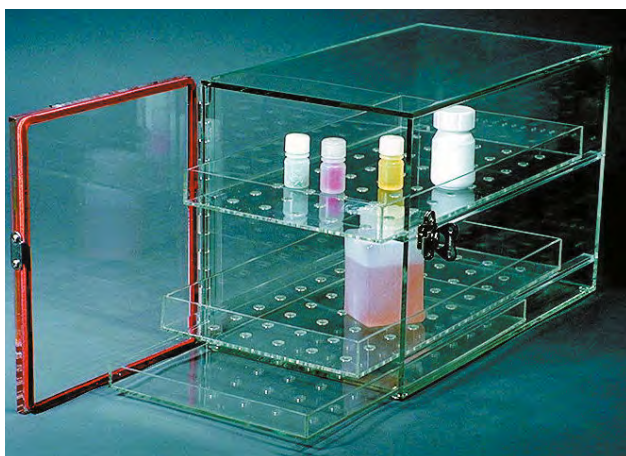
➤ Desiccator Cabinet 2

Same construction as cabinet 1. Comes with two shelves and vent holes, four sets of shelf rails for adjusting to low or high objects. "Smoke" tinted in color. The Door opening is 9" wide and 8" high (23 x 20cm); inside depth is 9". Overall measurements are 10 x 10 x 10" (25x25x25cm).



71216	Desiccator Cabinet 2	each
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► Desiccators Cabinet - Acrylic



71220

For dry, dust-free storage at temperatures up to 120°F. They can be used in incubators, freezers, and refrigerators or at room temperature. Cabinets have airtight doors that need no lubrication. Sliding perforated shelves for easy access; transparent acrylic walls for see-through storage. The third bottom shelf accommodates desiccants. Cabinets are also available with locks and a hygrometer. Hygrometer has a temperature range of -58°F to 158°F with $\pm 1.5^\circ\text{F}$ accuracy up to 104°F. Humidity range is 20 to 95% with $\pm 5\%$ accuracy. LCD display. Includes 2 'AAA' batteries.

Ordering:

DESICCATOR CABINETS ACRYLIC

Cat.#	71220-10	71220-20	71220-30	71220-40
Description	Regular	Regular	W/Hygrometer	W/Hygrometer
Length, in. (mm)	10 (254)	16 (406)	10 (254)	16 (406)
Width, in. (mm)	7 (178)	9 (229)	7 (178)	9 (229)
Height, in. (mm)	8½ (216)	10½ (267)	8½ (216)	10½ (267)
Shipping weight	8.75 lb	14.5 lb	9.0 lb	14.8 lb

LOCKING DESICCATOR CABINETS, ACRYLIC

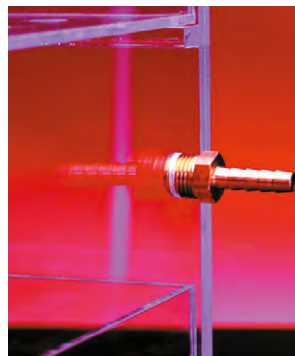
Cat.#	71222-10	71222-20	71222-30	71222-40
Description	Regular	Regular	W/Hygrometer	W/Hygrometer
Length, in. (mm)	10 (254)	16 (406)	10 (254)	16 (406)
Width, in. (mm)	7 (178)	9 (229)	7 (178)	9 (229)
Height, in. (mm)	8½ (216)	10½ (267)	8½ (216)	10½ (267)
Shipping weight	8.75 lb	14.5 lb	9.0 lb	14.8 lb

TECHNICAL TIP

- In order to extend the shelf-life of salts, buffer ingredients, and embedding components (which do not need to be refrigerated), we recommend that you store them in desiccators, where the humidity is controlled.
- The hydrated salts are always more stable than the anhydrous ones. For instance, Sodium Phosphate Dibasic Anhydrous is less stable than Sodium Phosphate Dibasic Dihydrate or Heptahydrate.

► Nitrogen Purge Cabinet – Acrylic

Simple and easy to use at temperatures up to 120°F. They can be used in freezers, refrigerators, or at room temperature. Cabinets have airtight doors that need no lubrication. Sliding perforated shelves for easy access, transparent acrylic wall for see-through storage. These cabinets are also available with Flow Meters. Direct reading scale flow meters with control levels that let you not only measure flow through the meter, but also make flow adjustments in the line. Acrylic, ethylene propylene and Type 316 stain-less steel welded parts. With a flow range of 2 – 20 scft, with an accuracy of $\pm 6\%$. Flow meter dimensions: 2" scale height x 4¼" overall height with mounting centers of 3".



71219-10



71219-20



71219-30

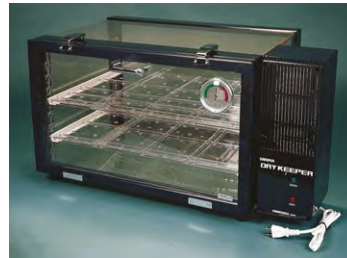
Cat.#	71219-10	71219-20	71219-30	71219-40
Description	Regular	Regular	W/Flow Meter	W/Flow Meter
Length, in. (mm)	10 (254)	16 (406)	10 (254)	16 (406)
Width, in. (mm)	7 (178)	9 (229)	7 (178)	9 (229)
Height, in. (mm)	8½ (216)	10½ (267)	8½ (216)	10½ (267)
Shipping weight	9.25 lb	15.0 lb	9.75 lb	15.5 lb

➤ **Dry-Keeper™**

Non-Vacuum with Dial Hygrometer in Door; Electrically Operated

➤ **Vertical Cabinet**

Made from clear methyl-methacrylate (Acrylic), this auto-desiccator cabinet features a permanent desiccant contained in the control unit; therefore, no desiccant tray is needed. The cycle is indicated by a green light for a 4½ hours absorption period, or a red light indicating ½ hour regeneration of the desiccant. This cabinet will lower relative humidity to 30 - 40% and it includes two adjustable shelves. The unit draws 6 watts, 120 VAC. The Unit measures overall: 12½" Length x 15½" Depth x 24½" Height (31.75 x 39.37 x 61.6 cm)



➤ **Horizontal Cabinet**

The same construction and all features as the Vertical Cabinet but its layout is horizontal. The generator unit is on the side. The overall unit measures: 24½" Length x 15½" Depth x 13½" Height (61.6 x 39.37 x 32.93 cm)

Cat. #	Description	Qty
71217	Auto-Desiccator Cabinet - Vertical	each
71217-HZ	Auto-Desiccator Cabinet - Horizontal	each

➤ **Dry Keeper Plus™ Desiccator Cabinet; Non-Vacuum**

- User-friendly electronic desiccant control
- One-touch door latch with silicone rubber door gasket
- Molded cabinet made from ABS plastic.

Efficient dehumidification is monitored by a hygrometer dial in the door. The dehumidifying auto-drying unit has an air circulating system which helps drop relative humidity sharply through its cycling of absorption and regeneration of the enclosed permanent desiccant. It can bring the relative humidity down from 60% to 10% in 6 hours of continuous operation in an unloaded cabinet. The unit comes with three clear, removable shelves with vent holes which provide evenly spaced storage area. It operates on 110 volts, 60 Hz., 10 watts, and comes with a 2-prong 6 ft (2 meter) cord.

Overall Measurement: 12.2"(L)x13.9"(W)x16.9"(H) (310x353x430mm).

Hinged door measures: 11.8"(W)x14"(H) (300x355mm). Weight: 13 lbs (5.9 Kg)

71218-00	Dry Keeper Plus™	each
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➤ **Vacuum Desiccators**

All clear; Polycarbonate.



- Large interior volume.
- Heavy walls.
- Stopcock with a PTFE plug.
- Ribbed Knob.
- Neoprene "O" ring.
- Fully visible.

Cat.#	71230	71232	71234	Package
Flange O.D.	71mm	230mm	273mm	each
Inside Dia.	149mm	197mm	240mm	each
Plate Size	140mm	190mm	230mm	each
Overall Height	206mm	260mm	311mm	each
Clearance above plate	121mm	157mm	197mm	each

➤ **Sample Stub Vacuum Desiccators**

Precision machined from a block of aluminum – anodized black - this Sample Stub Vacuum Desiccators accommodates 18 SEM Mounted Sample Stubs, pin style, under vacuum for year long.



- Compact and sturdy – will last as long as you own them
 - Prevents oxidation from occurring to the sample during long term storage
 - All pin stubs are kept secure inside the chamber by a built in "O" ring in each position
 - Very simple to use - Just need small vacuum pump to evacuate air out of the chamber
 - Acrylic Clear top for easy viewing the contents
 - Interlock when stack together to safe space
 - Ideal for transport and storage samples for SEM, TEM, FIB, AFM, etc.
- Measures: 13 cm x 13cm x 4.5cm High. Chamber cavity is 10.4cm diameter x 18mm deep. Lid is made with 10mm thick clear acrylic.
- | | | |
|-------|----------------------------|------|
| 76550 | SEM Stub Vacuum Desiccator | each |
|-------|----------------------------|------|

TECHNICAL TIP

Vacuum Drying Technique May Be An Effective Method To Eliminate Or Reduce The Wrinkles In Semithin Epoxy Sections.

Wrinkled, folded, buckled or warped sections can be vacuum dried as follows: a vacuum desiccator is furnished with a layer of calcium sulfate, and with a petri dish filled to a depth of 3 mm with phosphorous pentoxide. A large filter paper (Whatman #1) secured under the tray of the desiccator prevents dust from contaminating slides during pumping. Slides, positioned on top of the tray, are kept in vacuum for 48 hours. Immediately after removal from the vacuum jar, and without immersion in any organic solvent, the slides are coverslipped with mounting media. Hildegard H. Crowley and Ben H. Leightling (1989). Elimination or Reduction of Wrinkles in Semithin Epoxy Sections by Vacuum Drying. Stain Technology, Vol. 64, No 5, pg. 221-223

► Lab Companion™ Vacuum Desiccators

Premium Vacuum Sustainment

EMS is proud to announce our complete line of Lab Companion™ Vacuum Desiccators that holds a vacuum three times longer than the average vacuum desiccator. They stay gastight allowing reliable storage, creation of anaerobic environments, degassing of materials or vacuum drying of samples over extended periods. Available in 14 models available to suit most needs, users can choose from a standard round style or a unique cabinet style with molded design that prevents implosion.

- Cabinet style Lab Companion® desiccators hold more and often fit workspaces better
- Round style Lab Companion® desiccators complement Bel-Art Product's round vacuum desiccator offering; larger than Space Saver™ Vacuum Desiccators, smaller than Technidome® Vacuum Desiccators
- All units maintain a vacuum for 72 hours minimizing maintenance and monitoring

Choose from 14 models that hold a vacuum up to 3 times longer than the average vacuum desiccator

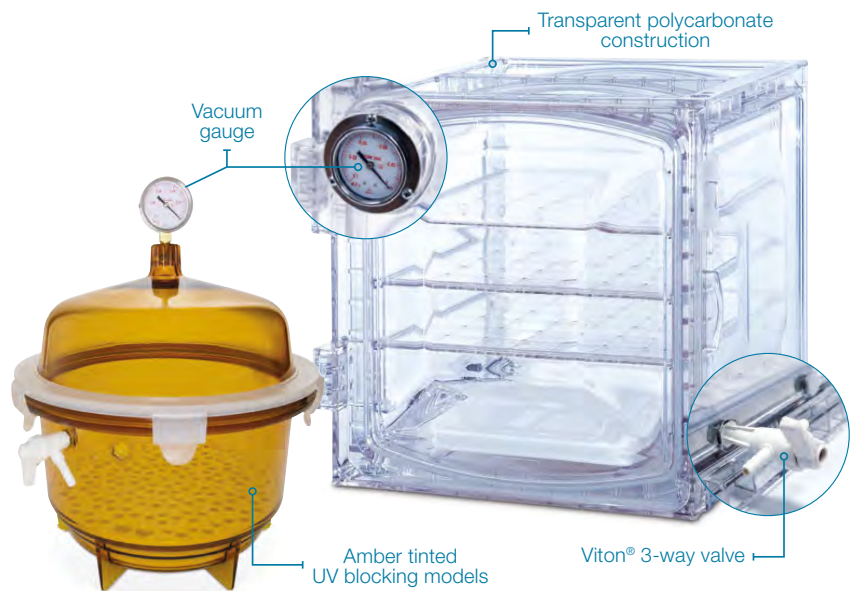
These high-quality vacuum desiccators provide vacuum integrity lasting three times longer than the average vacuum desiccator resulting in lower maintenance and greater peace of mind. Able to maintain 29in.-Hg vacuum for over 72 hours at room temperature, they stay gastight allowing reliable storage, creation of anaerobic environments, degassing of materials or vacuum drying of samples over extended periods.

- Viton® 3-way valve offers consistent and uniform vacuum draw, vacuum release, or gas exchange
- Transparent polycarbonate construction is durable, easy to clean, chemical-resistant, and allows quick visualization of the desiccator contents
- Amber tinted UV blocking models block 100% of UVA, B, and C light to minimize damages or discoloration of light-sensitive samples
- Vacuum gauge (analog dial) allows quick and convenient checking of the vacuum level

► Round Style Lab Companion™ Vacuum Desiccators

Eliminate the guesswork; easy to view vacuum gauge

- Vacuum level checking is simplified with a built-in analog vacuum gauge at the top of the unit • High-quality silicone O-ring and specially designed locking ring allow outstanding vacuum capability with virtually no leakage
- Locking ring secures top and bottom halves when vacuum not in use; provides additional convenience and safety when moving the unit
- Six models to choose from; 6, 10, and 20 liter internal volume in clear or UV blocking amber



► Cabinet Style Lab Companion™ Vacuum Desiccators

Outstanding vacuum sustainment in a space-maximizing cube

- Integrally molded cubic box design enables outstanding vacuum capability with virtually no leakage and exceptional durability
- Cabinet style provides maximum useable space
- Swinging door allows easy access; built in locking tabs secure the door when not under vacuum
- Analog vacuum gauge in front door allows vacuum level checking at a glance
- Perforated shelves can be repositioned to accommodate various storage needs (additional shelves available separately)
- Built-in ports permit attachment of up to 3 additional valves (sold separately)
- Stackable space-saving design allows efficient use of work space
- Eight models to choose from; 11, 23, 35, and 45 liter internal volume in clear or UV blocking amber



► Lab Companion™ Vacuum Desiccators (continued)

Cabinet Style Desiccator Models



SPECIFICATIONS

Cat. #	Exterior Dims W x D x H	Door Opening W x H	Net Weight	Shelves Incl / Max	Max Wt / Shelf
71260-10	32.2 x 28.5 x 27.1cm	20.8 x 23.8cm	4.2kg (9.25lb)	2 / 4	3kg (6.6lb)
71260-11	(12½ x 11¼ x 10¾")	(8½ x 9¾")			
71260-12	42.0 x 39.7 x 28.1cm	29.5 x 24.5cm	8.2kg (18lb)	2 / 4	5kg (11lb)
71260-13	(16½ x 15¾ x 11")	(11½ x 9¾")			
71260-14	42.0 x 39.7 x 38.1cm	29.5 x 34.5cm	10.8kg (23.75lb)	3 / 5	5kg (11lb)
71260-15	(16½ x 15¾ x 15")	(11½ x 13¾")			
71260-16	42.0 x 39.7 x 49.1cm	29.5 x 44.5cm	12.2kg (26.75lb)	3 / 6	5kg (11lb)
71260-17	(16½ x 15¾ x 19¾")	(11½ x 17½")			

ORDERING INFORMATION

Cat. #	Description	Internal Volume (cu. ft.)	Internal Volume (Liter)	Qty.
71260-10	Lab Companion™ Cabinet Vacuum Desiccator, 11L	0.4	11	each
71260-11	Lab Companion™ Cabinet Vacuum Desiccator, 11L,UV Amber	0.4	11	each
71260-12	Lab Companion™ Cabinet Vacuum Desiccator, 23L	0.8	23	each
71260-13	Lab Companion™ Cabinet Vacuum Desiccator, 23L,UV Amber	0.8	23	each
71260-14	Lab Companion™ Cabinet Vacuum Desiccator, 35L	1.2	35	each
71260-15	Lab Companion™ Cabinet Vacuum Desiccator, 35L,UV Amber	1.2	35	each
71260-16	Lab Companion™ Cabinet Vacuum Desiccator, 45L	1.6	45	each
71260-17	Lab Companion™ Cabinet Vacuum Desiccator, 45L,UV Amber	1.6	45	each

Round Style Desiccator Models



SPECIFICATIONS

Cat. #	Exterior Dims W x D x H	Net Weight	Shelves Incl / Max	Max Wt / Shelf
71260-18	28.6 x 35.4cm	1.7kg (3.75lb)	1 / 1	15kg (33lb)
71260-19	(11¼ x 13¾")			
71260-20	35.3 x 40.0cm	2.6kg (5.75lb)	1 / 1	20kg (44lb)
71260-21	(13¾ x 15¾")			
71260-22	42.7 x 47.5cm	4.3kg (9.5lb)	1 / 1	25kg (55lb)
71260-23	(16¾ x 18¾")			

ORDERING INFORMATION

Cat. #	Description	Internal Volume (cu. ft.)	Internal Volume (Liter)	Qty.
71260-18	Lab Companion™ Round Vacuum Desiccator, 6L	0.2	6	each
71260-19	Lab Companion™ Round Vacuum Desiccator, 6L,UV Amber	0.2	6	each
71260-20	Lab Companion™ Round Vacuum Desiccator, 10L	0.4	10	each
71260-21	Lab Companion™ Round Vacuum Desiccator, 10L, UV Amber	0.4	10	each
71260-22	Lab Companion™ Round Vacuum Desiccator, 20L	0.7	20	each
71260-23	Lab Companion™ Round Vacuum Desiccator, 20L, UV Amber	0.7	20	each

► Glass Desiccators

Glass vacuum desiccators are versatile and are equipped with a sidearm for connection to a vacuum source. The contents of the sealed evacuated desiccators are maintained in a dry, reduced pressure atmosphere. Dried materials are stored in desiccators while cooling in order to minimize the uptake of moisture.

■ **Hygroscopic materials should be stored in containers having tight fitting closures. Deliquescent samples and effervescent pharmaceuticals are prime examples.**

Applications:

- Protection of hygroscopic and deliquescent samples.
- Prolonged storage at reduced pressure.
- Reactions at ambient temperatures.
- Anesthesia chamber for laboratory animals.
- Environmental studies.
- Storage of thin layer chromatography plates.
- Determination of void content of aggregates and filters.
- Greaseless seal.
- Maximum vacuum of 27" Hg.
- Temperature range -15° to 80°C.
- De-aired the mixture.

Desiccants See page 1071 >>>>>

► Dry Seal® Vacuum Desiccators – With Covers, Sleeve Valves, Silicone Sealing Rings and Plates

Lubricating the standard taper sleeve valve with silicone-based vacuum grease is recommended for increased performance and to prevent freezing. 1/4" to 3/8" vacuum hose required. Made from Wheaton "810" glass and they are available in 3 sizes.



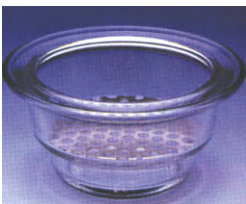
Cat.#	Size, mm	Joint Size	Qty/case
71256-15	170	40/35	each
71256-25	250	55/38	each

► Desiccator Components:

► 1. Vacuum Jars

Replacement jars for all Dry-Seal® desiccators.

Cat.#	Size, mm	Qty/case
71257-10	100	each
71257-15	150	each
71257-25	250	each



► 2. Covers, Without Sleeve Valves

Replacement for all Dry Seal® vacuum desiccators.

Cat.#	Size, mm	Joint Size	Qty/case
71258-10	100	40/35	each
71258-15	150	40/35	each
71258-25	250	55/38	each



► 3. Sleeve Valves

Replacement for all Dry Seal® vacuum desiccators.

Cat.#	Joint Size	Qty/case
71259-40	40/35	each
71259-15	55/38	each



► 4. Retaining Rings

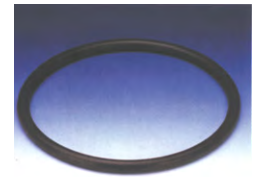
For sleeve valves.

Cat.#	Size, mm	Qty/case
71259-35	40/35	each
71259-38	55/38	each

► 5. Sealing Rings

These rings are molded from chemically resistant Viton® rubber.

Cat.#	Size, mm	Qty/case
71261-10	100	each
71261-15	150	each
71261-25	250	each



► 6. Aluminum Plates

Cat.#	Size, mm	Qty/case
71262-10	100	each
71262-15	150	each
71262-25	250	each



► Vacuum Bell Jar and Plate

Good for vacuum drying and degassing procedures. The chamber is made from a clear polycarbonate allowing for full visibility. Its polypropylene stopcock has a PTFE plug and it accepts 1/4" (6.4mm) I.D. tubing. The chamber measures: 77/8(20cm)I.D.; inside maximum height is 43/8"(11cm); plate is 13/4"(4.4cm)Hx91/8"(23.2cm) in diameter.



71236 Vacuum Bell Jar & Plate each

► Mini Vacuum Desiccator

- Ideal for Small Samples
- Degassing Embedding mixtures

The top part of the desiccator is clear, molded from polycarbonate and see-through from any angle. A polyethylene stopcock with a PTFE plug allows for gentle releasing of the vacuum. A peripheral flange around the poly-propylene bottom section fits into and snap locks therefore sealing the two halves against a "O" ring. Vacuum retention rating is 740 mm Hg (29"). Inside dimensions are 102mm (4") diameter x 59mm (2 3/16") high. The base is 175mm (6 7/8") diameter.



71246-01 Mini Vacuum Desiccator each

➤ **Reusable/Disposable Desiccant Cartridge**

These desiccant cartridges can be used in desiccator cabinets or non-vacuum desiccators, analytical balance cases, and precision laboratory instruments. The clear polystyrene dish allows for instant visual inspection of the silica gel color which changes from blue to pale pink as it absorbs moisture. A highly porous membrane covers the dish of the desiccant providing good moisture absorption. The desiccant can be regenerated by heating cartridges in an oven at 50°C (122°F) overnight. For rapid drying, cut the membrane and transfer the spent gel crystal into a glass or porcelain dish. Then place it in a 150°C (302°F) oven for one hour. The silica gel is inert and non-toxic. Each cartridge is individually sealed in aluminum foil. Dispose of the cartridges after repeated use. Cartridges come in two sizes: Small: 2 1/2" (65mm) diameter and Large: 4" (100mm) diameter.



71212-02	Desiccant Cartridge, Small	6/pk
71212-04	Desiccant Cartridge, Large	6/pk

➤ **Desiccant Canister; Reusable**

Ideal for dry control of desiccator cabinets. Moisture is absorbed through the perforations in the aluminum case, which contains silica gel. This 2 x 4" canister maintains a safe level of humidity in 3cu.ft (0.8 cu. meter) area. When the monitor window turns pink, the silica gel is saturated. It can be regenerated in a 300°F (150°C) oven in about 3 hours. The monitor window will be blue in color when recharged.



71210	Desiccant Canister	each
71211	Desiccant Canister	4/pk

➤ **Silica Gel-Desiccant**

Fast and extra moisture absorbing agent.

- Meets FDA specifications for food and drug product
- Provides superior absorption. Remains dry at maximum saturation.
- Silica gel can absorb 15% of its weight in water vapor in two hours.

➤ **Silica Gel Packets**

These packets lay flat, malleable to the storage area. Available in a variety of sizes.



Cat.#	Gram Size	Bag Dimensions	Protects Cu. In.	Pack
71206-01	1	3/8" x 1 1/2"	6.1	100/pk.
71206-02	2	3/8" x 2 1/4"	12.2	100/pk.
71206-03	3	1 1/8" x 2 1/8"	24.4	50/pk.
71206-05	5	1 1/8" x 2 1/4"	45.75	50/pk.
71206-10	10	2 3/4" x 3"	91.5	20/pk.

➤ **Desiccant in a Cartridge**

Regenerates Repeatedly without Degradation

These cartridges fit into the bottom of a standard glass or plastic desiccator. The cartridge consists of a durable long wearing polyester felt bag with a perforated Mylar cover sealed in place. The indicating gel beads will change their color from blue when dry to pink when moist. Saturated gel can be regenerated in a 150°C (300°F) vented oven for 3 hours or more (depending on size), until the blue color is restored. Cartridges come individually sealed in a moisture-proof pouch ready to use.



Cat.#	For Desiccator Diameter	Cartridge Diameter	Weight	Pack
71209-16	160 mm	114 mm	0.23kg (1/2 lb)	each
71209-20	200 mm	197 mm	0.68kg (1 1/2 lb)	each
71209-25	250 mm	238 mm	1.36kg (3 lb)	each

➤ **Vacuum Pressure Indicator**

This Vacuum-Pressure Indicator fits between the desiccator dome and the desiccator stopcock. Its slips easily onto the tapered outlet of the desiccator dome and into the standard desiccator stopcock without requiring any tools. The thermo-plastic elasto-meter collapses when there is negative pressure vacuum in the desiccator and expands under ambient atmospheric pressure.



71242-01	Vacuum Pressure Indicator	each
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➤ **Replacement Stopcock**

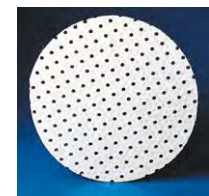
A polypropylene body which has a PTFE plug and washer as well as a bright red handle and nut. Its taper fits on the desiccator port and the plug is 3-way allowing for vacuum draw, shut-off, and release. May be used with our following catalog numbers: #71230; 71232; 71234; 71246.



71242-05	Replacement Stopcock	each
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➤ **Replacement Desiccator Plates**

These 4.8mm thick plates are able to withstand temperatures up to 150°C (300°F) and have excellent resistance to thermal shock, and to chemicals. They are non-combustible and asbestos free. Round plates are perforated with 4mm (.165") diameter holes on 12.7mm (1/2") centers in a straight line pattern. They are available in three sizes, and fit our following desiccators #71230; 71232; and #71234.



71242-15	140mm Diameter Desiccator Plate	each
71242-19	190mm Diameter Desiccator Plate	each
71242-23	230mm Diameter Desiccator Plate	each



► High-Speed Mini-Centrifuge

This compact centrifuge is ideal for most protocols calling for fast spins (up to 12,500 rpm / 9,800 rcf) and quick spin-downs. Useful for PCR®, microfilter cell separation, clinical applications, and HPLC protocols. Operation is extremely simple for this high-level of sophistication. For duplicate spins, simply reload rotor and push Start. Designed with quick-spin option for commonly used 20-second spins. Includes a toolfree, quick-change rotor system. Safety features ensure the

unit will not operate with an open lid, a jammed rotor or when out of balance. Efficiently designed for minimum bench top space.

Features

- Two rotors
- 12 place standard rotor with lid for 1.5/2 mL tubes
- Twelve 0.2 mL and twelve 0.5 mL adapters for customized use
- AC adapter 100 to 240VAC, 50/60Hz



Specifications

Maximum Speed	12,500 rpm
Maximum RCF	9800 x g
Voltage	100-240
Dimensions	203x171x114

EMS #	Description	Qty.
72359-12	Gusto mini-centrifuge	each

► 6-Place Table Top Centrifuge

This is a powerful, quiet, centrifuge for table top use in small labs or offices.

FEATURES:

- Variable 30-minute timer.
- Standard locking lid.
- Six place rotor.
- 7, 10 or 15ml tube capacity without the added expense of extra tube carriers.



Specifications:

Maximum Speed:	3,200 rpm
Maximum RCF:	1,300xg
Power:	120VAC, 120W
Maximum Volume:	90ml
Diameter (base):	10" (25.4cm)
Height:	8" (20.3cm)
Weight:	7.5lbs (3.40kg)

72359-06	6-Place Table Top Centrifuge	each
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► Sprout® Mini-Centrifuge

Newly improved rubber footplate includes soft feet to increase stability and deaden vibration

This compact mini-centrifuge is ideal for quick spin-downs from tube walls and caps. Use to microfilter cell separations and HPLC samples. Most spins last around 20 seconds, so Sprout® is designed for easy repeat opening. Ergonomically designed lid fits the palm of the hand comfortably.

Operation is very simple: load tubes, close lid, press ON/OFF button. For repeated spins, simply open or close the lid to operate. Internal safety switch ensures unit will not operate with lid open.

This personal centrifuge uses minimal benchtop space. Removable cord for easy storage. Unit is ETL, cETL, and CE marked and also complies with European RoHS directive.



Specifications:

Maximum Speed	600 rpm
Maximum RCF	2000 x g
Dimensions	153 x 128 x 104 mm



Tubes accommodation:

- Circular rotors and adapters combine to hold up to 6 microtubes (2.0 ml, 1.5 ml, 0.5 ml, or 0.4 ml)
- Straight rotor holds up to 16 PCR tubes (individual or two strips of 8)

Circular rotors are glass-filled polycarbonate; straight rotor is unfilled polycarbonate.

This mini Sprout unit includes:

- Two interchangeable rotors covering all applications – includes a set of adapters to accommodate all major microtubes and PCR tube styles.
- Storage case – Polyurethane foam case keeps extra rotors and adapters contained and dust-free.
- Tube Rack – Handy for handling samples before and after quick spins.



EMS #	Description	Qty.
72360-US	Sprout®, 110/120 VAC for US	each
72360-EU	Sprout®, 220/230 VAC for Europe	each
72360-AU	Sprout® 220.230 VAC for Australia	each
72360-UK	Sprout® 220/230 VAC for UK	each

► Mini Microcentrifuge

An ultra quiet, space saving centrifuge which is only 5 inches in diameter. This unit is ideal for use under the fume hood, or on any benchtop. It comes with a clear carbonate lid which is extra durable and allows visual inspection of the 6-place rotor while in operation. To start the operation of the unit simply close the lid; to open depress the plastic tab. The unit operates at 6400 rpm and 2000xg. 110 VAC.



72359-10	Mini Microcentrifuge	each
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► Thumbs-Up Microtubes

Made of autoclaveable polypropylene

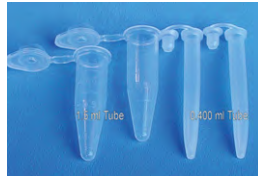
- Opens with flip of thumb!
- Easy retrieval from rotors
- Special reaction vessels in lid
- Color option for easy identification
- RNase and DNase free
- Temperature range: -196°C to 130°C
- RFC rating of 17,00 x g



Cat. #	Description	Qty
72370-0	0.5 ml Thumbs-Up Microtubes, Clear	1,000/pk
72370-1	0.5 ml Thumbs-Up Microtubes, Blue	1,000/pk
72370-2	0.5 ml Thumbs-Up Microtubes, Green	1,000/pk
72370-3	0.5 ml Thumbs-Up Microtubes, Pink	1,000/pk
72370-4	0.5 ml Thumbs-Up Microtubes, Purple	1,000/pk
72370-5	0.5 ml Thumbs-Up Microtubes, Yellow	1,000/pk
72371-0	1.5 ml Thumbs-Up Microtubes, Clear	500/pk
72371-1	1.5 ml Thumbs-Up Microtubes, Blue	500/pk
72371-2	1.5 ml Thumbs-Up Microtubes, Green	500/pk
72371-3	1.5 ml Thumbs-Up Microtubes, Pink	500/pk
72371-4	1.5 ml Thumbs-Up Microtubes, Purple	500/pk
72371-5	1.5 ml Thumbs-Up Microtubes, Yellow	500/pk

► Micro Sample Tubes

Suitable for use in the mini centrifuge. Poly-propylene tubes with a captive plug; they are steam autoclavable at 250°F (121°C).



72363	Polypropylene Tubes, 1.5ml	100/bx
72361	Polypropylene Tubes, 400µl	100/bx

► Micro Tube Label; Tough-Tags™

Pre-cut, peel-off, pressure sensitive labels. They are sized to fit microcentrifuge tubes, cryo tubes and many other containers.

FEATURES:

- They can be boiled, froze, and autoclaved.
- They are thin and will not jam in the centrifuge rotor.
- They are chemically resistant.
- They will not dry out, fall-off, or tear.



Tough-Tag® 1.28" x 0.50" (33mm x 13mm), Ideal Use: 1.5 ml Tubes

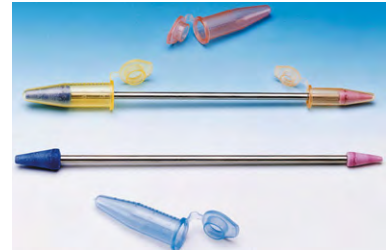
Cat. #	Color	Labels per roll
62045-20	White	1000
62045-B	Blue	1000
62045-G	Green	1000
62045-O	Orange	1000
62045-R	Red	1000
62045-Y	Yellow	1000
62045-10	Clear	1000

Tough-Tag® 0.94" x 0.50" (24mm x 13mm), Ideal Use: 0.5 ml Tubes

Cat. #	Color	Labels per roll
62044-20	White	1000
62044-B	Blue	1000
62044-G	Green	1000
62044-O	Orange	1000
62044-R	Red	1000
62044-Y	Yellow	1000
62044-10	Clear	1000

► Double End Pestle

This pestle is mounted on a stainless steel shaft, 3.2mm (1/8") in diameter and it may be hand held or mounted in a motorized chuck. Double ended pestle. One end fits the 1.5ml microcentrifuge tube and the other end fits the 0.5ml tube. Overall length is 152mm (6")



64786-02	Double End Pestle	each
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► Pestle Mixer with Matched 1.5 Tube

Economical Disposable polyethylene pestles and 1.5ml micro centrifuge tubes are used to resuspend precipitates such as protein or DNA pellets in buffer solution, or to grind soft tissue. The pestles are a matched fit for the tubes. These sets are excellent for processing large numbers of samples.



64788-10	Green Pestle and 1.5 ml Tube	100/pk
64788-20	Green Pestle only	100/pk

► Micro Centrifuge Sample Pestle

This pestle is ideal for resuspending lyophilized products or precipitates, or for homogenizing samples in a microcentrifuge tube. The PTFE pestle is mounted on a stainless steel shaft, 2.3mm (1/8") in diameter. It may be hand held or mounted in a motorized chuck. Overall length 143mm (5 3/8")



64785-15	1.5ml Tube Pestle, Flat Tip Cone	each
64785-16	1.5ml Tube Pestle, Rounded Tip Cone	each

► Silica Gel Canister

This small container offers more desiccant in less space. It is ship-proof and possesses greater drying capabilities. Designed for use in bottles and small containers. Perfect for protecting against potency loss, odor formation, color changes, caking, mildew and condensation. Capsule shell is made from polyethylene with very fine mesh top and bottom. The canister contains 1 gram silica gel. Capsule measures 9/16" dia. x 11/16" high (14 mm x 18 mm high)



Cat. #	Description	Pack
71205-01	Silica Gel Canister	100/pk
71205-05	Silica Gel Canister	500/pk

► Micro Sample Tube Racks

These round floating bubble racks can incubate 8 to 20 tubes in a beaker of water. Perfect for use in microbiology and immunology labs. Made to be used in beakers. The racks are loaded from the top and the tubes are easily removed by pressing the rack down on a bench until the short legs touch. Molded from buoyant foam-filled TPXR (polymethylpentene) with tiny bubbles throughout. 10.8mm diameter holes fit the 1.5ml microtubes, and 7.7mm holes fit the 0.5ml tube. The racks are 1/4"(6.4mm) thick with 3/4" (19mm) long legs and a center rod handle. They are steam autoclavable at 250°F (121°C).

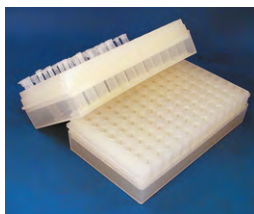


Cat.#	OD, (mm)	Holes	Hole Size	Fits Beaker
72364-10	66	8	10.8mm	400 ml
72364-12	66	8	7.7mm	400 ml
72364-20	105	20	10.8mm	1000 ml
72364-22	105	20	7.7mm	1000 ml

► Microcentrifuge Tube Racks; BestRack®

This Reversible Rack Holds 96 Microcentrifuge Tubes

This sturdy polypropylene rack holds 96 tubes in an 8 x 12 format. The rack provides easy access to each tube, even when 96 places are full. The transparent polypropylene lid has a snug fit and is tall enough to store most screw-cap microcentrifuge tubes. The rack measures 8-7/16" (L) x 45/8" (W)x2"(H) with lid.



- Holds 1.5/2.0 ml tubes on one side, and 0.5 ml tubes on the other.
- Rows and columns labeled for easy sample identification.
- Frosted labeling areas on four sides.
- Withstands freezing (-90°C) and autoclaving.
- Comes in 5 popular colors as well as natural.

Cat.#	Description	Pack
72375-05	96-place Rack. Mixed color (blue, green, pink, orange, and yellow) and Natural Lids	5/pk
72375-06	96-place Rack and Lid, Natural color	5/pk
72375-01	96-place Rack and Lid, Natural color	each

► Hot Plate/Stirrers Models PC-220

The Corning™ exclusive glass-ceramic Pyroceram® top has been a laboratory standard. These Hot Plate/Stirrers are packed with improved and customer requested features that are both durable and sophisticated, including:

- Exclusive Microprocessor design ensures faster and even heating.
- Exclusive closed-loop stirring monitors and regulated stirring speed.
- Exclusive external 'spill trough' deflects spills away from electronic and control knobs.
- Superior component designs and enclosed control electronics protect temperature and stirring control circuits from harsh environments.
- Extra large knobs with easy-to-read numbers provide better control.
- External Temperature Controller socket is provided on the 400 and 600 series



Model	Cat.#	Power	Top Size	Stir Range RPM	Temperature Range, °C	Weight Lb (kg)	Dimensions H x W x H, In.	Pack
PC-220	72348-10	120V/60Hz/283W/2.4A	4 x 5"	60-1100	25 - 550	5.0 (2.3)	4.4 x 5.8 x 7.3	each
	72348-20	230V/50Hz/288W/1.3A	4 x 5"	60-1100	25 - 550	5.0 (2.3)	4.4 x 5.8 x 7.3	each

Notes: 230 volt Units come with UK plug. Continental European and Italian plugs are available upon request.

► Water/Ice Bath Rack

Rust-proof Anodized Aluminum Rack – Designed to be used in Water/Ice Baths

- 24-place rack holds 1.5 and 2.0ml tubes.
- 40-place rack holds 0.5ml tubes.
- Removable cover keeps tubes closed while boiling.
- Handle for easy removal from water baths.
- Will not rust.



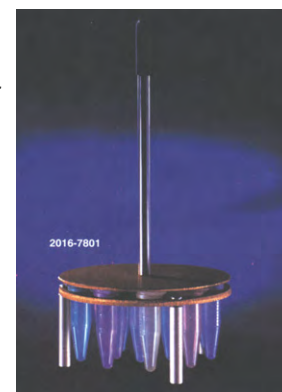
Dimensions
(W)x(L)x(H)

Cat.#	Rack Style	Dimensions (W)x(L)x(H)	Pack
72380-20	24-place, for 1.5/2.0 ml Tubes	6 ⁵ / ₁₆ " x 2 ¹ / ₄ " x 2 ³ / ₈ "	each
72380-24	40-place, for 0.5 ml Tubes	4 ¹ / ₂ " x 2 ³ / ₄ " x 1 ¹ / ₈ "	each

► Beaker Buddy™

Round, Anodized Aluminum Rack for use with Beakers, Water Baths, and Ice Baths

Keep microcentrifuge tubes closed while boiling. Place the tubes in the rack, and then screw on the handle to hold down the cover. The handle is 51/8" long, and assist's in the removal from hot beakers. Rack measures 31/2" diameter and holds up to 16 tubes.



- For 1.5 and 1.0ml tubes.
- Fits standard 800ml or larger beakers.
- Thermometer slot for monitoring temperature.
- Aluminum legs for free-standing use.
- Will not rust.

72365-01	16-place Beaker Buddy (2016-7801)	each
72365-06	16-place Beaker Buddy with lid	each

► **Temperature Controller Accessory for Hot Plate/Stirrers Models PC-220**

The Corning temperature controller accessory works with all Corning hot plates/stirrers, models PC-220. The controller plugs into the socket on the back of the hot plate. It can be used to control or monitor the temperature of the hot plate. The temperature controller features a PTFE coated probe, which allows the controller to be used for more applications.

Specifications: Optional Temperature Controller $\pm 2^{\circ}\text{C} @ 80^{\circ}\text{C} + 1\%/10^{\circ}\text{C}$, after 30 minutes.

► **Support Rods**

Corning hot plates, stirrers, and hot plate/stirrers have a space for a support rod accessory to be screwed into the base of the unit. These support rods are constructed from stainless steel and are offered in three different sizes

Cat.#	Description	Use with Model	Pack
72351-21	Temperature Controller B	PC-200/210/220	each
72351-12	Support Rod $\frac{5}{16}$ " x 12"L	PC-200/210/220	each
72351-18	Support Rod $\frac{5}{16}$ " x 18"L	PC-200/210/220	each
72351-24	Support Rod $\frac{5}{16}$ " x 24"L	PC-200/210/220	each



► **Overhead Stirrer**

- Allow for power homogenization or mixing
- Speed control capable of RPM / Torque combinations
- Use only with tissue grinders with stainless steel rods
- Keyless chuck accepts shaft size to 7.9 mm
- One year warranty

This overhead stirrer is a compact unit with solid state speed control capable of providing RPM/torque combinations for most laboratory operation such as homogenizing or mixing. This Over Head Mixer should be attached only to Tissue Grinders with PTFE pestles and with stainless steel rods. Unit and motor are mounted in a housing with epoxy finish and is provided with 6" aluminum rod and clamp for attachment to support stand. Keyless chuck accepts shaft sizes up to 5/16" (7.9 mm). Support stand is not included. One year warranty.



SPECIFICATIONS:

Speed Range:300 – 5,000 RPM (Under load)
 Electrical:.....120 VAC, 50/60 Hz, 50 watts
 Dimensions:4½" x 5" x 12" (11.5 x 13 x 30 cm)
 Weight:.....6 lbs (2.7 kg)

Cat. #	Description	Qty
64806-10	Overhead Stirrer Complete Unit	each

► **Accessories:**

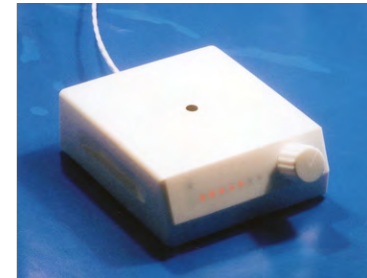
Cat. #	Description	Qty
64806-50	Swivel blade paddle for stirring liquid in vessels with side entry port or for vessels with narrow openings. Shaft $\frac{1}{4}$ " x 12" (6.3 x 305mm), Blade: $\frac{1}{2}$ " x 2" (12.7x50.8mm)	each
64806-51	Stainless steel Extension Rod, $\frac{1}{4}$ " x 6" (6.3 x 153mm). For use with extension sleeve for lengthening Paddles.	each
64806-52	Stainless steel Extension Rod, $\frac{1}{4}$ " x 12" (6.3 x 305mm). For use with Extension Sleeve for lengthening Paddles.	each
64806-53	Stainless steel Extension Sleeve for $\frac{1}{4}$ " (6.3mm) diameter Rods, with set screws. For use in lengthening Paddles.	each

► **PTFE Magnetic Stirrer**

A New Concept in Magnetic Stirrers!

All parts are fully encapsulated in a PTFE body to give a stirrer which is totally inert to the most aggressive laboratory conditions.

- Speed display
- Reversible Spin Mode
- No heat transfer to media
- BIO VERSION
- Controlled speed 10 -160 rpm
- Stutter free motion



SPECIFICATIONS:

Max beaker capacity:2L
 Size:130 x 130 x 50 mm
 Power:7 watt – CE Marked
 Weight:1.3 kg (included power unit)

24 Volt stepper motor with controlled acceleration and deceleration and stall detection

Ambient temperature range 0 – 40°C
 PFA covered lead cable fused into body

Ordering: All units come with a power module

EMS #	Description	Country
Standard Version 50 – 800 rpm		
60910-10	Standard PTFE Magnetic Stirrer	USA (JP)
60910-22	Standard PTFE Magnetic Stirrer	EU
60910-24	Standard PTFE Magnetic Stirrer	UK
Bio-Version 10 -160 rpm		
60911-10	Bio-Version PTFE Magnetic Stirrer	US (JP)
60911-22	Bio-Version PTFE Magnetic Stirrer	EU
60911-24	Bio-Version PTFE Magnetic Stirrer	UK

► Corning® Digital Stirring Hot Plates

Corning Stirring Hot Plate model PC-420 (EMS #72350-) is replaced by our new Digital Stirring Hot Plate, model PC-420D, and model PC-620 (EMS #72349-) is replaced by our new Digital Stirring Hot Plate, model PC-620D.

Corning® has now added innovative microprocessor technology into their units with digital display which optimally controls the heating and stirring to the 5" x 7" (12.7 x 17.8cm) and 10" x 10" (25.4 x 25.4cm) Pyroceram glass-ceramic stirring hot plates.

Performance Features:

- Closed-loop heating and stirring controls that monitor and regulate both temperature and stirring speed.
- Microprocessor maintains consistent and repeatable temperature setting from 5°C (if ambient temperature is 0°C or lower) up to 550°C.
- Digital LED temperature display is adjustable in 5°C increments and blinks until temperature is reached.
- Optional external temperature controller truly controls temperature inside the vessel and eliminates the need to closely monitor liquid temperature.
- Exclusive closed-loop stirring control monitors and regulates the stirring speed from 60 -1150 RPM for aqueous, viscous, or semi-solids solutions.
- Digital LED speed display gives you better control of your stirring process.
- Stronger, larger magnet improves stir bar coupling combined with automatic up speed adjustment minimizes decoupling.

Safety Features:

- Bright LED HOT TOP icon lights up when top plate is over 60°C, even when heat control is turned off.
- Separate temperature sensor provides power cutoff if unit overheats.
- Optional temperature controller will shut off unit when is not in liquid.
- Two piece casting design deflects spills away from electronic and includes a built in mount for an optional 18" (45.7cm) support rod.
- UL and cUL approved.



Ordering:

Model	EMS #	Power	Top Size	Stir Range RPM	Temp. Range, °C	Weight Lb/Kg	Dimensions LxWxH, in. (cm)	
PC-420D	72350	120V/60Hz/ 698W/5.9A	5" x 7"	60-1150	5 - 550	7.0/3.2	10.9" x 7.8" x 4.4" 27.7x19.8x11.2cm	each
PC-420D	72350-20	230V/50Hz/ 698W/3.1A	5" x 7"	60-1150	5 - 550	7.0/3.2	10.9" x 7.8" x 4.4" 27.7x19.8x11.2cm	each
PC-620D	72349-10	120V/60Hz/ 1113W/9.3A	10" x 10"	60-1150	5 - 550	11.5/5.2	15.8 x 10.6 x 4.8" 40.1x26.9x12.2cm	each
PC-620D	72349-20	230V/60Hz/ 1113W/4.9A	10" x 10"	60-1150	5 - 550	11.5/5.2	15.8 x 10.6 x 4.8" 40.1x26.9x12.2cm	each

► External Temperature Controller for Digital Hot Plates

This temperature controller (model 6795PR) is designed to take the guesswork out of controlling liquid temperatures on the digital display PC-400D and PC-600D hot plates and PC-420D and PC-620D stirring hot plates.

- Controls the temperature of liquids up to 200°C in vessels on top of the Pyroceram heated top
- Increases accuracy and repeatability by controlling liquid temperature not top plate temperature
- When in use, the controller icon on the display will be lit and the temperature control on the unit can set from 5 – 200°C.
- CAUTION: A 200°C setting when using 6795PR does not mean that the top plate is at 200°C. Top plate temperature could be as high as 550°C

► Temperature Probe Support Clamp

This is a 3/16" (1.1cm) diameter by 6" (16.5cm) support clamp for clamp for

model 6795PR and 400188(EMS 72351-21) temperature probes. Support has two openings, 3/8" (9mm) and 0.15" (3.75mm), for holding probes. It is designed to be used with a boss heat clamp (Corning® #440140) or standard right angle clamp.

► Stainless Steel Support Rod

This is a stainless steel, two piece, 18" (45.7cm) support rod with a 5/16" (0.8cm) diameter that consists of two 9" rods that screw together. It screws into the base of Corning® hot plate and stirrer models PC-400/410/420, PC-400D/410D/420D/and PC-600D/610D/620D

► Accessory Kit

This kit is designed for all Corning digital display hot plates and stirring hot plates (Models PC-400D, PC-420D, PC600D, PC-620D). It is voltage independent and includes a Temperature Controller (6795PR), a two piece, 5/16" (0.8cm) diameter, 18" (45.7cm) long support rod, and magnetic stir bar retriever.

Ordering:

EMS #	Description	Use with Models	
72351-22	Temperature Controller for digital display hot plates & stirring hot plates	PC-400D, PC-420D, PC-600D, PC-620D	each
72351-30	Probe Support Clamp for #72351-21 & #72351-22	All Corning® Hot Plates and Stirring Hot Plates that have temperature probes.	each
72351-25	Two 9" support rods that screw together	PC-400/410/420, PC-400D-410D/420D, PC-600D/610D/620D	each
72351-50	Universal Accessory Kit	PC-400D, PC-420D, PC-600D, PC-620D	each

➤ SUPER-NUOVA™ Digital Hot Plates

Top of the Line Features:

- Warning system deters accidental contact with hot surface
- Remote probe allow for accurate reading of solution temperature to 0.1°C for temperature below 100°C
- User-adjustable over-temperature protection prevents runaway temperature conditions
- 24 months warranty

PRODUCT DESCRIPTION & OPERATION

- Rugged low profile cast aluminum body provides stability and durability
- Unit designed provides protection of internal components in case of spillage
- Available in 7 x 7" and 10 x 10" sizes
- Accommodates sample weights up to 35 lbs (19.5kg) on the 10 x 10" models, 25 lbs (11.3kg) on 7 x 7" models
- Integral ring stand holder accommodates 0.5" (1.3cm) diameter support rod
- Unique, single knob design controls heating. Set points go up slowly when the knob is rotated slowly, faster as the knob is rotated faster. The knob then is locked out to avoid accidental changes
- RS232 port enables you to output time count, temperature set points, top surface/remote probe temperature, to a printer or computer
- All models supplied with 6" type K probe, detachable cord and retention bracket that prevents cord from accidentally removed.
- Easy-to-read digital displays indicate temperature settings adjustable in 1°C increments
- Designed to provide superior control of temperatures below 100°C
- Ideal for cold room application. Can be used in a 0 to 27°C, 80% relative humidity, non-condensation environment



- User programmable preset buttons allow for up to four often-used temperatures to be recalled at the touch of a single button. Ideal for lab that perform repetitive procedures
- Hot surface alert systems protect from accidental burns.
- Walk away timer shuts off heating after a preset user-defined interval
- Independently adjustable over temperature protection circuit limits top plate temperature and prevent run away conditions.
- Calibration mode allows remote probe to be calibrated to external standard and at any temperature the user selects.

Ordering Information

Choose from Ceramic or Aluminum Top

- Rugged aluminum surface provides uniform heat distribution and added durability to sustain point impacts that might break ceramic or glass surface.
- Seamless reflective white ceramic top enhances sample visibility and provides an easy-to-clean and alkali/acid resistant surface.

Cat #	Model #	Description	Electrical (50/60HZ)			Operating Temp Range		Shipping Weight	Qty
			Volts	Amps	Watts	°C	°F		
7.25"x7.25" (18.4x18.4cm) Heating Surface: Overall Dimension 8.2"W (20.8cm) x 13"D (33cm) x 3.8"H (9.7cm)									
72342-12	HP131725Q ¹	Ceramic Top	120	5.5	660	1-370	34-698	9.2 (4.2)	each
72342-20	HP131720-33Q ^{1,2}	Ceramic Top	220-240	2.9	690	1-370	34-698	9.2 (4.2)	each
72342-50	HP133424Q ¹	Aluminum Top	100	6.7	665	1-300	34-572	9.8 (4.4)	each
72342-52	HP133425Q ¹	Aluminum Top	120	5.5	660	1-300	34-572	9.8 (4.4)	each
72342-60	HP133420-33Q ^{1,2}	Aluminum Top	220-240	2.9	690	1-300	34-572	9.8 (4.4)	each
10.5"x10.5" (26.7x26.7cm) Heating Surface: Overall Dimension 11.3"W (28.7cm) x 16.25"D (41.2cm) x 4"H (10.1cm)									
72345-12	HP133735Q ¹	Ceramic Top	120	10.0	1200	1-370	34-698	15.2 (6.9)	each
72345-20	HP133730-33Q ^{1,2}	Ceramic Top	220-240	5.6	1345	1-370	34-698	15.2 (6.9)	each

¹ CSA, ² CE

► Great Low-End Nuova™ Hot Plate

- Corrosion resistant heating Surface
- Low profile
- 24 month warranty

Product Description and Operation

- Die cast aluminum case – durability and long lasting
- Porcelain coated stainless steel top – corrosion resistant
- Topside drip edge – protects internal components in case of spillage
- Integral ring stand holder – accommodates 0.5" (13mm) support rod
- Accommodates up to 20 lb (9.1 kg) loads
- Recommended for use with glass vessels only
- All unit included PTFE coated stir bar
- Demand-Type thermostatic temperature control – excellent temperature stability $\pm 5.0^{\circ}\text{C}$ (9°F) @ 371°C (700°F)
- Embedded heating elements – uniformity transfer heat to the top plate
- Low temperature control: 38°C (100°F) – perfect choice for warming applications
- All units operating temperature range is $38 - 371^{\circ}\text{C}$ ($100 - 700^{\circ}\text{F}$)
- Heating Surface $7.0'' \times 7.0''$ ($17.7 \times 17.7\text{cm}$)
- Overall dimensions $11.8''\text{W} \times 4.5''\text{H} \times 8.6''\text{D}$ ($29.9 \times 11.43 \times 21.8\text{cm}$). Shipping weight 10 lb (4.5kg)

Applications

- General reagent heating
- Evaporation – Sample drying
- Heating TLC plates
- Digestions



SPECIFICATION AND ORDERING

Cat #	Model #	Electrical			Qty
		Volts	Amps	Watts	
72358-10	HP18325Q ^{1,2}	120	7	840	each
72358-20	HP18320Q ^{1,2}	220-240	3.5	840	each
72358-22*	HP18320-26Q*	220-240	3.5	840	each

¹ UL, ² CUL * model supplied with European cord set

► SUPER-NUOVA™ Digital Stirrers

Top of the Line Features:

- Stir Trac™ stirring offers improved coupling stirring and stronger magnetic control
- User programmable preset buttons provides quick program recall
- 24 months warranty

PRODUCT DESCRIPTION & OPERATION

- Seamless reflective white ceramic top enhances sample visibility and provides an easy-to-clean and alkali/acid resistant surface
- Rugged low-profile cast aluminum body provides stability and durability.
- Unit designed provides protection of internal components in case of spillage
- Accommodate sample weights to 35 lbs (19.5kg) on the 10 x 10" models, 25 lbs (11.3kg) on 7 x 7" models
- Integral ring stand holder accommodates 0.5" (1.3cm) diameter support rod
- Set points go up slowly when the knob is rotated slowly, faster as the knob is rotated faster. The knob then is locked out to avoid accidental changes
- RS232 port enables you to output time count, stirring set points, and actual speed to a printer or computer

- All models supplied with 2" x 3/8" dia TFE-coated stir bar, detachable cord and retention bracket that prevents cord from accidentally removed.

- Easy-to-read digital displays indicate rpm for stirring models, adjustable in 1 rpm increments

- Ideal for cold room application. Can be used in a 0 to 27°C, 80% relative humidity, non-condensation environment

- User programmable preset buttons allow for up to four often-used stirring speeds to be recalled at the touch of a single button. Ideal for lab that perform repetitive procedures

- Unique Stir Trac™ technology offers improved slow speed stirring, consisting speed control and stronger magnetic coupling from 50 rpm up to 1200 rpm

- Walk away timer shuts off stirring after a preset user-defined interval



ORDERING INFORMATION

Cat #	Model #	Description	Electrical (50/60 Hz)			Stir Range RPM	Shipping Weight
			Volts	Amps	Watts		
7.25" x 7.25" (18.4 x 18.4cm) Heating Surface: Overall Dimensions 8.2"W (20.8cm) x 13"D 933cm) x 3.8"H (9.7cm)							
72343-10	S133324Q ¹	Ceramic Top Stirrer	100	0.42	25	50 to 1200	12 (5.4)
72343-12	S133325Q ¹	Ceramic Top Stirrer	120	0.41	25	50 to 1200	12 (5.4)
72343-20	S133320-33Q ¹	Ceramic Top Stirrer	220-240	0.18	25	50 to 1200	12 (5.4)
10.5" x 10.5" (26.7x26.7cm) Heating Surface: Overall Dimensions 11.3" (28.7cm) x 16.25"(41.2cm) x 4"(10.1cm)							
72346-12	S133935Q ¹	Ceramic Top Stirrer	120	0.41	25	50 to 1200	17 (7.7)
72346-20	S133930-33Q ¹	Ceramic Top Stirrer	220-240	0.18	25	50 to 1200	17 (7.7)

¹ CSA, -33 models for CE marked

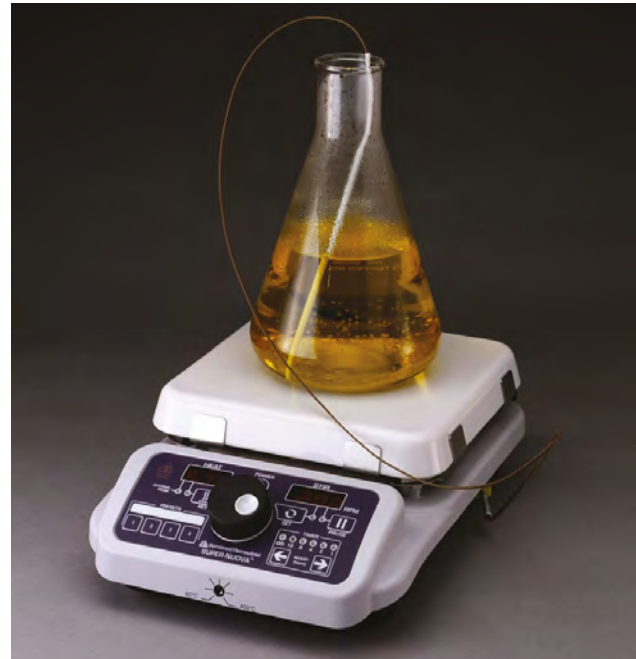
► SUPER-NUOVA™ Digital Top Stirring Hot Plates

Top of the Line Features

- Warning system deters accidental contact with hot surface
- Remote probe allow for accurate reading of solution temperature to 0.1°C for temperature below 100°C
- User-adjustable over-temperature protection prevents runaway temperature conditions
- 24 months warranty.

Product Description & Operation

- Stir Trac™ technology offers improved slow speed stirring, consistent speed control and stronger magnetic coupling from 50 rpm to 1200 rpm
- Ideal for cold room applications. Can be used in a 0 to 27°C, 80% relative humidity, non-condensing environment
- Accommodates sample weight up to 35 lb (15.9 kg) on the 10x10" models, 25 lb (11.5kg) on the 7x7" models.
- Integral ring stand holder accommodates 0.5" (1.3cm) diameter support rod
- Unique, single knob design controls both heating and stirring. Set points go up slowly when the knob is rotated slowly, faster as the knob is rotated faster. The knob then is locked out to avoid accidental changes.
- RS232 port enables you to output time count, temperature set points, top surface/remote probe temperature, stirring set point and actual speed to a printer or computer
- All models supplied with 6" type K probe, detachable cord and retention bracket that prevents cord from accidentally removed, and include 2" x 3/8" dia TFE-coated stir bar.
- Separate easy-to-read digital displays indicate temp settings for heating and rpm for stirring. Adjustable 1°C and 1 rpm increments
- Microprocessor controlled feedback technology offers user programmable preset buttons allow for up to four often-used temperatures and/or stirring speed to be recalled at the touch of a single button, with consistent and repeatable
- Hot surface alert safety systems protect from accidental burns
- Walk-away timer shuts off heating, stirring or both after a preset user-defined interval.
- Independently adjustable over temperature protection circuit limits top plate temperature and prevent run away conditions.
- Calibration mode allows remote probe to be calibrated to external standard and at any temperature the user selects.



Ordering Information

Choose from Ceramic or Aluminum Top

- Rugged aluminum surface provides uniform heat distribution and added durability to sustain point impacts that might break ceramic or glass surface.
- Seamless reflective white ceramic top enhances sample visibility and provides an easy-to-clean and alkali/acid resistant surface.

Please choose aluminum or ceramic top when ordering.

Cat. #	Model #	Item	Weight
72344-12	SP131825Q ¹	Digital Hot Plate	12 (5.4)
72344-20	SP131820-33Q ^{1,2}	Digital Hot Plate	12 (5.4)
72344-52	SP133525Q ¹	Digital Hot Plate	9.8 (4.4)
72344-60	SP133520-33Q ^{1,2}	Digital Hot Plate	9.8 (4.4)
72347-12	SP133835Q ¹	Digital Hot Plate	17(7.7)
72347-20	SP13380-33Q ^{1,2}	Digital Hot Plate	17(7.7)

Accessories

72352-01	TC732X1	Remote Probe, 6" (15.2cm), 316 Stainless Steel, Maximum Temperature 1100°C
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¹CSA, ²CE

Specifications

Cat. #	Volts	Amps	Watts	Stirring RPM	Heating Surface:	Overall Dimensions:
72344-12	120	5.6	670	50 to 1200	7.25" x 7.25" (18.4 x 18.4cm)	8.2"W x 13" D x 3.8"H (20.8 x 33 x 9.7cm)
72344-20	220-240	3.0	710	50 to 1200	7.25" x 7.25" (18.4 x 18.4cm)	8.2"W x 13" D x 3.8"H (20.8 x 33 x 9.7cm)
72344-52	120	5.6	670	50 to 1200	7.25" x 7.25" (18.4 x 18.4cm)	8.2"W x 13" D x 3.8"H (20.8 x 33 x 9.7cm)
72344-60	220-240	3.0	710	50 to 1200	7.25" x 7.25" (18.4 x 18.4cm)	8.2"W x 13" D x 3.8"H (20.8 x 33 x 9.7cm)
72347-12	120	10.1	1210	50 to 1200	10.5" x 10.5" (26.7 x 26.7cm)	11.3"W x 16.25"D x 4.0"H (28.7 x 41.2 x 10.1 cm)
72347-20	220-240	5.7	1365	50 to 1200	10.5" x 10.5" (26.7 x 26.7cm)	11.3"W x 16.25"D x 4.0"H (28.7 x 41.2 x 10.1 cm)

► SUPER-NUOVA™ Digital Multi Position

Multi-Position Stirrer and Stirring Hot Plates

Top of the Line Features

- Four in One Performance – all of the features of the Super-Nuova with 4-position stirring ability
- Precision Control – 1 rpm stir control and 1°C temperature control
- Smart Performance – Walk away timer, RS232 output and user calibration function
- Simple operation – A single knob controls both heating and stirring
- Built-in Safety Features – Hot top warning system and user defined over temperature protection
- 24 Month Warranty

PRODUCT DESCRIPTION & OPERATION

- Suoer-Nuova Multi Position stirring hot plates combine the features of the Super Nuova with four individually controlled string positions; making it the only one of its kind on the market
- Stir Trac™ breaking feature brings stir bar to an immediate stop for quick flask removal and prevents 'runaway' or decoupled stir bars.
- Operation is simple, with a single knob controlling both heating and stirring
- Store up to three programs and recall at the touch of a button using the preset buttons.
- Dual LED's display both temperature and stir speed simultaneously
- Adjust temperature in increments of 1° up to 370°C (698°F); 0.1°C for temperatures below 100°C with remote temperature probe.

- Stirring adjustable in unit of 1 rpm
- 'Hot Top' warning system alerts users when the hotplate is over 50°C even if the power is off.
- Walk away timer shut off heating, stirring, or both after 1, 2, 4, 8 or 12 hours

ORDERING INFORMATION

Units are offer with seamless, easy-to-clean white ceramic top enhances sample visibility



Cat. #	Model #	Electrical (50/60Hz)			Stir Range RPM	Operating Temperature		Number Stirring	Shipping Weight Lb. (Kg)
		Volts	Amps	Watts		°C	°F		
<i>Size 10.25" x 10.25" (26 x 26 cm) Heating Surface: Overall Dimensions 11.3"W x 16.2"D x 4.0"H (28.7 x 41.1 x 10.1 cm)</i>									
72356-10	Stirring/Hot Plate	120	11.8	1400	1 – 370	34 – 698	50 – 1200	4	19 (8.6)
72356-20	Stirring/Hot Plate	220-240	6.1	1450	1 – 370	34 – 698	50 – 1200	4	17 (7.7)
72357-10	Stirrer only	120	6.1	110	NA	NA	50 – 1200	4	19 (8.6)
72357-20	Stirrer only	220-240	1	100	NA	NA	50 – 1200	4	20 (9.2)

► Explosion Proof Hot Plate Stirrers – Model SF87325

Explosion proof Hot plate Stirrers meets these requirements:

- UL Listed for Class I, Group C, and D hazardous atmospheres
- Safe in hazardous situations where Class I, Group C and D flammable gases or solvent vapors can produce explosive or ignitable mixtures.
- UL listed explosion proof; meet IEC1010 laboratory standard.
- Thermostatic control
- Over-temperature safety control



PRODUCT HIGHLIGHTS

- Stir solutions with a viscosity of 1200 cps @400 rpm @21.5°C
- Large, aluminum top plate surface 9.1" x 9.1" (23.2 cm x 23.2 cm) provides efficient heat transfer and excellent temperature uniformity. (Uniformity of top plate @ 70°C (158°F) is ±2°C (±4°F))
- Electronic temperature control. Temperature range from 38°C to 220C (100°F to 428°F)
- Precise electronic heat control maintains temperature stability within ±2°C (±4°F)
- Automatic over temperature safety switch cuts power to unit if top plate temperature exceed 280°C
- Sturdy construction allows maximum load capacity on top of the plate (25 lb or 11.3 kg)

- Stainless steel case is easily cleaned and maintained
- Designed for sparkless, hardwired connection. Unit has 45.7 cm lead wire and conduit attachment
- Optional dial thermometer, with 0°C to 300°C range, fits directly into top plate and measures surface temperature
- Meets all CE, UL and CUL

APPLICATION

- Heat and stir flammable chemicals or solvents (Class I, group C & D)
- Heat-treat and uniformly mix coatings
- Silicon wafer etching
- Quality control – test viscosity of oil and water/organic content analysis

SPECIFICATIONS AND ORDERING

Cat. #	Heating Surface		Overall Dimensions			Electrical (50/60 Hz)			Temperature Range		Stirring Speed RPM	Weight Lb (kg)					
	W	D	W	H	D	Volt	Amps	Watts	°C	°F							
72341-10	9.1"	23.2cm	9.1"	23.2cm	10"	25.4cm	8.1"	20.8cm	12.8"	32.4cm	120	8.9	1070	38 - 220	100 - 428	60 - 1200	37 (16.8)

ACCESSORIES

72341-50 Dial Thermometer

➤ Analog and Digital Modular Blocks – Dri-Baths

Choose from Analog and Digital!

- Compact design saves bench space.
- Powder-coated steel body construction ensures durability.
- Digital units utilize a PID microprocessor controller with digital temperature set and easy-to-read LED display for accurate and reproducible temperature control.

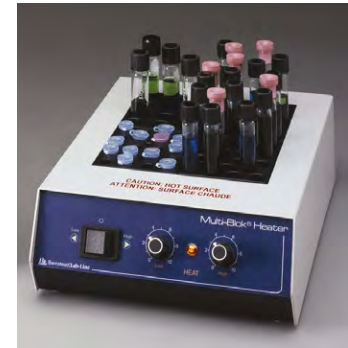
ANALOG UNITS

- Temperature control at 37°C: ±3.0°C
- Temperature uniformity at 37°C: ±0.5°C
- Dual temperature control for precise control over the two ranges: from slightly above ambient to 60°C and from 50°C to 130°C
- Read thermometer and adjust knob controller to your desired point.

- Analog units feature a bimetallic dual thermostat control as an economical alternative.
- Dri-baths hold one to six interchangeable modular blocks to accommodate a variety of vessels. Modular block sold separately.
- Temperature range: Ambient +5°C to 130°C.

DIGITAL UNITS

- Temperature control at 37°C: ±0.1 to 0.2°C
- Temperature uniformity at 37°C: ±0.1 to 0.4°C
- Set point is easily adjusted by using up and down arrow keys located on the front of the unit
- Modular block mounts on a single temperature probe in the bottom of the dri-bath providing better temperature accuracy and control.



PRODUCT SPECIFICATIONS AND ORDERING

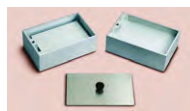
Cat. #	Model #	Description	Electrical (50/60 Hz)			Overall Dimensions, inches (cm)			Shipping Weight, lb (kg)
			Volts	Amps	Watts	W	H	D	
Microprocessor Controlled Dri-Baths - Digital									
63126-10	2000Q ¹	Single Block	120	0.83	100	8.7 (22.1)	3.6 (9)	11.2 (28.4)	5 (2)
63126-20	2001Q ^{2,3}	Double Block	120	1.25	150	8.7 (22.1)	3.6 (9)	14.2 (36)	6 (3)
63126-30	2002Q ¹	Triple Block	120	1.67	200	10.8 (27.4)	3.6 (9)	12.0 (30.4)	8 (4)
63126-40	2003Q ¹	Four Block	120	2.5	300	10.8 (27.4)	3.6 (9)	14.1 (35.5)	8 (4)
63126-60	2004Q ¹	Six Block	120	3.33	400	10.8 (27.4)	3.6 (9)	17.0 (43.0)	10 (5)
Bimetallic Controlled Dri-Baths - Analog									
63127-10	2050Q ²	Single Block	120	0.83	100	6.2 (16)	3.4 (9)	7.6 (19)	5 (2)
63127-20	2052Q ²	Double Block	120	1.25	150	8.4 (21)	3.4 (9)	8.6 (22)	6 (3)
63127-30	2053Q ²	Triple Block	120	1.67	200	11.25 (29)	3.4 (9)	9.1 (23)	8 (4)
63127-40	2054Q ²	Four Block	120	2.50	300	8.3 (21)	3.4 (9)	12.4 (31)	8 (4)
63127-60	2056Q ²	Six Block	120	3.33	400	11.25(29)	3.4 (9)	12.9 (33)	10 (5)

¹CSA, ²UL, ³CUL, ⁴CE - All Models include heavy duty 3-wire line cord and block puller.

➤ Modular Block Accessories

Close contact of tubes to block walls, provides excellent heat transfer.

- Block includes thermometer well for monitoring block temperatures.
- Solid black anodized aluminum blocks for better heat retention.
- Block Puller included with all models.
- For use with all our brand modular dri-baths.
- Single block size: 3.75" W x 2" H x 2.9" D (9.5 x 5.1 x 7.4 cm).



Cat. #	Model #	Description	Opening Diameter		Number of Wells
			Inches (cm)		
63129-01	2070Q	Modular Block, 6 mm Dia Test Tubes	0.31 (.79)		30
63129-02	2071Q	Modular Block, 10 mm Dia Test Tubes	0.4 (1.02)		24
63129-03	2072Q	Modular Block, 12 – 13 mm Dia Test Tubes	0.53 (1.35)		22
63129-04	2073Q	Modular Block, 15 – 16 mm Dia Test Tubse	0.68 (1.73)		12
63129-05	2081Q	Modular Block, 17 – 18 mm Dia Test Tubes	0.75 (1.9)		12
63129-06	2074Q	Modular Block, 20 mm Test Tubes	0.81 (2.06)		8
63129-07	2075Q	Modular Block, 25 mm Test Tubes	1.03 (2.62)		6
63129-10	2076Q	Modular Block, Combination: three, 25mm; five, 12-13mm; 6, 6mm	—14		
63130-01	2066Q	Modular Block, Cuvette 12.5 mm square	—12		
63131-02	2059Q	Modular Block, Microcentrifuge Tube, Size 0.2 ml	0.24 (0.61) taper		79
63131-05	2068Q	Modular Block, Microcentrifuge Tube, Size 0.5 ml	0.29 (0.74) taper		30
63131-15	2069Q	Modular Block, Microcentrifuge Tube, Size 1.5 ml	0.44 (1.04) taper		20
63132-10	2078Q	Solid Aluminum Block to be machine by user	—		
63132-50	2083Q	Modular Block, PCR Block, size of two blocks	—		
63133-01	2064Q	Modular Block, Titer Plate, direct contact, size of two blocks	—		
63133-02	2065Q	Modular Block, Titer Plate, size of two blocks	—1		

Modular Blocks for Dri-Bath

■ Anodized coating resists the harshest environments

■ Versatile

Solid anodized aluminum blocks provide maximum heat retention. All blocks include thermometer well for easily measuring block temperature.

Fit all our Modular Block Dri-Baths. All blocks are same sizes. Blocks measure: 3" (7.6cm) W x 2" (5cm) H x 4" (10.1cm) D.



Cat. #	Model #	Tube Size (mm)	Number of Wells	Max Tube Size (mm)	Well Volume ml	Well Depth ml
63124-01	BK165X3AQ	6	30	6.5	.62	48
63124-03	BK165X4AQA	10	20	10.75	2.4	48
63124-05	BK165X12AQ	12	20	12.75	4.1	48
63124-07	BK156X5AQ	13	20	13.75	4.5	48
63124-09	BK156X6AQ	15	12	15.75	6.3	48
63124-11	BK165X7AQ	16	12	16.75	7.4	48
63124-15	GK165X13AQ	18	12	18.75	9.8	48
63124-17	GK165X8AQ	20	12	20.75	12.2	48
63124-19	GK165X9AQ	25	6	25.75	19.9	48
63124-24	BK165X17AQ	1.5	20	—	—	48
63124-26	BK165X20AQ	.5	30	—	—	48
63124-30	BK165X2AQ	—	—	—	—	48
63124-32	BK165X21AQ	1 Cuvette Block	12	—	—	48
63124-34	ME384X1	—	—	—	—	48

Digital Dry Bath

Thermally control samples during use.

■ Versatile - Utilizes all CoolSafe system chambers

■ Stable Operation - Temperatures can be controlled from 5° above ambient to 100°C in 1° increments.

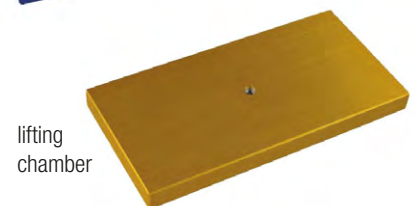
■ Uniform Heat Transfer - Aluminum block evenly transfer heat to tubes.

■ Easy Removal - each unit comes with a block lifter to safely remove hot chambers.

■ Small Footprint - 7.625"W x 6.375"D x 4.125"

Note: To use microplates with the 61951-10, 61951-50, and 61951-80, you will need a lifting chamber. This chamber is included with the 67119-20, -30, -40.

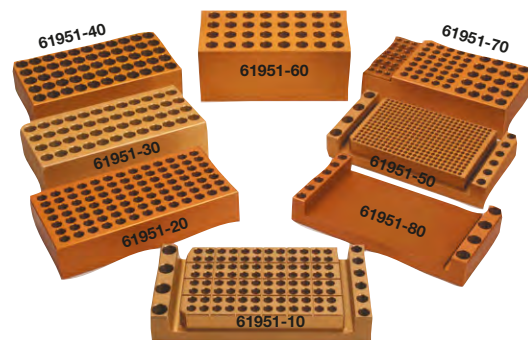
Cat. #	Desc.	Qty.
67119-10	Digital Dry Bath	each
67119-20	Digital Dry Bath w/CHAM-1000 and lifter	each
67119-30	Digital Dry Bath w/CHAM-3840 and lifter	each
67119-40	Digital Dry Bath w/CHAM-9600 and lifter	each



► CoolSafe Cooling Chambers

Each Cooling Chamber is a solid aluminum block that surrounds inserted tubes to guarantee sustained hot or cold temperatures.

Cat. #	Dimensions	Ideal Use
61951-10	6 7/8"(L) x 3 1/8"(W) x 1"(H)	0.2ml tubes
61951-20	6 7/8"(L) x 3 1/8"(W) x 1 1/4"(H)	0.5ml tubes
61951-30	6 7/8"(L) x 3 1/8"(W) x 1 1/2"(H)	1.5ml tubes
61951-40	6 7/8"(L) x 3 1/8"(W) x 1 1/2"(H)	1.5ml Cryogenic tubes
61951-50	6 7/8"(L) x 3 1/8"(W) x 1"(H)	384-well microplates
61951-60	6 7/8"(L) x 3 1/8"(W) x 2 1/2"(H)	5ml tubes
61951-70	6 7/8"(L) x 3 1/8"(W) x 1 1/2"(H)	multi-tube format
61951-80	6 7/8"(L) x 3 1/8"(W) x 1"(H)	Microplate Chamber



➤ **Metric Polygon Assortment Box**

Polygon stirring bars: PTFE. It consists of 2 each:

10mmx6mm, 15mmx6mm, 20mmx7mm, 25mmx8mm, 30mmx8mm, 40mmx8mm, 50mmx8mm, 60mmx8mm, 80mmx10mm.

64510-18 18 Polygon Spin Bar Assortment Box 18/bx



➤ **Color Coded Octagon Assortment Box**

24 color coded octagon magnetic stirring bars: PTFE with pivot ring. Consists of 1 each: Yellow, Red And Blue: 1/2"x1/8", 5/8"x5/16", 7/8"x5/16", 1/2"x5/16", 1"x5/16", 1 1/2"x5/16", 2"x5/16", 3"x1/2".

64510-24 24 Color Coded Spin Bar Assortment Box 24/bx

➤ **Egg-Shaped Assortment Box**

These egg-shaped magnetic stirring bars provide its own pivot point. Designed especially for use in round-bottom vessels.

13 Egg-shaped spin bars, PTFE. Consists 1 each: 3"x3/4", 2 each: 3/4"x3/8", 1"x1/2", 1 1/4"x5/8", 1 1/2"x5/8", 1 5/8"x3/4", 2"x3/4".

64510-13 13 Egg-Shaped Spin Bar Assortment Box 13/bx



➤ **SpinPlus™ Assortment Box**

Add speed and efficiency to your mixing. The "+" shape creates a deep vortex and provides stability to your mixing. 5 SpinPlus magnetic stirring bars, PTFE. Consists of 1 each: 5/8"x3/8", 3/4"x3/4", 1"x1", 1 1/4"x1 1/4", 1 1/2"x1 1/2".

64510-05 5 SpinPlus Spin Bar Assortment Box 5/bx



➤ **Stirring Rods**

Available in two versions: pure PTFE solid rod with tapered end and pure PTFE with bendable steel core. The version with steel core can be bent into a permanent shape. Rods are inert and will not scratch, use up to 280°C.



EMS #	Rod Length	Rod OD, mm	Qty
PTFE with Steel Core Rods			
66200-10	100 mm (4")	6	each
66200-15	150 mm (6")	6	each
66200-20	200 mm (8")	6	each
66200-25	250 mm (10")	6	each
66200-30	300 mm (12")	6	each
66200-35	350 mm (14")	6	each
66200-40	400 mm (16")	6	each
Solid PTFE Rods			
66201-10	100 mm (4")	8	each
66201-15	150 mm (6")	8	each
66201-20	200 mm (8")	8	each
66201-25	250 mm (10")	8	each
66201-30	300 mm (12")	8	each

➤ **Colored Micro Assortment Box**

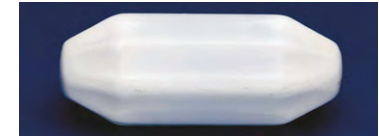
12 Micro Spin Bar magnetic stirring bars in assorted colors; PTFE. Consists of 1 each of every color and size: red, yellow and blue: 8mmx1.5mm, 5mmx2mm, 7mmx2mm, 10mmx3mm.



64510-12 12 Colored Micro Spin Bar Assortment Box 12/bx

➤ **KOMET™ Spinbar® - Stirring Bar**

Improved Efficiency



The PTFE Komet™ Spinbar® Magnetic Stirring Bar is made from a high-energetic magnetic material. That, combined with its octagonal shape, produce exceptional power although its length is only 50mm (1.969" with a 21mm (.827") diameter. The Samarium-Cobalt magnet is encapsulated in PTFE. Its eight edges generate strong turbulence so liquids are thoroughly mixed and its stability is not impaired in vessels with curved bottoms. In addition, the risk of demagnetization caused by external magnetic fields is completely eliminated. Komet™ transmits torque loads 2 to 3 times larger than those of conventional stirring bars of this length significantly improving efficiency.

64517-01 Komet™ Spinbar® each

➤ **Disposable Magnetic Stirring and Mixing Bars**

These bars are designed for single use applications where efficiency and cross contamination is a concern. These economical bars have a PTFE coating which is chemically inert for high purity contact. The magnet is an Alnico V. Packaged 100 pieces/bag.



Cat.#	Size	Pack
64521-01	25.4 x 8 mm (1 x 5/16")	100/pk.
64521-02	50.8 x 8 mm (2 x 5/16")	100/pk.
64521-12	12.7 x 3.2 mm (1/2" x 1/8")	100/pk.
64521-16	41.3 x 8 mm (1 5/8" x 5/16")	100/pk.



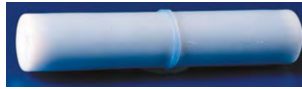
➤ **Micro Stirring Bars**

Coated with PTFE white resin. For stirring test tubes, micro-beakers, etc... Packed 12 bars per box.

Cat.#	Measures	Pack
64515-01	1/8x3/16 inches; 1.5x15mm	12/bx
64515-04	1/8x3/16 inches; 1.5x8mm	12/bx
64515-06	3/8x1/4 inches; 2x7mm	12/bx
64515-08	1/2x3/8 inches; 3x10mm	12/bx
64515-12	3/8x1/2 inches; 3x12.7mm	12/bx

► Magnetic Stirring Bars

► Octagon Assortment Box with Micro Spinbars®



Box contains 16 assorted bars; It consists of 12 octagon magnetic stirring bars, PTFE with pivot ring and 4 fleas. 2 each: 7mmx2mm, 10mmx3mm, 1/2"x3/8", 5/8"x3/8", 1"x3/8", 1 1/2"x3/8", 2"x3/8", 2 1/2"x3/8"

64510-16 16 Spin Bar Assortment Box 16/bx

► Round Assortment Box



22 round magnetic stirring bars.

PTFE with removable pivot ring on 1" long and over. The box consists of 2 each: 1/2"x3/8", 1"x3/8", 2"x3/8", 1/2"x5/16", 3/4"x5/16", 1"x3/8", 1 1/2"x5/16", 1 3/4"x5/16", 2"x5/16" and 1 each: 1 1/4"x5/16", 1 1/4"x3/8", 1 1/2"x3/8", 1 3/4"x3/8".

64510-22 22 Spin Bar Assortment, Round 22/bx

► Stirring Bar Retrievers

Polypropylene Stirring Bar Retrievers: are ideal for use with all stirring bars. The entire retriever is totally encased in chemically resistant polypropylene. Handy ring allows for hanging when not in use.

PTFE Stirring Bars Retrievers: a permanent powerful magnet which is encapsulated in PTFE and it is supplied with a flexible PTFE rod.



Cat#	Description	Pack
64208-12	Polypropylene Retriever, 12" (304mm) long	each
64208-18	Polypropylene Retriever, 18" (456mm) long	each
64208-13	PTFE Retriever, 13" (330mm) long	each

► Mini-Mixer

Perfect for mixing in test tubes, micro centrifuge tubes and other containers which are too narrow for conventional mixers. The stirring rod will also flare out for use in larger spaces. It comes with a clear vinyl carrying case, 4 1/2"x1/4" stirring rod, and two "AA" batteries. Dimensions (including rod): 8"x1 1/2"x1". Weight: 3 oz.

71849-10	Mini-Mixer	each
71849-11	Mini-Mixer Stirring Rods	10/pk



Micropunch See Specimen Prep. page 305-307 <<<<

► Microwave Stirrer

Heat and Magnetically Stir Simultaneously Inside a Microwave Oven



- Simultaneous heating and stirring – for more consistent mixing and dissolving.
- Speedy processing of frozen materials – for greater efficiency.
- Purification of chemical compounds—by preparing super-saturated solutions for re-crystallization.

The Microwave Stirrer magnetically stirs inside a microwave oven by using the oven's turntable drive spindle as the power source. Many two step-processes can now be combined for increased efficiency and productivity. Use this Microwave Stirrer with virtually any microwave oven containing a rotary turntable.

Overall measurements: 10 1/2" x 10 1/2" x 2 1/2" (276 mm x 257 mm x 67 mm)

Cat.#	Description	Pack
72081-01	Microwave Stirrer	each

► Tissue Rotator

This variable speed rotator provides a slow rotation which helps in the agitation of biological specimens during tissue preparation. It is very useful during procedures such as fixation, dehydration and infiltration, etc. The rotational head comes complete with adjustable tilt. The standard rotation disc (Cat. No. 71780-50) provided with the unit carries:

- Twelve 30mm OD vials in its outer ring
- Ten disposable cups, fit in the inner ring,

Measurement (with disc in place): 11 1/2" (30cm) width, 9" (23cm) height. Disc diameter is 10" (25.4cm).

71780-10	Tissue Rotator, 110V, 0-6RPM	each
71780-20	Tissue Rotator, 220V, 0-6RPM	each



► Tissue Rotator Disc

In addition to the disc (Cat. #71780-50) that comes with the Tissue Rotator above, we offer another disc with 24 outer holes for 13mm diameter test tubes, and 10 inner holes for 28.6mm diameter cups.

71780-52	Test Tube and Cup Disc	each
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► **Mini Rotator**

The mini-rotator is a small, compact, rotator which is ideal for use on a lab bench; in a small incubator or refrigerator; in a biological cabinet; or in a fume hood or any other place where space is at a premium. It handles both large and small applications for micro centrifuge tubes and micro test tubes.



It is heavy duty and has a permanent-magnet motor which maintains constant speed with a variable speed control between 2-80rpm and its mixing action is able to be adjusted from a gentle slosh to a rapid agitation. For optimum mixing, the chemical resistant cabinet is fixed at a 20 degree angle. Unit comes complete with an aluminum disk head with spring clips to hold 15 each for both 5-10mm and 12-14mm tubes. An option of 30 position tissue culture tube head is available.

Specifications:

Speed:Variable speed control(2-80 rpm)
 Ambient Temp.Range:0°C to 40°C
 Size:7"Wx10"Dx11"H (18x25.5x28cm)
 Rating:180VA, 50/60Hz
 Electrical:Speed Control with ON/OFF Switch and protected-fuse, 6 ft, 3-wire cord.
 Finish:.....Foxtip gray and charcoal

65100-10	Mini-Rotator, 120V	each
65100-20	Mini-Rotator, 220V	each
65100-50	Tissue Culture Head with Clips	each

► **Spinbar® Circulas™ (Dumbbell-shaped)**



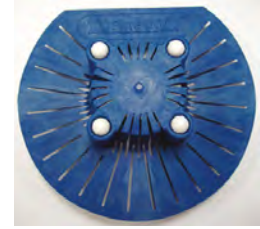
This magnet stirring bars provide strong turbulence at relatively low speeds, offer reduces surface contact and have excellent centering characteristics, particularly in vessels with convex bottoms. Ideal for all "problem" liquids, highly viscous mixtures, metals particles in fluid. All sizes have solid PTFE end disks 20 mm

(.79") in diameter, and bar diameter is 8 mm (.315")

EMS #	Description	Qty
64511-W	Circulus™ 32mm (1¼") long, White	each
64511-R	Circulus™ 32mm (1¼") long, Red	each
64511-Y	Circulus™ 32mm (1¼") long, Yellow	each
64511-B	Circulus™ 32mm (1¼") long, Blue	each
64512-W	Circulus® 52mm (2") long, White	each
64512-R	Circulus® 52mm (2") long, Red	each
64512-Y	Circulus® 52mm (2") long, Yellow	each
64512-B	Circulus® 52mm (2") long, Blue	each

► **Spinbar® Magnetic Sink Strainer**

Just drop in place – prevent Spinbar® from going down the sink



- Durable and flexible material
- Four strong magnets included: capture Magnetic Stirring Bars before they go down to the sink drain.
- Long slits: fluids drain easily and rapidly
- Wide skirt: can be used with a variety of sink drain
- Four legs located on the underside: anchors the strainer firmly in the sink drain.
- One size fits most laboratory sinks.

EMS #	Description	Qty
64525-B	Spinbar Magnetic Sink Strainer, Blue	each
64525-G	Spinbar Magnetic Sink Strainer, Green	each

► **SpinBar® Restrainer**

Hold on to SpinBar to the beaker while decant the content

- Conveniently capture magnetic stirring bars in containers, without contaminating solution being stirred.
- Eliminate hazard caused with stir bar splashes when decanting mixing vessels
- Made with easy-to-clean durable polystyrene



The Spinbar Restrainer fits in one hand and when placed alongside the outer wall of a mixing vessel, it readily attracts and holds stirring bar in place. As vessel is drained, the stirring bar is securely retrieved from vacant vessel. The Spinbar Restrainer is molded of easy to clean high impact polystyrene. It contains a powerful magnet that attracts and holds magnetic stirring bars up to 80mm (3") long.

EMS #	Description	Qty
64526	Spinbar® Restrainer	each

► **Wood Stirring Rods**

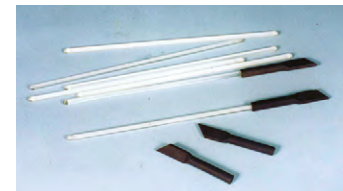
Smooth 8" long hardwood. One end flat for mashing, one end sharply pointed for pinpoint stirring.



Cat. #	Description	Qty
66205-10	Wood Stirring Rods	100/pk

► **Glass Stirring Rods & Policeman**

Useful tool for all laboratories needs to stir / mix substances. Glass rods are 5mm diameter, and come in three lengths. 12 rod / box.



Policeman is rubber cover to fit 5mm rods above. The sealed end is cut at an angle to help stir at the bottom of container. 12 policeman / box.

Cat. #	Description	Qty
66206-20	Glass Rods, 200 mm Long	12/pk
66206-25	Glass Rods, 250 mm Long	12/pk
66206-30	Glass Rods, 300 mm Long	12/pk
66207-12	Rubber Policeman	12/pk

► Vortex Genie™ 2 and Vortex Genie™ 2T

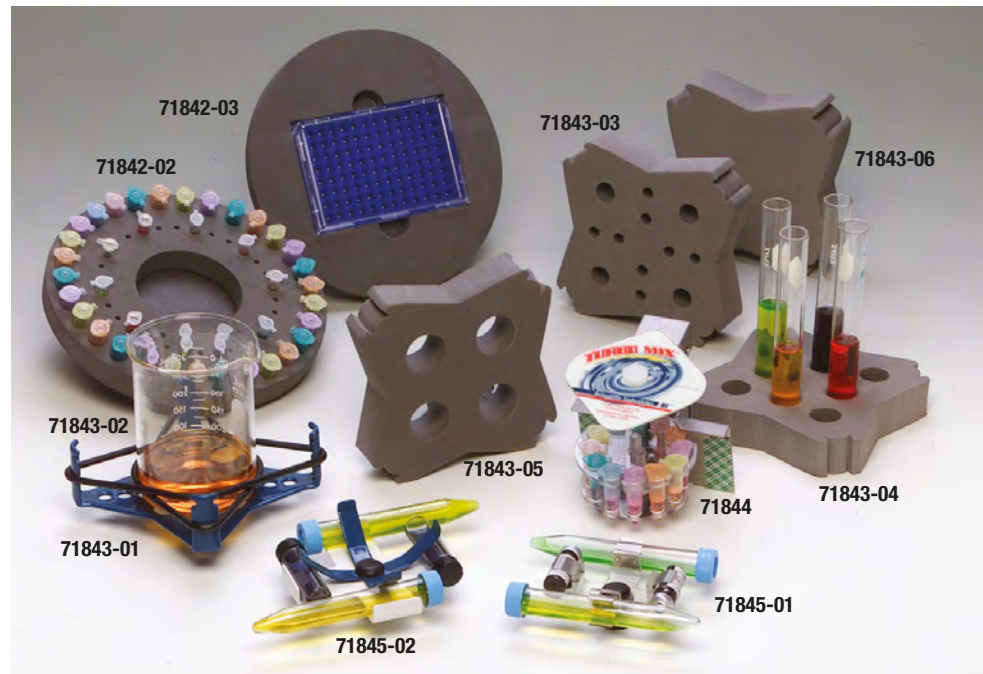
Versatile Vortex-Genie 2 mixes or shakes fluids in any type container with speed and precision Vortex-Genie has long been the standard for laboratory mixing. However, now with the development of numerous new mixing heads, the range of applications for the Vortex-Genie 2 has been greatly broadened so its use is limited only by your imagination. The Vortex Genie 2 is The Lab Standard that we have all come to know, and the Vortex Genie 2T is new with an Integral Timer.

FEATURES FOR 2 AND 2T:

- **Shaking or Vortexing Action.** Variable speed control allows slow speed shak action up to high speed vortexing. In addition, each attachment is designec produce different mixing actions, allowing you to choose the correct action your application.
- **Multi-Task Versatility.** A broad range of attachments of various shapes, sizes, and materials allows for the mixing of almost all common tubes or container for hands-free or touch operation.
- **Hand-Free or Touch.** A 3-position power switch lets you select continuous action or "Touch On" control. With the true "Hands-Free" operation of continuous action, lab operators can greatly increase lab efficiency.
- **Stable Platform.** Tough metal housing combined with "just enough weight", provides a stable platform for all types of mixing.
- **Unmatched Reliability.** Many years of proven performance in laboratories all over the world.

ADDITIONAL FEATURES FOR 2T

- **Timer Function.** Both Touch and Hands-Free mode automatically turns the unit off after set time. Touch Mode: 1-60 seconds. Hands-Free (Switch activated Start/Stop) Mode: 1-60 minutes, or continuous un-timed mode.
- **Convenient.** No need to watch the clock. Unit automatically stops at set time – in Touch Mode or Hands-Free (switch activated Start/Stop) Mode.
- **Reproducibility.** Vortexing time is constant, no matter the day or operator. Accuracy $\pm 5\%$. Repeatability $\pm 1\%$.



► Accessories For Vortex-Genie™ 2 & Vortex-Genie™ 2T

Snap on these attachments for new ways to use your Vortex-Genie!

Ordering:

Cat.#	Description	Pack	Cat.#	Description	Pack
71844	TurboMix Attachment (includes 1.5ml snap top tube holder)	each	71842-03	Replacement Micro-Well Plate Insert	each
71844-01	Optional 2.0ml Screw-Top Micro-centrifuge Tube Holder for TurboMix	each	71843	Large Sample Set (includes: Recessed Platform, Elastic Band, 9-16mm Tube Insert, 14-29mm Tube Insert, 29-37mm Tube Insert, Blank Insert)	each
71845-01	Small Ampoule/Tube Attachment	each	71843-01	Replacement Recessed Platform	each
71845-02	Large Ampoule/Tube Attachment	each	71843-02	Replacement Elastic Band	each
71845-03	Pop-Off Cup Head *	each	71843-03	Replacement 9 – 16mm Tubes Insert	each
71845-04	3" Platform with Rubber Cover*	each	71843-04	Replacement 14 – 29mm Tubes Insert	each
71842	Multi Sample Head Starter Set, (includes: 6" Platform, 60 Micro Tube Insert, Micro-Well Plate Insert)	each	71843-05	Replacement 29 – 37mm Tubes Insert	each
71842-01	Separate 6" Platform	each	71843-06	Replacement Blank Inserts (make your own custom shapes)	each
71842-02	Replacement 60 Micro Tube Insert	each			

* These items are included with Vortex-Genie 2 & Vortex-Genie 2T)

Ordering:

All units include a 3" Platform (shown) and Pop-Off Cup. Weight: 4kg (4.4lb), cast metal base with rubber feet. Base Dimensions: 165mm (6.5") L x 122mm (4.8") W x 165mm (6.5")

Cat. #	Description	Pack
71840	Vortex-Genie 2, 120V, 60Hz, 0.65Amp	each
71840-T	Vortex-Genie 2T, 120V, 60Hz, 0.65Amp	each
71841	Vortex-Genie 2, 230V, 50Hz, 0.5Amp	each
71841-T	Vortex-Genie 2T, 230V, 50Hz, 0.5Amp	each

► **Roto-Shake Genie® - 6-in-1**

Rotator/Rocker - The one that does it all!

- **Magnetic Platform & Clip Plates**
- **Suitable for Use in Cold Rooms & Incubators**
- **Change between Rocking & Rotating Quickly & Easily.**
- **Economical, Space Saving & Secure**

Combination platform/tilt, shaker, rocker, and specialized rotator mixes tubes in 6 different ways: rotating, rocking/shaking, rotating/rocking, rolling/rocking and rotating/rolling, as well as a combination of all these mixing actions. An optional 3-D Orbital Shaker attachment transforms the unit into an orbital shaker. Easy to remove, two-sided 8" x 13.5" (20.3cm x 34.3cm) stainless steel magnetic platform easily converts from rotating to rocking with a simple mechanical adjustment. The platform is magnetized to accommodate up to two 6" x 6" (15.3 x 15.3cm) plastic bags per side, a 12" x 12" (30.5 x 30.3cm) non-skid metal rocker tray for conventional rocker/shaker operations, or up to four metal clip plates per side to accommodate similar or different tube sizes for various mixing solutions. Ideal for use in cold rooms and incubators for complete and even soaking of membrane-based blot assays/washings. Unit can be easily cleaned or decontaminated. Maintains the set speed between 32°F (0°C) and 100°F (38°C). Expansion kits are available for increased capacity, and different containers.

Specification:

Rotating:.....5 – 35 RPM
 Rocking:.....10 – 70 cycles per minutes
 Rocking Angle:±10 degree from the horizontal
 Platform Workload:10 lb (4.5kg)
 Weight:26lb. (11.8kg)
 Electrical:120VAC, 60Hz, 0.5A
 Requirements:230VAC, 50/60Hz, 0.25A
 Dimensions:10.5" x 20.0" x 9.9" (26.7x50.8x25.2cm)
(12" D with non-skid metal rocker tray installed)
 Environmental:Installation Category 2" 32°F (38°C)
95% maximum relative humidity.



2-Year Warranty!

Ordering:

- **The Roto-Shaker Genie is supplied with:**
- **1 non-skid metal rocker tray, measuring 12" x 12" (30.5x30.5cm)**
- **4 magnetic stainless steel mounting strips for holding 2 plastic bags, measuring up to 6 x 6" (15.3 x 15.3cm)**
- **1 clip plate for 12 each of 10-13mm tubes**
- **1 clip plate for 6 each of 15 – 17mm tubes**
- **1 clip plate for 3each of 28-30mm tubes**

Cat #	Description	Pack
71834-10	Roto-Shake Genie®, 120VAC	each
71834-20	Roto-Shake Genie®, 220VAC	each

► **Accessories for Roto-Shaker Genie®**

Cat.#	Description	Pack
71834-50	6 Clip Plates for 12 each of 10-13mm tubes	each
71834-51	6 Clip Plates for 6 each of 15-17mm tubes	each
71834-52	6 Clip Plates for 3 each of 28-30mm tubes	each
71834-53	1 Clip Plates for 12 each of 10-13mm tubes	each
71834-54	1 Clip Plates for 6 each of 15-17mm tubes	each
71834-55	1 Clip Plates for 3 each of 28-30mm tubes	each
71834-56	Magnetic Mounting Strip for Bag, 16/bag	each
71834-57	Expansion Kit, two stainless steel trays & 24 magnetic mounting bag strips	each
71834-60	2 Clip Plates for Hybridization Tubes	each
71834-64	2 Universal Clip Plates	each
71834-65	1 Magnetic Attachable Covered 100 Microtube Box	each
71834-66	1 Clip Plate for 4 100ml Volumetric Flasks	each
71834-67	3-D Orbital Shaker Attachment	each
71834-68	Non Skid tray	each



► Disruptor Genie™

Cell Disruptors and Media

- Rapid hands-free disruption of up to 12 microtubes (1.5 ml or 2.0 ml) at one time
- Unique agitation, vortexing, and collision actions for cell disruption and sample resuspension
- Maintain operating speed for up to 15 minutes or continuous operation, even in cold rooms
- Supplied pop-up cup easily attaches for use as a standard single-tube vortex mixer
- Ideal for glass bead procedures using Disruptor Beads
- Less costly than ultrasonic units or homogenizers



Disruptor Beads

- Spherical lead-free soda lime glass beads are available in two sizes
- Can be used for disruption of yeast, bacteria, and other samples
- Used in combination with Disruptor Genie or TurboMix™ attachments for Vortex-Genie™ 2, Vortec-Genie™ 2T or Digital Vortex-Genie™ 2



Specifications

Disruptor Beads

0.1 mm diameter beads for bacteria	375g (8 fl. oz.)
0.5 mm diameter beads for yeast	375g (8 fl. oz.)

Disruptor Genie	1.5 ml	2.0 ml
Supplied	1.5 ml Microtube Holder (tube not included) & Pop-off Cup	2.0 ml Microtube Holder (tube not included) & Pop-off Cup
Dimensions (base) (DxWxH)	165 x 122 x 190 mm (6.5 x 4.8 x 7.5")	165 x 122 x 190 mm (6.5 x 4.8 x 7.5")
Weight	4.3 kg (9.5 lb)	4.3 kg (9.5 lb)

Ordering:

72406-12	120 V, 60 Hz	1.5 ml	each
72406-20	230 V, 50 Hz – No Plug	1.5 ml	each
72406-Eu	230 V, 50 Hz Euro-Plug	1.5 ml	each
72406-Br	230 V, 50 Hz British-Plug	1.5 ml	each
72406-Sw	230 V, 50 Hz Swiss-Plug	1.5 ml	each
72406-Au	230 V, 50 Hz Australian-Plug	1.5 ml	each
72406-10	100 V, 50/60 Hz	1.5 ml	each
72407-12	120 V, 60 Hz	2.0 ml	each
72407-20	230 V, 50 Hz – No Plug	2.0 ml	each
72407-Eu	230 V, 50 Hz Euro-Plug	2.0 ml	each
72407-Br	230 V, 50 Hz British-Plug	2.0 ml	each
72407-Sw	230 V, 50 Hz Swiss-Plug	2.0 ml	each
72407-Au	230 V, 50 Hz Australian-Plug	2.0 ml	each
72407-10	100 V, 50/60 Hz	2.0 ml	each
72408-01	Disruptor Beads, 0.1mm	8 oz	each
72408-05	Disruptor Beads, 0.5mm	8 oz	each

► Vortex Genie® 2 Digital

Digital Control and Display

Shaking or Vortexing Action. Variable speed control allows slow speed shaking action up to high-speed vortexing. In addition, each attachment is designed to produce different mixing actions, allowing users to choose the correct action for each application.

Multi-Task Versatility. A broad range of attachments of various shapes, sizes, and materials allows for mixing of almost all common tubes or containers for Hands-Free or Touch operation.

Digital speed control and display. Provides accuracy, reproducibility and repeatability.

Timer Function. Touch on for 1-99 seconds. Hands-Free for 1-99 minutes or continuous.

Does not walk. Tough metal housing combined with "just enough weight", provides a stable platform for all types of mixing.

Unmatched Reliability. Many years of proven performance in laboratories all over the world.

Additional accessories for the Vortex Genie® 2 Digital available.



Specifications

Supplied with:	3 inch Platform, Pop-Off Cup
Speed	500-3000 (2850 for 50Hz models)
Timer	1-99 seconds, 1-99 minutes or continuous
Weight	4 Kg (8.8 lb)
Dimensions (base).....	165 x 122 x 165mm (D x W x H)(6.5 x 4.8 x 6.5in)
Warranty.....	2-year manufacturer warranty

Ordering:

71838-12	Digital Vortex Genie 2, 120 V, 60 HZ	each
71838-20	Digital Vortex Genie 2, 120 V, 50 HZ No Plug	each
71838-EU	Digital Vortex Genie 2, 120 V, 50 HZ European plug	each
71838-BR	Digital Vortex Genie 2, 120 V, 50 HZ British plug	each
71838-SW	Digital Vortex Genie 2, 120 V, 50 HZ Swiss plug	each
71838-AU	Digital Vortex Genie 2, 120 V, 50 HZ Australian plug	each
71838-10	Digital Vortex Genie 2, 120 V, 50 HZ	each

➤ Accessories for Analog and Digital Vortex Genie® 2 & Vortex Genie® 2T

Snap on these attachments for new ways to use your Vortex-Genie!

Ordering:

71844	TurboMix Attachment (includes 1.5ml snap top tube holder) each
71844-01	Optional 2.0ml Screw-Top Micro-centrifuge Tube Holder for TurboMix each
71845-01	Small Ampoule/Tube Attachment each
71845-02	Large Ampoule/Tube Attachment each
71845-03	Pop-Off Cup Head * each
71845-04	3" Platform with Rubber Cover* each
71842	Multi Sample Head Starter Set, (includes: 6" each Platform, set 60 Micro Tube Insert, Micro-Well Plate Insert)
71842-01	Separate 6" Platform each
71842-02	Replacement 60 Micro Tube Insert each
71842-03	Replacement Micro-Well Plate Insert each
71843	(Fig. 7:) Large Sample Set (includes: Recessed Platform, set Elastic Band, 9-16mm Tube Insert, 14-29mm Tube Insert, 29-37mm Tube Insert, Blank Insert)

71843-01	Replacement Recessed Platform	each
71843-02	Replacement Elastic Band	each
71843-03	Replacement 9 – 16mm Tubes Insert	each
71843-04	Replacement 14 – 29mm Tubes Insert	each
71843-05	Replacement 29 – 37mm Tubes Insert	each
71843-06	Replacement Blank Inserts (make your own custom shapes)	each
71842-50	1.5ml Snap-top Microtube Holder	each
71842-51	Shock Absorbing Feet (4)	kit
71842-52	Screw-On-Feet Kit (4)	kit
71842-55	3-inch Platform w/o Rubber Cover	each
71842-56	Assorted Foam Inserts (4)	kit
71842-57	Rubber Cover for 3-inch Platform	each
71842-58	Two-Tier Microplate Foam Insert	each
71842-59	TurboMix Attachment, 2.0ml Tubes	each

Note that items marked with an asterisk (*) are included with Vortex-Genie 2 and Vortex-Genie 2T.

➤ Microplate Genie® – Microplate Mixer

High Speed Action For Increased Mixing Efficiency In Every Well!

- Aggressive mixing speed from 750-3200 RPM for complete and uniform mixing in any microplate format.
- May be used to shake any single microplate.
- Multi capacity microplate mixer is also available (Multi-MicroPlate Genie).
- Small vortexing orbit of 1.0mm for thorough mixing regardless of sample viscosity.
- Speed and orbit combine to offer true vortexing action in each well of a microplate.
- Accepts most microplate types within the recommendations of the Society for Biomolecular Screening (SBS), even in 384-well formats.
- Built-in timer operates from 1 - 60 minutes or continuous for hands-free use.
- May be used in cold rooms and incubators for temperature sensitive applications.



Heat will not be transferred to your microplates. The fan (located in the bottom of the unit) directs air downward and out of the unit. As a result, room air is constantly drawn into the unit underneath the tray that holds the microplates, insuring that samples will not be heated.

Specifications

Speed	750 - 3200 RPM (750 - 2700 RPM for 50Hz models)
Time	1 - 60 minutes or continuous
Vortexing Orbit	1.0mm diameter
Maximum Capacity	1 microplate, any type with standard SBS footprint
Dimensions (D x W x H)	150 x 180 x 165mm (5.75 x 7.0 x 6.5in)
Weight	2.75kg (6.1lb)

Ordering:

61040-12	MicroPlate Genie, 120V, 60Hz	each
61040-20	MicroPlate Genie, 230V, 50Hz, No Plug	each
61040-EU	MicroPlate Genie, 230V, 50Hz, European Plug	each
61040-BR	MicroPlate Genie, 230V, 50Hz, British Plug	each
61040-SW	MicroPlate Genie, 230V, 50Hz, Swiss Plug	each
61040-AU	MicroPlate Genie, 230V, 50Hz, Australian Plug	each
61040-10	MicroPlate Genie, 100V, 50/60Hz	each

Additional accessories for the Microplate Genie® available.

➤ Multi-Microplate Genie® – Microplate Mixer

High Speed Action For Increased Mixing In Up To 8 Microplates!



Heat will not be transferred to your microplates. The fan (located in the bottom of the unit) directs air downward and out of the unit. As a result, room air is constantly drawn into the unit underneath the tray that holds the microplates, insuring that samples will not be heated.

- Aggressive mixing speed from 750-3200 RPM for complete and uniform mixing in any microplate format.
- May be used to shake up to 4 microplates, an optional accessory tray is available to double capacity and shake up to 8 microplates at one time.
- Single capacity microplate mixer is also available (MicroPlate Genie)
- Small vortexing orbit of 1.0mm for thorough mixing regardless of sample viscosity.
- Speed and orbit combine to offer true vortexing action in each well of a microplate.
- Accepts most microplate types within the recommendations of the Society for Biomolecular Screening (SBS), even in 384-well formats.
- Built-in timer operates from 1 - 60 minutes or continuous for hands-free use.
- May be used in cold rooms and incubators for temperature sensitive applications.

Additional accessories for the Microplate Genie® available.

continued >>>>>

► Multi-Microplate Genie® – (continued)

Specifications

Speed	750 - 3200 RPM (750 - 2700 RPM for 50Hz models)
Time	1 - 60 minutes or continuous
Vortexing Orbit	1.0mm diameter
Maximum Capacity	1 microplate, any type with standard SBS footprint
Dimensions (D x W x H)	150 x 180 x 165mm (5.75 x 7.0 x 6.5in)
Weight	2.75kg (6.1lb)

Ordering:

61042-12	Multi-MicroPlate Genie, 120V, 60Hz	each
61042-20	Multi-MicroPlate Genie, 230V, 50Hz, No Plug	each
61042-EU	Multi-MicroPlate Genie, 230V, 50Hz, European Plug	each
61042-BR	Multi-MicroPlate Genie, 230V, 50Hz, British Plug	each
61042-SW	Multi-MicroPlate Genie, 230V, 50Hz, Swiss Plug	each
61042-AU	Multi-MicroPlate Genie, 230V, 50Hz, Australian Plug	each
61042-10	Multi-MicroPlate Genie, 100V, 50/60Hz	each
61043	Multi-MicroPlate Accessory Tray	each

► Accessories for Microplate Genie® and Multi-Microplate Genie®

Snap on these attachments for new ways to use your Microplate Genie!

Ordering:

61040-50	Shock Absorbing Feet, MicroPlate Genie (4)	kit	
61040-51	Screw-On-Feet Kit, MicroPlate Genie (4)	kit	
61040-52	2 mil "PTFE" 96-Well Pattern Film, pk 100	100/pk	
61040-53	2 mil "PTFE" 96-Well Pattern Film, Sterile, pk 100	100/pk	
61040-54	5 mil "PTFE" 96-Well Pattern Film, pk 100	100/pk	
61040-55	5 mil "PTFE" 96-Well Pattern Film, Sterile, pk 100	100/pk	
61040-56	2 mil Polyethylene 96-Well Pattern Film, pk 50	50/pk	
61040-57	SealPlate Films, pk 100	100/pk	
61040-58	SealPlate Films, Sterile, pk 100	100/pk	
61040-59	MiniStrips Films, pk 200	200/pk	
61040-60	MiniStrips Films, Sterile, pk 200	200/pk	
61040-61	AeraSeal Films, pk 100	100/pk	
61040-62	AeraSeal Films, Sterile, pk 100	100/pk	
61040-63	TuffSeal Metalized Films, pk 100	100/pk	
61040-64	TuffSeal Metalized Films, Sterile, pk 50	50/pk	
61040-70	Accessory Plate Roller	each	

► Multi Vortex Genie® – Large Capacity Multi Vessel Vortex Mixer

Vortex Anything and Everything that only a Vortex-Genie can - Only More!

- Same true vortexing as with the original Vortex-Genie® 2.
- Holds multiple test tubes, vials, or cylinders of various sizes (racks included) or up to six 250mL vessels, (more for smaller vessels) or a combination of tubes and vessels such as Erlenmeyer flasks.
- Designed and built "Genie"™ strong, rugged and reliable.
- Digital control and display of speed and time for reproducibility and accuracy, with true speed display.
- Gentle ramp up to speed, so open containers will not spill.
- Use for gentle, orbital-style shaking or more vigorous vortexing.
- Durable and heavy zinc die casting with specially designed feet prevents "walking".
- No additional holders or accessories necessary. Racks are included.
- May be used in cold rooms or incubators.



Specifications

Supplied with	Two 12-Pack Multi-Tube Racks holding up to 24 tubes of any material up to 29mm dia., or up to six 250mL vessels.
Speed	250 - 1000RPM (up to 950RPM for 50Hz models)
Vortex Orbiting	4mm dia. (same as Vortex-Genie 2)
Timer	1-99 minutes or continuous
Dimensions (D x W x H)	310 x 270 x 195mm (12.2 x 10.6 x 7.7in)
Weight	11.3 kgs (25 lbs)
Warranty	2-year manufacturer warranty

Ordering:

71846-12	Multi Vortex-Genie, 120V, 60 Hz	each
71846-20	Multi Vortex-Genie, 230V, 50 Hz, No Plug	each
71846-EU	Multi Vortex-Genie, 230V, 50 Hz, European Plug	each
71846-BR	Multi Vortex-Genie, 230V, 50 Hz, British Plug	each
71846-SW	Multi Vortex-Genie, 230V, 50 Hz, Swiss Plug	each
71846-AU	Multi Vortex-Genie, 230V, 50 Hz, Australian Plug	each
71846-10	Multi Vortex-Genie, 100V, 50/60Hz	each
71846-40	12-Pack Multi-Tube Rack	each
71846-41	12-Pack Multi-Tube Rack (set of 2)	pack

➤ **QuadMag Genie®** — Magnetic Stirrer

The powerful multi-position QuadMag Genie provides vigorous stirring for up to 4 vessels simultaneously.



General purpose magnetic stirrer designed for general laboratory applications

- Powerful magnet and motor offer exceptional magnetic force capable of stirring up to 2L for each position.
- Powerful “rare earth” magnets automatically pull stir bars into position and stay coupled even under the most demanding stirring conditions.
- Rugged ABS/Polycarbonate housing and the famous Vortex-Genie® heavy-duty motor provide years of reliable service
- Easy-to-use controls allow users to easily change the desired speed.
- Spill-resistant housing channels fluids away from the internal components.
- Can be used in cold rooms and incubators.
- Non-skid feet.

Specifications

Stirring Speed	150-1500 RPM
Maximum Stirring Positions	4
Maximum Stirring Capacity	2 L each position
Stir Bar Maximum Length	5.6 cm (2in)
Material	ABS/Polycarbonate Nonskid Top Pads (4)
Top Surface Dimensions	305 x 305mm (D x W x H).....
Overall Dimensions	12 x 12in
Overall Dimensions	310 x 305 x 130mm (D x W x H).....
Weight	12.25 x 12 x 5.1in
Weight	3 kg (6.6 lb)

Ordering:

72402-12	QuadMag-Genie, 120V, 60Hz	each
72402-20	QuadMag -Genie, 230V, 50Hz, No Plug	each
72402-EU	QuadMag -Genie, 230V, 50Hz, European Plug	each
72402-BR	QuadMag -Genie, 230V, 50Hz, British Plug	each
72402-SW	QuadMag -Genie, 230V, 50Hz, Swiss Plug	each
72402-AU	QuadMag -Genie, 230V, 50Hz, Australian Plug	each
72402-10	QuadMag -Genie, 100V, 50/60Hz	each

➤ **MegaMag Genie®** and **Digital MegaMag Genie®** — Magnetic Stirrers

Large volume magnetic stirrers designed for large capacity applications

The powerful single-position MegaMag Genie and Digital MegaMag Genie provide the optimal stirring for large volume containers. Both analog and digital feedback (true speed) versions are available.



- Powerful magnet and motor offer exceptional magnetic force capable of stirring up to 38L.
- True Speed digital feedback version is available. Analog version features speed dial.
- Feedback control on digital version of the MegaMag Genie is adjustable in 10 RPM increments.
- LED display is offered on digital version for easier speed and time readings.
- Rugged ABS/Polycarbonate housing and the famous Vortex-Genie® heavy-duty motor provide years of reliable service.
- Spill-resistant housing channels fluids away from the internal components.
- Ramping feature slowly increases speed to avoid splashing and improve spin bar control.
- Can Be Used in cold rooms and incubators.
- Non-skid Feet.

Specifications

Stirring Speed	200-1300 RPM
Timer	1-99 min or continuous (digital only)
Maximum Stirring Positions	1
Maximum Stirring Capacity	38 L
Stir Bar Maximum Length	7.6 cm (3in)
Material	ABS/Polycarbonate
Top Surface Dimensions	305 x 305mm (D x W x H).....
Overall Dimensions	12 x 12in
Overall Dimensions	310 x 305 x 130mm (D x W x H).....
Weight	12.25 x 12 x 5.1in
Weight	3 Kg (6.6 lb)

Ordering:

72400-12	MegaMag-Genie, 120V, 60Hz	each
72400-20	MegaMag-Genie, 230V, 50Hz, No Plug	each
72400-EU	MegaMag-Genie, 230V, 50Hz, European Plug	each
72400-BR	MegaMag-Genie, 230V, 50Hz, British Plug	each
72400-SW	MegaMag-Genie, 230V, 50Hz, Swiss Plug	each
72400-AU	MegaMag-Genie, 230V, 50Hz, Australian Plug	each
72400-10	MegaMag-Genie, 100V, 50/60Hz	each
72401-12	Digital MegaMag-Genie, 120V, 60Hz	each
72401-20	Digital MegaMag-Genie, 230V, 50Hz, No Plug	each
72401-EU	Digital MegaMag-Genie, 230V, 50Hz, European Plug	each
72401-BR	Digital MegaMag-Genie, 230V, 50Hz, British Plug	each
72401-SW	Digital MegaMag-Genie, 230V, 50Hz, Swiss Plug	each
72401-AU	Digital MegaMag-Genie, 230V, 50Hz, Australian Plug	each
72401-10	Digital MegaMag-Genie, 100V, 50/60Hz	each

► MagStir Genie® – Magnetic Stirrer

The revolutionary single-position MagStir Genie provides low to high speed stirring and editable memory profiles. Microprocessor controls offer precision and reproducibility without internal heat build-up.



- Customize your application with the single-position MagStir Genie.
- MagStir Genie may be used with any regular flask/beaker or spinner flask and a maximum sample weight of 5.0 kg.
- Speed range of 10-1800 RPM including reverse and interval stirring for applications ranging from gentle stirring for cell culture to aggressive mixing for viscous polymers.
- Three power levels are available for various sample viscosities.
- Low-profile magnetic stirrer uses microprocessor control for precise and reproducible operation without heat build-up from internal friction.
- Manual mode provides stir, stir reverse, and time functions.
- Profiles mode allows users to quickly program speed, ramp rate, stir direction, time (including pause), and power level in up to 9 distinct steps. Up to 4 stirring profiles can be saved.
- Automatic mode recalls and executes one of up to 4 user-defined profiles.

Specifications

Speed	10 - 1800 RPM including stir reverse
Time	1 second - 99 hours
Power Levels	Low, Medium, High
Selectable Ramp Rates	5 - 300 rpm/sec
Memory	Up to 4 user-defined profiles
Maximum Capacity	5.0 kg (11 lb)
Dimensions (D x W x H)	200 x 160 x 55mm 7.9 x 6.3 x 2.2in
Weight	1.0 kg (2.2 lb)

Ordering:

72404-12	MagStir Genie, 120V/100V, 60Hz	each
72404-20	MagStir Genie, 230V, 50Hz, No Plug	each
72404-EU	MagStir Genie, 230V, 50Hz, European/Swiss Plug	each
72404-BR	MagStir Genie, 230V, 50Hz, British Plug	each
72404-AU	MagStir Genie, 230V, 50Hz, Australian Plug	each

► MultiMagStir Genie®



- The revolutionary 4-position MultiMagStir Genie provides low to high speed stirring and editable memory profiles. Microprocessor controls offer precision and reproducibility without internal heat build-up.
- Customize your application with the four-position MultiMagStir Genie!
- MultiMagStir Genie may be used with up to 4 1L flasks/beakers or 3 1L spinner flasks and a maximum sample weight of 10.0 kg.
- Speed range of 10-1200- RPM including reverse and interval stirring for applications ranging from gentle stirring for cell culture to aggressive mixing for viscous polymers.
- Three power levels are available for various sample viscosities.
- Low-profile magnetic stirrer uses microprocessor control for precise and reproducible operation without heat build-up from internal friction.
- Manual mode provides stir, stir reverse, and time functions.
- Profiles mode allows users to quickly program speed, ramp rate, stir direction, time (including pause), and power level in up to 9 distinct steps. Up to 4 stirring programs can be saved.
- Automatic mode recalls and executes one of up to 4 user-defined protocols.

Specifications

Stirring Speed	10-1200 RPM
Time	1 second - 99 hours
Power Levels	Low, Medium, High
Selectable Ramp Rates	5 - 300 rpm/sec
Memory	Up to 4 user-defined profiles
Maximum Capacity	10.0 kg (22 lb)
Weight	3.2 kg (7.0 lb)
Dimensions (DxWxH)	375 x 325 x 48mm 14.8 x 12.8 x 1.9in

Ordering:

72405-12	MultiMagStir Genie, 120V/100V	each
72405-20	MultiMagStir Genie, 230V, No Plug	each
72405-EU	MultiMagStir Genie, 230V, Euro/Swiss Plug	each
72405-BR	MultiMagStir Genie, 230V, British Plug	each
72405-AU	MultiMagStir Genie, 230V, Australian Plug	each

► **Enviro-Genie® - 6-in-1**
Bench-top Refrigerated Incubator

■ REFRIGERATOR ■ INCUBATOR ■ ROTATOR ■ ROCKER ■ STIRRER ■ SHAKER

Designed to provide the security of precise temperature control and uniformity for demanding incubation/refrigeration application without taking up a great deal of space. It uses Thermo-Electric (Peltier) refrigeration & heating with no compressor. Chamber air is gently and continuously re-circulated at a rate that ensures the temperature consistency and uniformity of all test samples. Re-circulated air eliminates the possibility of contamination from outside air. Shatter resistant viewing window allows for inspection of samples without effecting the chamber environment.

Applications include the study of microorganisms and tissue cell growth under strictly controlled conditions of temperature and agitation. It performs membrane based assays/washing and hybridizations more efficiently.

Microprocessor controls easily achieve desired rotating, rocking, stirring, shaking, temperature and time; all of which are displayed on large LED's for accurate reproducible results. Timer displays elapsed time or remaining time until programmed off – up to 96 hours. Visible and audible alarms for both temperature and time. Equipped with RS232 port for connection to your computer.



Specifications:

Stirring:.....1 – 2000RPM (includes reverse)
Rotating:.....1 – 35 RPM
Rocking:.....2 – 70 cycles per minute

Temperature

Heating:to 75°C
Cooling:to 4°C
Accuracy:±0.2°C
Uniformity:±1.5°C
Resolution:0.1°C
Stability:±0.1°C
Time, Hours:programmable to 96
Alarms:audible, visible, temp. & time
Platform workload:
Capacity:.....10 lb 4.5kg
Chamber volume:.....0.86 cu. ft (24L)
Weight:80 lb (36kg)
Electrical:120VAC, 60Hz, 5A
Requirements:230/240VAC 50Hz, 2.5A

Dimensions

Chamber DxWxH:10" x 14¼" x 10¼" (254x362x260mm)
Overall DxWxH:19½" x 24½" x 14½" (495x622x368mm)

► **Accessories: for Enviro-Genie®**

See photos on previous page

Cat.#	Description	Pack
71834-50	6 Clip Plates for 12 each of 10-13mm tubes	each
71834-51	6 Clip Plates for 6 each of 15-17mm tubes	each
71834-52	6 Clip Plates for 3 each of 28-30mm tubes	each
71834-53	1 Clip Plates for 12 each of 10-13mm tubes	each
71834-54	1 Clip Plates for 6 each of 15-17mm tubes	each
71834-55	1 Clip Plates for 3 each of 28-30mm tubes	each
71834-56	Magnetic Mounting Strip for Bag, 16/bag	each
71834-57	Expansion Kit, two stainless steel trays & 24 magnetic mounting bag strips	each
71834-60	2 Clip Plates for Hybridization Tubes	each
71834-61	1 Stackable Shelf	each
71834-62	Serial Cable	each
71834-64	2- Universal Clip Plate	each
71834-65	1-Magnetic Attachable Covered 100 Microtube Box	each
71834-66	1-Clip Plate for 4 each of 100ml Volumetric Flasks	each
71835-50	3-D Orbital Shaker Attachment	each

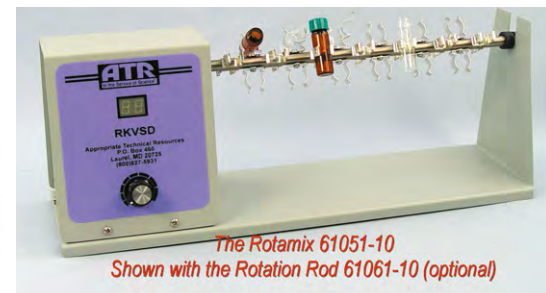
Ordering:

Cat. #	Description	Pack
71835-10	Enviro-Genie®, 120VAC	each
71835-20	Enviro-Genie®, 220VAC, without plug	each

► **Rotamix™**

The Rotamix units are designed with interchangeable 12" long rotary rods accommodating tubes ranging from 1.5ml to 50 ml, which make the rotary universal. Rotamix is made from steel, coated with a chemically resistant paint and is extremely quiet. Rotamix® is suitable for use both in the cold room and the incubator. The speed is variable from 0 to 80 rpm. On the RKVSD, rotation speed is displayed on a large LCD.

- Immunoprecipitation
- Blood mixing
- Extractions and phase separations
- Bacterial cultures
- Bead mixing and extracting
- Embedding infiltration



The Rotamix 61051-10
Shown with the Rotation Rod 61061-10 (optional)

Specifications:

Rotation speed:0 – 80 rpm
Material:Chemically resistant coated steel case,Stainless steel rods.
Voltage:12V, power transformer supplied
Weight:5 lb
Motor:Variable speed DC motor
Power:6W, 110V, 60Hz
Dimensions:16.25" (L) x 4.75" (D) x 6.12" (H)

All units are analog controlled and come without racks. Racks are sold separately.

Ordering:

Cat. #	Description	Pack
61050-10	Rotamix® RKVS – Analog Control, 0 – 80 rpm, 110V –	each
61051-10	Rotamix® RKVSD – Analog control, 0 – 80 rpm w/digital speed display	each
61060-10	TT-Rack – Platform designed to rotate "flip rack" for 96 – 1.5ml or 96 – 0.5ml tubes	each
61061-10	TT-15 – Rod for 26 – 10 – 15ml tubes (15 – 17mm)	each
61062-10	TT-1.5 – Rod for 26 – 1.5ml tubes (9 – 12mm)	each
61063-10	TT-50 – Rod for 14 tubes, 30 – 50 ml (28-30ml)	each
61064-10	TT-mix – Rod for 14 - 1.5ml and 10 – 15ml tubes	each

► Vacuum Ovens

The Most Popular, Multipurpose Vacuum Ovens!

- 220 Degrees C (428F) Maximum temperature.
- Two control configurations and display options.
- 0.44 cu. ft (12.5 L), 0.7 cu ft (19.8 L) and 2.3 cu. ft (65 L) chamber volumes.
- 24 Months Warranty.

OPERATION

- Operating temperature range from ambient +5°C to 220°C (428°F)
- Vacuum level displayed on gauge from 0 to 30" Hg (76.2cm)
- Model 3606, 3608 and 3618 Vacuum Ovens feature a hydraulic thermostat to control temperature to $\pm 1.5^\circ\text{C}$ with a uniformity of $\pm 5^\circ\text{C}$ @ 100°C; 25" Hg and built-in oven-temperature protection.
- Model 3618P Vacuum Ovens feature programmable microprocessor-based P.I.D. temperature control that regulates to within $\pm 0.2^\circ\text{C}$ with a uniformity of $\pm 2.4^\circ\text{C}$ @ 100°C; 25" Hg.
- The programmable microprocessor-based temperature control on Model 3618P Vacuum Ovens run at a single set point or utilize a 24-step program of ramps and dwells. These vacuum ovens features independent vacuum and purge needle values.
- Model 3606 and 3606-1 have top-mounted independent evacuation and venting vacuum fittings; all other models features front-mounted three-way valve for evacuation, venting, and purging of inert gases (e.g. nitrogen or argon) with vacuum fitting on front of unit.

PRODUCT DESCRIPTION

- Radiant warm wall heating system provides optional uniformity.
- Conserves chamber space for drying, curing, vacuum embedding, and plating applications.
- Silicone door gasket and a positive latch door maintains the seal for all vacuum levels.
- Exclusive Polycarbonate safety shield protects door glass.
- Two removable aluminum shelves included standard.
- Vacuum fittings require 0.25" (0.6cm) I.D. tubing.
- Easy-to-clean #304 stainless steel chamber interior.
- Powder coated heavy gauge steel exterior construction.



PRODUCT SPECIFICATIONS

Model #	Chamber Dimensions, Inches (cm)			Overall Dimensions Inches (cm)			Chamber Volume, cu. ft. (l)	Net Weight, lbs (kg)	Shipping Weight, lbs (kg)
	W	H	D	W	H	D			
3606	8 (20)	8 (20)	12 (30)	17 (43)	17.4 (44)	16 (41)	0.44 (12.5)	57 (26)	110 (50)
3608	10 (25)	10 (25)	12 (30)	19.8 (50)	16.25 (41)	16 (41)	0.7 (19.8)	83 (38)	130 (59)
3618	14 (36)	14 (36)	20 (51)	25 (64)	22 (56)	25 (64)	2.3 (65.1)	150 (68)	295 (134)
3618P	14 (36)	14 (36)	20 (51)	25 (64)	22 (56)	25 (64)	2.3 (65.1)	120 (64)	300 (136)

OPERATING SPECIFICATIONS

Model #	Operating Temp Range °C	Rise Time (Ambient to 100°C)	Control @100°C, 25" Hg	Uniformity, @100C, 25" Hg	Vacuum Range
3606	Ambient +5°C to 200°C	100 minutes	$\pm 1.5^\circ\text{C}$	$\pm 2.2^\circ\text{C}$	0 - 30" Hg
3608	Ambient +5°C to 200°C	4 hours*	$\pm 1.0^\circ\text{C}^*$	$\pm 4.0^\circ\text{C}^*$	0 - 30" Hg
3618	Ambient +5°C to 200°C	2 hours	$\pm 1.0^\circ\text{C}$	$\pm 5.0^\circ\text{C}$	0 - 30" Hg
3618P	Ambient +5°C to 200°C	2.4 hours	$\pm 0.2^\circ\text{C}$	$\pm 2.4^\circ\text{C}$	0 - 30" Hg

* Model 3608 specifications determined at 150°C

ORDERING

Catalog #	Model #	Description	Electrical (50/60 Hz)		
			Volts	Amps	Watts
63234-10	3606	Vacuum Oven, Dial	120	5.0	600
63234-20	3606-1CE ¹	Vacuum Oven, Dial	240	2.5	600
63235-10	3608	Vacuum Oven, Dial	120	5.0	600
63235-20	3608-1CE ¹	Vacuum Oven, Dial	240	2.5	600
63236-10	3608-5	Vacuum Oven, LED	120	5.0	600
63236-20	3608-6CE ¹	Vacuum Oven, LED	240	2.5	600
63237-10	3618	Vacuum Oven, Dial	120	13.3	1600

Catalog #	Model #	Description	Electrical (50/60 Hz)		
			Volts	Amps	Watts
63237-20	3618-1CE ¹	Vacuum Oven, Dial	240	6.7	1600
63238-10	3618-5	Vacuum Oven, LED	120	13.3	1600
63238-20	3618-6CE ¹	Vacuum Oven, LED	240	6.7	1600
Programmable Microprocessor Temperature Control					
63239-10	3618P	Vacuum Oven, LED	120	13.3	1600
63239-20	3618P-1	Vacuum Oven, LED	240	6.7	1600

¹CE

➤ General Purpose – High Quality Incubators

Affordable Prices!

PRODUCT DESCRIPTION

- Gravity convection incubators come with 3-wire cord.
- 5.1 cu. ft. (144L) chamber size.
- Two adjustable, perforated aluminum shelves come standard and are easily removed to facilitate interior chamber cleaning
- Twenty shelf positions per chamber, adjustable on half inch centers
- Corrosion resistant aluminum chamber construction
- Pilot light indicates when unit is operating
- Durable powder coat paint on steel exterior construction
- Red, spirit filled thermometer is safe for handling
- Adjustable hydraulic thermostat reacts quickly to temperature changes in the range of 5°C above ambient to 65°C
- Radiant warm wall heating provides maximum temperature uniformity in chamber.
- Superior heat distribution help eliminate hot spots and provides temperature uniformity of ±1.3°C at 37°C



APPLICATIONS:

- Bacteriological cultures
- Hematology studies
- Chick embryo studies

PRODUCT SPECIFICATIONS

Model #	Operating Temp °C	Temp Control °C	Temp Uniformity °C	Chamber Dimensions Inches (cm)			Overall Dimensions Inches (cm)			Shipping Weight Lb (kg)
				W	H	D	W	H	D	
408Q+1Q	Ambient +5	±1.3°C at 37°C	±1.3°C at 37°C	18	27	18	21	33	21	90 (41)
408Q+1Q	to 65°C	±1.3°C at 37°C	±1.3°C at 37°C	(46)	(69)	(46)	(53)	(84)	(53)	

ORDERING

Cat. #	Model #	Electrical (50/60 Hz)			Chamber Vol.	
		Volt	Amps	Watts	cu. ft (L)	# of Shelves
63157-10	408Q ^{1,2}	120	3.3	400	5.1 (144)	2
63157-20	408-1Q	240	1.7	400	5.1 (144)	2

¹ UL, ² CSA

➤ Oven/Incubator

This Oven/Incubator with an aluminum inner chamber, and venting is up to the task of providing many years of long service in busy labs.

The oven comes complete with a double-pane glass window door which means there is no longer a need to squint to see what is going on inside the oven. The cast aluminum chamber provides for dependable temperature uniformity and the vent efficiently expels moisture and vapors. The unit comes complete with a Removable shelf.



FEATURES:

- A double-pane glass window located in the door permits easy viewing of contents.
- A magnetic latch assures positive door closure.
- An aluminum chamber provides excellent temperature uniformity.
- A thermometer port at the top of the oven accommodates any partial immersion thermometer.
- Heats up rapidly. (56°C in 9 minutes).
- The chamber is vented through the top to allow for the removal of moisture and other vapors.
- The aluminum chamber is easy to clean and it provides excellent temperature uniformity.
- Oven works on the gravity convection heating method.
- The unit comes complete with one removable metal shelf, three-wire cord, and plug.

APPLICATIONS:

- General drying and incubation applications.
- Polymerization of resins.

SPECIFICATIONS:

Chamber Dimensions Inch (cm)			Overall Dimensions Inch (cm)			Weight Lb. (Kg) Ship	Electrical 50/60Hz Volts	Amps	Watts	Temp. Uniformity @100°C	Operating Temp. Range °C
W	H	D	W	H	D						
10.00 (25)	11.3 (29)	11.50 (29)	12.5 (32)	18 (46)	13.5 (34)	35 (16)	120	2.90	500	+/-5°C	+5°C - 210°C

Ordering:

63230-10 Oven/Incubator, 120 Volts each 63230-20 Oven/Incubator, 240 Volts each

For our complete line of Slide Warmers, See Chapter 11 Histology section, pages 604–605 <<<<<

► Compact Low Cost Incubator *Low Cost Incubator for Clinic or Classroom!*

- Mechanical Convection Technology
- Controller with LED display
- Minimal benchtop for space restricted lab areas
- Temperatures at or below ambient: 17° to 40°C
- High temperature accuracy
- Easy-to-use interface

- Internal light and window facilitate observation
- Footprint: 1.3 sq.ft (.12 sq. m)
- Number of shelves (supplied/max.): 2/3
- Maximum shelf load: 4.4 lb. (2 kg)
- Temperature uniformity of $\pm 1.2^\circ\text{C}$ (at 37°C)
- Temperature stability of $\pm 0.2^\circ\text{C}$ (at 37°C)



Applications:

- Bacteriological cultures
- Hematology studies
- Chick embryo studies

Product Specifications

Model #	Operating Temp Range °C	Temp Control at 37°C	Temp Uniformity T at 37°C	Chamber Volume cu. ft. (L)	Chamber Dimensions Inches (mm)			Overall Dimensions Inches (mm)		
					W	H	D	W	H	D
IMC18	Ambient 17° to 40°C	$\pm 0.2^\circ\text{C}$	$\pm 1.2^\circ\text{C}$	0.65 (18)	11.4 (290)	7.1 (180)	12.2 (310)	18.5 (470)	10.2 (260)	16.3 (415)

Ordering

Cat. #	Model #	Volts	Electrical (50/60 Hz)		Watts	Ship Wgt. lbs (kg)	Plug	Qty.
			Amps					
63151-10	IMC18	100-240V	.85	.45	45	15.9 (7.2)	US	each

► Isotemp Standard Lab Incubators

Incubators with gravity flow circulation provide accurate, efficient heating for routine laboratory procedures: drying and staining of slides, paraffin embedding, tissue culture work, incubation of antibody tests, microbiological determinations, crystallization studies and more. Electrical receptacle inside (5A at 120V) to plug in a stirrer, shaker or other apparatus. Includes: Small (2.5 cu. ft.) and medium (3.75 cu. ft.) incubators each come with one plated-steel shelf; large (5.0 cu. ft.) incubator comes with two shelves.

Easy to operate:

- Microprocessor control
- Controls are conveniently located at the top of the incubator chamber
- Keypad with arrow keys to increase or decrease set point temperature in 0.1°C increments
- Overtemperature value is automatically set at 3°C above setpoint
- PID controller comes with fixed parameters so no tuning is required
- Circuit breaker protects incubator from power surges; battery backup
- Designed to stack two units

Big three-character LED display

- Digits display actual temperature to nearest 0.1°C
- Display shows current value for set point temperature
- HEAT indicator light cycles on and off to show when incubator heaters are on

- ALARM indicator lights up if temperature exceeds overtemperature limit; backup controller maintains temperature at 3°C above setpoint; safety backup built into software

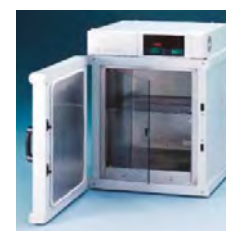
Small, medium and large workload capacities

- Available in three chamber capacities
- Mounting holes at 2 in. (5cm) intervals on the chamber walls for shelf placement
- Small incubator holds a maximum of five shelves, medium incubator holds eight, and large incubator holds eleven

Low-maintenance incubators with inner and outer doors

- Cabinet has durable, enamel-coated steel exterior
- Extruded aluminum trim has acrylic powder coating

- Chamber is easy-to-clean stainless steel
- Low-watt-density heater elements are designed for long life
- Silicone gasket on outer door and 3 in. thick (7.6cm) fiberglass insulation throughout prevent heat loss
- Outer door opens to 180° for unhindered access and features two grabber-type latches
- Inner door is tempered glass
- Steel shelves are 17.37 in. wide and 16.75 in. front-to-back (44 x 42.5cm)
- Black synthetic rubber feet keep incubator from slipping and maintain a space between incubator and benchtop for ventilation



Operating Specifications

Convection Technology: Dual Convection
Controller: Microprocessor control with vacuum fluorescent display
Temperature range: ambient +5° to 105°C
Temperature uniformity at 37°C: $\pm 0.6^\circ\text{C}^\dagger$
Temperature Stability at 37°C: $\pm 0.1^\circ$
Timer: weekly / real time / hour
Maximum Shelf Load: 44 lbs. (25 kg)
Plug Type: Nema 5-15

[†]Rated average uniformity per ASTM* E 1292 Method. Value assumes fan is off. With fan at full speed, uniformity is $\pm 0.2^\circ\text{C}$ (51028066), $\pm 0.3^\circ\text{C}$ (51028067), and $\pm 0.4^\circ\text{C}$ (51028068).

Product Specifications

Model #	Operating Temp Range °C	Temp Control at 37°C	Temp Uniformity T at 37°C	Chamber Volume cu. ft. (L)	Chamber Dimensions Inches (mm)			Overall Dimensions ³ Inches (mm)		
					W	H	D	W	H	D
Small	30°-75°C	$\pm 0.1^\circ\text{C}$	$\pm 0.7^\circ\text{C}$	2.5 (70.8)	18 (46)	18 (46)	13.5 (34)	23.5 (60)	26 (66)	26 (66)
Medium				3.75 (106.2)	18 (46)	18 (46)	20 (51)	23.5 (60)	26 (66)	33 (84)
Large				5.0 (141.6)	18 (46)	18 (46)	26.5 (67)	23.5 (60)	26 (66)	39 (99)

Ordering

Cat. #	Model	Recovery ² min.	Air Changes per hr	BTU per hr (75°C)	Electrical ⁴ (60 Hz)			Ship Wgt. lbs (kg)	Qty.
					Volts	Amps	Watts		
63155-10	small	2	6	290	120	2.2	260	115 (52)	each
63155-20	medium	2	4	360	120	2.2	260	130 (59)	each
63155-30	large	2	3	430	120	2.7	320	145 (66)	each

1 Rated average uniformity per ASTM* E 1292 Method.

2 Door open 30 seconds at 37°C.

3 Length includes thickness of door; does not include handle.

4 Internal accessory outlet will increase current usage by 5A if utilized at its rating.

➤ **General Protocol Microbiological Incubators** *Compact Low Cost Incubators*



- Gravity convection provides gentle air flow and minimal drying out
- Temperatures at or below ambient: +5° to 75°C
- Intuitive user interface for setting temperature
- Large, easy to read vacuum fluorescent display
- Internal glass door allows sample viewing without impacting temperature
- Exceptionally small footprint
- Temperature uniformity of ±0.6°C (at 37°C)
- Temperature stability of ± 0.2°C (at 37°C)
- Easy to clean, corrosion-resistant stainless-steel interior (AISI 430)

Operating Specifications

Convection Technology: Gravity Convection
Controller: Microprocessor control with vacuum fluorescent display
Temperature range: ambient +5° to 75°C
Temperature uniformity at 37°C: ±0.2°C (60, 100, 180L) ±0.4°C (400, 750L)
Temperature Stability at 37°C: ±0.6°C (60, 100, 180L) ±0.4°C (400L) ±1.3°C (750L)
Maximum Shelf Load: 55 lbs. (25kg) (60, 100, 180L) 66 lbs. (30kg) (400, 750L)

Product Specifications

Model #	Number of Shelves (supplied/max)	Chamber Volume cu. ft. (L)	Chamber Dimensions Inches (mm)			Overall Dimensions Inches (mm)		
			W	H	D	W	H	D
51028063	2/13	2.6 (75)	16.3 (414)	13.9 (354)	20.0 (508)	22.2 (565)	20.9 (530)	28.3 (720)
51028064	2/16	4.0 (117)	16.3 (414)	18.3 (464)	23.9 (608)	22.2 (565)	25.2 (640)	32.3 (820)
51028065	2/19	6.9 (194)	23.2 (589)	18.3 (464)	27.9 (708)	29.1 (738)	25.2 (640)	36.2 (920)

Ordering

Cat. #	Model #	Electrical (60 Hz)			Watts	Ship Wgt. lbs (kg)	Qty.
		Volts	Amps				
63153-10	51028063	120	2.5	300	88 (40)	each	
63153-20	51028064	120	4.5	540	112 (51)	each	
63153-30	51028065	120	6	720	143 (65)	each	



Exceptionally small footprint compared to other manufacturers.

➤ **Advanced Protocol Microbiological Incubators**



- Dual convection for application versatility-fan speed adjustable from 0 to 100%
- Advanced digital timer for daily or weekly ON / OFF cycles
- Internal socket allows the use of equipment, such as shakers or stirrers, inside the unit
- Easy to clean, corrosion-resistant stainless-steel interior (AISI 304)
- Broad temperature range from 5°C above ambient to 105°C-suitable for drying applications
- Temperature uniformity of ± 0.6 (Fan off) and between ±0.2°C and ± 0.4°C (Fan full speed) (measured at 37°C)
- Temperature stability of ± 0.1°C (at 37°C)
- Intuitive user interface for setting temperature
- Large, easy to read vacuum fluorescent display
- Internal glass door allows sample viewing without impacting temperature
- Exceptionally small footprint

Operating Specifications

Convection Technology: Dual Convection
Controller: Microprocessor control with vacuum fluorescent display
Temperature range: ambient +5° to 105°C
Temperature uniformity at 37°C: ±0.6°C†
Temperature Stability at 37°C: ±0.1°C
Timer: weekly / real time / hour
Maximum Shelf Load: 44 lbs. (25 kg)
Plug Type: Nema 5-15
 †Value assumes fan is off. With fan at full speed, uniformity is ±0.2°C (51028066), ±0.3°C (51028067), and ±0.4°C (51028068).



Internal socket



Easy to clean



Internal glass door

Product Specifications

Model #	Number of Shelves (supplied/max)	Chamber Volume cu. ft. (L)	Chamber Dimensions Inches (mm)			Overall Dimensions Inches (mm)		
			W	H	D	W	H	D
51028066	2/13	2.3 (66)	14.5 (368)	13.9 (354)	20.0 (508)	22.2 (565)	20.9 (530)	28.3 (720)
51028067	2/16	3.67 (104)	14.5 (368)	18.3 (464)	23.9 (608)	22.2 (565)	25.2 (640)	32.3 (820)
51028068	2/19	6.3 (178)	21.4 (543)	18.3 (464)	27.9 (708)	29.1 (738)	25.2 (640)	36.2 (920)

Ordering

Cat. #	Model #	Electrical (60 Hz)			Watts	Ship Wgt. lbs (kg)	Qty.
		Volts	Amps				
63154-10	51028066	120	5	600	99 (45)	each	
63154-20	51028067	120	7	840	123 (56)	each	
63154-30	51028068	120	8.5	1020	154 (70)	each	



► Cooling Chambers and Ice Baths

► The CoolSafe™

The World's Most Versatile and Effective Benchtop Cooling and Storage System

Complete CoolSafe Systems

Versatile – Designed for 0.2ml tubes (strips or trays), 96-well and 384-well microplates, 0.5ml, 1.5ml, 5ml tubes

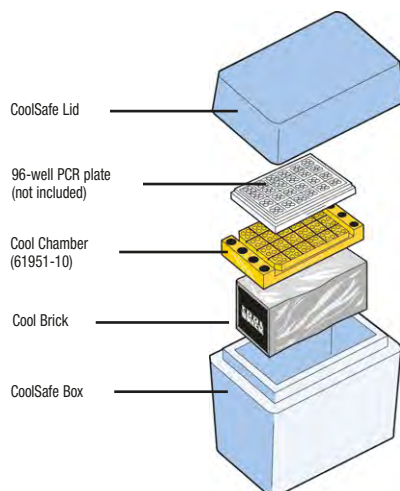
Specially Formulated – Cool Bricks maintain a constant temperature (1°C or -10°C) for up to 10 hours

Quality Engineering – Each aluminum Cool Chamber surrounds tubes to guarantee sustained cold temperatures

Durable – The CoolSafe box is made of triple density expanded polystyrene and molded under extreme pressure creating a durable container that guarantees temperature stability.

Easy to Use – Easily interchange Cool Chambers and Cool Bricks for different sized tubes.

No Mess – Messy ice buckets are now a thing of the past!



"Surround-a-Tube" Engineering

Super temperature-conducting solid metal surrounds the vast majority of the surface area of the microtube, keeping the entire sample or tray of samples cool.



Ordering the Complete CoolSafe Systems

Each complete CoolSafe System includes:

- 1 CoolSafe box with lid
- 1 Cool Chamber
- 2 Cool Bricks (1°C & -10°C)

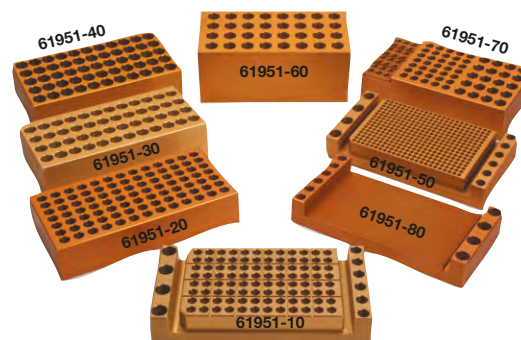
Cat. #.	Description	Holes	Unit
61950-10	For 0.2ml PCR plates or tubes	96**	kit
61950-20	For 0.5ml tubes	91	kit
61950-30	For 1.5ml tubes	48	kit
61950-40	For 1.5ml Cryogenic tubes	55	kit
61950-50	For 384-well plates	384**	kit
61950-60	For 5ml tubes	32	kit
61950-70	For 0.2ml, 0.5ml, 1.5ml tubes	79	kit
61950-80	For flat-bottom microplates	None**	kit

**These Chambers also include 4 holes for 1.5ml tubes and 6 holes for 0.5ml tubes

► CoolSafe Individual Components

► Cooling Chambers

Each Cooling Chamber is a solid aluminum block that surrounds inserted tubes to guarantee sustained hot or cold temperatures.



Cat. #	Dimensions	Ideal Use
61951-10	6 1/8" (L) x 3 1/8" (W) x 1" (H)	0.2ml tubes
61951-20	6 1/2" (L) x 3 1/8" (W) x 1 1/4" (H)	0.5ml tubes
61951-30	6 1/8" (L) x 3 1/8" (W) x 1 1/2" (H)	1.5ml tubes
61951-40	6 1/8" (L) x 3 1/8" (W) x 1 1/2" (H)	1.5ml Cryogenic tubes
61951-50	6 1/8" (L) x 3 1/8" (W) x 1" (H)	384-well microplates
61951-60	6 1/8" (L) x 3 1/8" (W) x 2 1/2" (H)	5ml tubes
61951-70	6 1/2" (L) x 3 1/8" (W) x 1 1/2" (H)	multi-tube format
61951-80	6 1/8" (L) x 3 1/8" (W) x 1" (H)	Microplate Chamber

► Cool Bricks

Each Cool Brick allows up to 10 hours of benchtop temperature stability. Two temperature zones are available: 1°C and -10°C.



Cat. #.	Ideal Use	Temp	Qty
61952-10	For 5ml tubes	1°C	each
61952-20	For 0.2ml, 0.5ml, 1.5ml & 5ml tubes	-10°C	each
61952-30	For 0.2ml, 0.5ml & 1.5ml tubes	1°C	each

► CoolSafe Box

The CoolSafe Box is made of triple density expanded polystyrene and is molded under extreme pressure to create a durable container that guarantees temperature stability.

► CoolBag

The CoolBag is an insulated cooler for added coolness of critical samples. Use the shoulder strap for easy transporting from lab to lab.



Cat. #.	Description	Qty
61953-01	CoolSafe Box	each

► The CoolSafe™ (continued)

► The CoolSafe™ Deluxe

- Additional sample protection
- Improved portability
- Smaller bench-top footprint
- Clear lid for sample visibility

Each complete CoolSafe Deluxe system includes:

- 1 CoolSafe Deluxe box
- 1 Cool Chamber
- 2 Cool Bricks (1°C & -10°C)



**These Chambers also include 4 holes for 1.5ml tubes and 6 holes for 0.5ml tubes

Cat. #	Description	Holes	Unit
61954-10	For 0.2ml PCR plates or tubes	96**	Kit *
61954-20	For 0.5ml tubes	91	Kit *
61954-40	For flat-bottom microplates		Kit *
61954-55	CoolSafe™ Deluxe box	None**	each

► Stand Alone Specialty Cooling Chambers

Ideal for Ice Pans, Ice Buckets, and Cold or Hot Plates

Multiple Uses – Ideal for use on hot or cold plates or for temperature sensitive liquid transfers

Durable – Anodized aluminum blocks will not rust or corrode

Ideally Sized – A variety of options are available to accommodate PCR tubes and trays, 1.5ml tubes, 15ml and 50ml conical tubes

A variety of Specialty Chambers are available to keep samples cool and on ice while you work. Freeze these Chambers overnight for added cooling convenience.

These Chambers do not fit the CoolSafe system; use separately (*61955-30 not pictured)

► 15ml & 50ml

Chambers

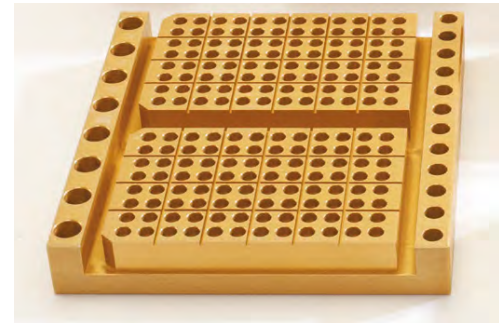
Each Chamber is an anodized aluminum block. Excellent temperature conductors. Use with hot plates or with our Ice Pans & Ice Buckets.



Cat. #	Dimensions	Ideal Use	Holes	Qty
61951-10	6½"(L) x 3½"(W) x 1"(H)	15ml tubes	6	each
61955-21	3½"(L) x 3½"(W) x 3½"(H)	15ml tubes	12	each
61955-40	3½"(L) x 1¾"(W) x 3½"(H)	50ml tubes	2	each
61955-41	3½"(L) x 3½"(W) x 3½"(H)	50ml tubes	4	each

► Double Chamber for 0.2ml tubes

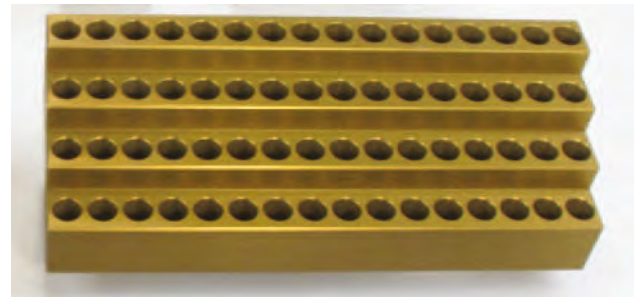
The Double Chamber fits two 96-well PCR trays or individual tubes and strips. Each edge can accommodate up to (12) 0.5ml and (8) 1.5ml tubes. Great for



temperature sensitive liquid transfers. It measures 6¾" x ½" x 1".

Cat. #	Dimensions	Ideal Use	Holes	Qty
61955-10	6¾"(L) x 6¾"(W) x 1"(H)	0.2ml PCR Plates, tubes	192	each

► 64-Place Step Chamber



Description: Anodized aluminum block sized to fit 64 1.5ml microtubes (16 holes per 'step') for easy viewing of samples when in the freezer, on the bench-top or in an ice pan or ice bucket.

Cat. #	Dimensions	Ideal Use	Holes	Qty
61955-30	8¼"(L) x 3"(W) x 2½"(H)	1.5ml tubes	64	each



► 80-Well Chamber

The 80-well Chamber is a solid, anodized aluminum block sized to fit 1.5ml microtubes. An excellent temperature conductor for use with hot plates and ice buckets. It measures 8.25" x 2.625" x 1.25".

Cat. #	Dimensions	Ideal Use	Holes	Qty
61955-80	8¼"(L) x 2¾"(W) x 1¼"(H)	1.5ml tubes	80	each

► EMS Freeze Substitution Kit

Freeze Substitution is a process for low temperature dehydration and fixation of rapidly frozen cells that usually takes days to complete. With the amazing work of K.L. McDonald and R.I. Webb¹ they have now introduced a new method for freeze substitution with a basic kit that we are proud to offer.

With this unique kit researchers are now able to achieve excellent freeze substitution results in as little as 90 minutes for cells of small volume such as bacteria and tissue culture cells. For those cells of greater volume or that have significant diffusion barriers such as cuticles or thick cell walls, one can extend the time to 3 hours simply by putting a lid on the box.

For more information on the EMS Freeze Substitution Kit, see page 692-693

Cat. #.	Description	Qty
34500	EMS Freeze Substitution Kit with Shaker	kit
34500-S	EMS Freeze Substitution Kit without Shaker	kit
34502	EMS 111 Platform Shaker, 115 Volt	each
62013-10	EMS 002 Ice Chest	each
34504-B	EMS 003 Heater Block, 12mm	each
34504-R	EMS 003 Heater Block, 13mm	each
34505	EMS 004 Temperature Probe	each
34506	EMS 005 Cryo Tubes	100/pk
34507	EMS 006 Data Logger	each

Kit Features

EMS 111 Platform Shaker
 EMS 002 Ice Chest
 EMS 003 Heater Block
 EMS 004 Temperature Probe
 EMS 005 Cryo Tubes
 EMS 006 Data Logger



EMS 111 Platform Shaker



EMS 002 Ice Chest



EMS 003 Heater Block



EMS 004 Temperature Probe



EMS 005 Cryo Tubes



EMS 006 Data Logger

► Ultraviolet Lamps; UV Lights

► High-Intensity UV Lamp

These UV Lamps are designed to provide a beam of 365nm wave with an average 7000µW/cm² at 15" (38.2cm). Its powerful 100-watt light source fluoresces fine particles and hard to see surface defects. The lifetime of the light bulb is 2,000 hours. At 18" (45.7cm), this lamp produces a highly intense center of UV irradiance about 5" (12.5cm) in diameter. This offers the microscopist a quality tool in staining and polymerization as well as many other uses that are related to UV lights in EM labs. The lamp head rotates a full 3600, and is mounted into a removable pistol grip handle, which inserts firmly into the transformer base (as a stand); it weighs only 21½ lbs. It comes with a 5" (12.5cm) diameter black light filter which is recessed in the head. If more details are needed in order to study the subject, a second filter is available as an option that reduces the visible light. Powered by 115V, 60Hz, total cord length is 15 ft. (4.57m).



72414	Hi-Intensity UV Lamp, 115V	each
72415	Hi-Intensity UV Lamp, 220V	each
72416	Hi-Intensity UV Filter	each
72417	Hi-Intensity UV Bulb	each
72418	Extension Cord (20')	each
72420	UV Safety Spectacles	each

► Low-Intensity UV Lamp

This 6-watt UV lamp meets most laboratory requirements; such as, fluorochemistry, bacterial identification, specimen staining, titration processes, photochemical reactions, aflatoxin detection, and curing UV cements. Constructed from Cyolac® plastic, with a longwave emission of 365nm and an intensity at 6" (15.2cm) of 750µm/cm². The bulb has a rated life of 6,000 hours. It can be used as a hand-held light or it may be mounted on a stand (optional). Powered by 110V/60Hz or 220V/50Hz.



72422 (The UV Lamp Stand is an optional)



72422	Low-Intensity UV Lamp, 110V	each
72423	Low-Intensity UV Lamp, 220V	each
72424	Low-Intensity UV Lamp Stand	each
72425	Replacement Low-Intensity Bulb	each

► Laboratory Jacks – LabJack

This LabJack provides stable height adjustment and support for items in the lab such as flasks, baths or hot plate stirrers. Top and bottom plates are constructed of anodized aluminum while the support mechanism is made of chrome plated steel.

Cat#	Plate WxL	Vertical Lift	Qty.
63225-24	6 x 6 in	7 in	each



Safety Accessories and Supplies

Spill Control, Stabilizers, and Cleanup
Hand Care, Cleansers, and Germicidal
Solutions

Lab Organizers

Lab Carts, Shelves, and Trays

Drying Racks, Holders, Carriers, Turntables

Lead Shields, Surface Protectors, Hot Mits,
and Wash Bottles

Air Purifiers



**Electron
Microscopy
Sciences**



Safety in the Electron Microscopy Laboratory

All of us at Electron Microscopy Sciences are concerned for the safety and well being of the microscopy community. For this reason we highly recommend the following publications regarding safety in the lab:

ELECTRON MICROSCOPY SAFETY HANDBOOK; Vernon C. Barber and Deborah L. Clayton, Editors. San Francisco Press Inc., 1985 ISBN 0-911302-56-5

ELECTRON MICROSCOPY PRINCIPLES AND TECHNIQUES FOR BIOLOGISTS; John J. Bozzala and Lonnie D. Russell. Jones and Bartlett Publishers., 1992 pp. 498-519. ISBN 0-86720-126-6

SAFETY IN THE SCANNING ELECTRON MICROSCOPY LAB; J. Bastacky and T.L. Hayes, Scanning 7:255-72., 1985

► Tissue-Tek® NEUTRA-GUARD™ Aldehyde Control Systems

These products offer a safe, efficient and economical solution for the control of aldehyde wastes and/or spills:

- 4 unique products for fast, safe and efficient aldehyde neutralization
- Eliminates exposure to potentially hazardous conditions
- It is a certified technology for treating formalin waste
- Complies with federal, state, and local ordinances

► Neutralex™

- CAL/EPA certified technology
- Complete aldehyde neutralization in 15 minutes
- No drain-clogging polymer by-products
- Final neutralization levels down to 10 ppm
- No pH adjustment
- Easy to use: Pre-measured pouches are ready to use convenient to store and will not leak or freeze during the winter months.
- Neutralex® Starter Kit consists of: 16 Neutralex® pre-measured pouches, each pouch neutralizes 4 liters (1 gallon) of aldehyde; Aldehyde Test Kit consisting of 100 analytical test strips; 9.5 L (2.5 gallon) Reaction Container



► Neutra Pads™

- Revolutionary grossing pad that absorbs and neutralizes 10% formalin
- Significantly reduces the effects of noxious vapors
- Unique pad design encapsulates formalin and promotes neutralization
- Exclusive plastic pad backing prevents escape of harmful liquids; keep grossing area drier, cleaner and safer
- Neutra-Pads™ come packaged: 10 pads per bag, 10 bags per case, each pad measures 20.3 x 25.4 cm (8" x 10")



► Neutra-Wipes™

- Rapidly absorbs and neutralizes small formalin spills
- Significantly reduces the effects of noxious vapors
- Perfect liner for tissue transporting trays
- Ideal as a shelf liner in tissue storage areas
- Convenient pop-up dispensing container provides fast accessibility to wipes
- Neutra-Wipes™ Starter Pack consists of: 1 dispenser, 1 roll of Neutra-Wipes™ Four-Roll Packs consists of: 4 rolls, 60 wipes per roll; Wipe size: 30.5 cm x 31.8 cm or (12" x 12.5")



► Neutra-Form™

- Fast, effective control agent for accidental aldehyde spills
- Diminishes harmful vapors
- Neutralizes hazardous aldehydes
- Neutra-Form™ Sets consist of: 2 containers; each container neutralizes larger spills of 10% formalin or 2% glutaraldehyde.



Cat.#	Tissue-Tek	Description	Pack
63330-SK	4046	Neutralex™ Starter Kit	each
63330-16	4047	Pre-measured Pouches	16/pk.
63330-10	4050	Aldehyde Test Kit	100/pk.
63330-25	4276	9.5 L Reaction Container	each
63332-01	4295	Neutra-Pads™	10/pk.
63332-10	4295	Neutra-Pads™	100/pk.
63334-SP	4278	Neutra-Wipes™ Starter Pack	each
63334-04	4279	Neutra-Wipes™ 4-Roll Pack	each
63335-02	4304	Neutra-Form™ Set	each

➤ **Formalin Spill Control; F-gard- ER**

For the handling and disposing of formaldehyde containing solutions. It immobilizes, cools, and contains spills. As well, it reduces the escape of formaldehyde gas and significantly reduces formalin concentration. F-gard- ER aids in reducing exposure to formaldehyde gases by immobilizing the formalin and transforming it to an easily removed semi-solid mass. The mass cools rapidly minimizing formaldehyde off-gassing.

24140-01	Formalin Spill Control	11 oz
24140-06	Formalin Spill Control	12x11 oz/cs

➤ **Formaldehyde Spill Response™ Kit**

This kit features FSC-1™ to aid in reducing exposure to formaldehyde gas in the event of a spill. The formalin is transformed into an easily removable semi solid mass. The resulting mass cools rapidly to minimize formaldehyde off gassing.



KIT CONTAINS:

- | | | |
|--|--|------------------------|
| 1 – 11oz bottle of FSC-1™ solidifier (EMS #24140-01) | 1 – Respirator | 4 – Scoop/scrappers |
| 1 – Pair vented goggles | 1 – Open backed gown to protect clothing | 3 – Wiper pads |
| | 1 – Pair nitrile gloves | 4 – Thirty gallon bags |

Cat. #	Description	Qty
24141	Formaldehyde Spill Response Kit in Hard Case	each
24141-R	Formaldehyde Spill Response Kit , Refill	each

➤ **Glutaraldehyde Spill Control; G-gard-ER**

Transforms glutaraldehyde to a nearly neutral solution and renders the solution acceptable for sewer disposal. Prepares glutaraldehyde for biodegradation. Reduces biocidal activity and odor. 65g G-gard pre-treats one gallon of 1% solution.

24142-01	Glutaraldehyde Spill Control	62.4g pouch
24142-10	Glutaraldehyde Spill Control	10 x 62.4g pouches

➤ **Glutaraldehyde Clean-up™ Kit**

The kit contains GPT-1™ pre-treatment and neutralizer, and Green Z™ fluid control solidifier. Sprinkle GPT-1™ onto the glutaraldehyde spill. Once the spill turns brown, it has been neutralized. Then apply the Green Z, which transform the neutralized spill into a semi-solid mass.



KIT CONTAINS:

- | | | |
|---|-------------------------------|---------------------------------|
| 1 – 5oz bottle of Green Z™ | 1 – Pair of high-risk gloves | 2 – Scoop/scraper |
| 1 – 2.2oz pouch of GPT-1™ (EMS #24142-01) | 1 – Goggle | 1 – Disposable bag with closure |
| | 1 – Glutaraldehyde respirator | 1 – Instruction |

Cat.#	Description	Qty
24143	Glutaraldehyde Spill Response Kit in Hard Case	each
24143-R	Glutaraldehyde Spill Response Kit , Refill	each

➤ **Lab-Sorb**

Converts Liquid Waste to Solid Waste for Easy Disposal



Turn this...

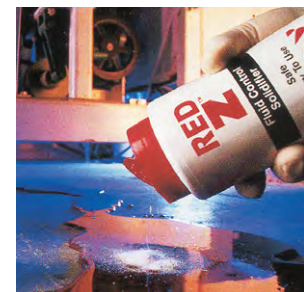
...into this

- Convenient - Includes extra durable disposal bags, super absorbent LabSorb granules and a convenient graduated scoop.
- Prevents Spills - Reduces the possibility of accidentally spilling liquid waste in the lab. If spills do occur, use LabSorb for safe liquid containment during cleanup.*
- Quick - Convert liquids to solids in seconds.
- Adaptable - Apply to any volume of liquid waste including 500mL, 600mL, 1L and 2L vessels. One jar of LabSorb can absorb up to 50 litres of liquid.
- Versatile - LabSorb granules can rapidly absorb aqueous or mixed aqueous and organic solvent waste

68552-06	Lab-Sorb Jar	16 oz
68552-07	Kit - Lab-Sorb 16 oz jar plus 25 small bags	each
68552-08	Kit - Lab-Sorb 16 oz jar plus 25 medium bags	each
68552-09	Kit - Lab-Sorb 16 oz jar plus 25 large bags	each
68552-10	Variety kit - Lab-sorb plus 15 small, 10medium, and 5 large bags	each
68552-11	50 small (500 to 600m)l bags	each
68552-12	50 medium (1L) bags	each
68552-13	50 large (2L) bags	each

➤ **RED-Z - Fluid Control Solidifier**

RED-Z will solidify any water base fluid at a ratio of ¾ oz to 1 full liter.



- Solidifies, decontaminates and deodorizers.
- Contains chlorine (NaDCC) an EPA registered disinfectant - almost twice the amount recommended by the CDC.
- An Alternate treatment to steam sterilization or incineration.
- For blood and other body fluids.
- Available in a pointed top bottle that fits easily in porthole containers and in a flip-top shaker top bottle for large spills.

24145-10	Red-Z™ Shaker Top Bottle	11 oz.	each
24145-25	Red-Z™ Shaker Top Bottle	15 oz.	each

► Break-Safe™ Ampoule Opener

EMS Introduces Break-Safe™ allowing you to safely open up to 3 ampoules at one time

Box style design allows one handed opening of up to 3 ampoules at a time. Gently pressing down on the lid snaps ampoule necks clean while keeping them contained within the device and away from fingers. After removing ampoule contents, simply turn the device upside down over a trash receptacle to safely discard ampoules and tops.



Features:

- 4 inserts allow opening of 1ml, 2ml, 5ml and 10 ml ampoules
- Open ampoules easily and safely
- Transparency allows unobstructed viewing of ampoule contents at all times
- Copolyester plastic construction has broad chemical resistance

60607 Break-Safe™ Ampoule Opener each

► Ampoule Breaker; Soft Silicone

EMS EXCLUSIVE Reusable – Made from soft silicone. It offers a simple way to break pre-scored glass ampoules safely. Accommodates 5, 7, and 10 ml size ampoules. Reduces injury and spillage.



60600 Ampoule Breaker; Soft Silicone each

► Ampoule Cracker™

The Ampoule Cracker™ is a disposable plastic fracture and safety collar, which is specially designed to aid in the breaking open of pre-scored glass ampoules. Simply slip the Ampoule Cracker™ over the top at the pre-scored portion, snap it, and discard both the ampoule top and the safety collar to prevent cross contamination.



Cat #	Description	Pack
60605-04	Ampoule Cracker for Ampoule Size 1 – 4 ml	500/pk
60605-10	Ampoule Cracker for Ampoule Size 5 – 10 ml	500/pk
60605-20	Ampoule Cracker for Ampoule Size 10 – 20 ml	500/pk

► Bottle and Jar Opener

THIS UNIQUE OPENER:

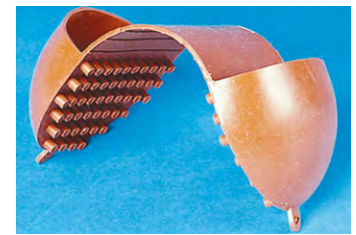
- Saves your wrist by making it easy to open bottles and jars
- Open lids up to 4.5" in diameter
- Eliminates the risk of cracking the cap by using the wrong tool



64493-20 Bottle And Jar Openers each

► Hot Hand® Protector Pad

Made from strong silicone and it withstands temperatures as high as 500°F (260°C). A gripping surface with built in multi suction studs for a non-slip grip. Has two pockets for thumb and fingers.



64480 Hot Hand Protector Pad each

► Benchtop Mat

A flexible polyethylene film backing which has a highly absorbent upper surface which traps water, dyes, resins, solvents, and radioactive solutions. The sheets can be rolled up and discarded after use. Ideal for daily use in EM labs. Benchtop mat comes in a roll 20" (50.8cm) wide and 50 ft. (15.2m) long in a dispenser carton, or a cut size of 20" x 24" sheets.



64445 Benchtop Mat 50' roll each
64446 Benchtop Mat Cut Size 20"x24" 100/bx

► Spill Control Tray

The tray is made from vacuum formed polystyrene ½" (12.7cm) deep with an external flange. The overall dimensions are 23"x27" (58x69cm). The tray accommodates our Benchtop mat (Cat. #64446). These trays are very useful in the biology or chemistry labs.



64448 Spill Control Tray each

➤ **TubePopper™**

For One-Handed Opening and Closing of Microtubes

- Improve Efficiency - Ring design allows researcher to wear the
- TubePopper on the pipetting hand while pipetting
- Finger Saving - "Pry open" design means tubes pop right open, saving your fingers from the repetitive stress of opening microtubes
- Snag-Free - Bottom portion of TubePopper allows caps to be pressed closed without snagging glove fingers
- Universal - Works with most flat-top and domed microtubes
- One Size Fits All - TubePopper can be worn on any finger so you can find the perfect pipetting fit



Cat #	Description	Qty
70556-21	TubePopper	each

➤ **Stabilizing Rings**

Vinyl coated lead rings which stabilize glassware that is immersed in water baths; reduces tilting and chemical spills.

Cat.#	Weight gm	I.D. mm	Fits Glassware	Pack
64435	165	20	5-10ml cylinders	each
64436	237	48	125-500ml flasks	each
64437	454	56	250-1000ml flasks	each
64438	681	61	500-2000ml flasks	each
64439	408	74	1000-4000ml flasks	each
64440	Stabilizing Rings, assorted sizes			5/pk



➤ **VIKEM® Vinyl Coated Lead Sheets**

A soft lead sheet coated with Vikem vinyl has many uses for stabilizing laboratory equipment in water baths or any application where extra weight is needed. Small sheets are handy as a hold-down weight for note books, drawings or charts on the table top. Longer sheets may be bent into the shape of the glassware to keep them from sliding or tilting. Coated lead sheets are 0.085" (2.2mm) thick.

Cat.#	Dimensions		Weight		Qty
	in	mm	lb	gm	
64434-01	2x7	51x178	.36	163	each
64434-03	2x12	51x305	.62	281	each
64434-04	6x16	152x406	2.47	1121	each
64434-05	8x24	203x610	4.93	2238	each



➤ **VIKEM® Vinyl Coated Lead Wire**

This lead wire is 1/4" (6.4mm) in diameter and is coated with a chemical-resistant red Vikem vinyl. Its 12" (300mm) length and its flexibility make it a very versatile weight. It can be coiled around a flask, beaker, or any other irregular shape. It weighs only 1/4 lb (114g).

64443-00	Vinyl Coated Lead Wire	each
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➤ **Weighted Beaker/Flask Holder**

This weighted holder grips the beaker or flask firmly in four flared stainless steel prongs. The Vikem® vinyl-coated lead ring secured beneath the beaker keeps it immersed in water, providing a low center of gravity which allows water to circulate underneath the beaker.

Cat.#	Fits Beaker Size		Weight		Diameter		Qty
	ml	lb	gm	in	mm		
64441-01	100	.36	165	2.4	60	each	
64441-02	250	5	237	3.2	80	each	





70573 (DermaPlus not included)

► DermaPlus

A greaseless, non-toxic skin protection. It is a sophisticated formulation of lanolin, aloe vera and vitamin E, that can be applied to any area of the skin. It provides two distinct advantages:

- A barrier to aqueous-based materials.
- It contains one of the most effective broad-spectrum antimicrobial agents available.

DermaPlus is able to repel substances with any pH ranging from

0-14 (acids and bases except HF); caustic substances; and organic fluids. DermaPlus provides a barrier against continued aggravation of abused sensitive skin. It prevents the continuation of irritation enabling the skin to heal naturally, even after repeated washings. DermaPlus is not meant to be a glove replacement; however, it does offer added extra protection to the

skin in case of glove failure or leakage. On your hands it works as a "glove under a glove." It is a primary line of defense on the face, neck, and other exposed areas that are difficult, if not impossible to cover. Furthermore, it protects those that are exposed to microorganisms and/or toxic irritants. DermaPlus has been tested and is resistant to most chemicals used in microscopy. Due to its formula make-up once a layer is applied and dries (within 4-5 minutes) it works as an invisible barrier that protects the skin. It is long lasting (4 hours), convenient, comfortable, and safe.

70560	DermaPlus	2 oz.
70561	DermaPlus	12x2 oz./cs
70564	DermaPlus	6 oz.
70565	DermaPlus	12x6 oz./cs
70567	DermaPlus	12 oz.
70568	DermaPlus	12x12 oz./cs
70570	DermaPlus*	17 oz.
70571	DermaPlus*	6x17 oz./cs
70573	DermaPlus Dispenser	each

*Indicates that the Wall Mount Dispenser is required.

► Silver Bioguard Antimicrobial Wipe

Moisture activated silver particles bind bacteria proteins through an ion exchange with salt.



- Antimicrobial - Prevents the spread of bacteria and fungus.
- Anti-Odor - Alleviates odors caused by mold.
- Effective - Kills 99% of common microbes.
- Versatile - Use on door handles, switch plates, instrument panels or refrigerator or incubator gaskets.

68552-15	Silver BioGuard Roll, 0.75" x 100'	Roll
68552-16	Silver BioGuard Sheets, 2" x 5" 20/Roll	Roll

► Bio-Pure™ Alcohol Wipes

100% biodegradable - Proprietary fabric is formulated to easily break down over time.



- Green - Re-sealable and flexible packaging has a low carbon footprint.
- No Residue - 70% IPA/30% H₂O mixture evaporates completely.
- Lint-Free - Wipes won't scratch surfaces or optics.
- Durable Strong fabric won't fall apart.
- Ideal Use Clean lab surfaces, equipment, optical parts and cuvettes.

68552-14	Bio-Pure Alcohol Wipes	40/pk
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► Instant Hand Sanitizer (Fresh Scent)

Kill 99.99% of germs in 15 seconds without the use of soap and water. This formula evaporates completely with no rinsing required. Instant Hand Sanitizer contains aloe-vera which adds moisture with each use. Instant Hand Sanitizer is available in convenient pump dispensers, single use pouches and flip-top dispenser bottles. Our Hand Sanitizer helps you meet OSHA, APIC and CDC hand washing recommendations in the absence of soap and water. Instant Hand Sanitizer has demonstrated virucidal activity against HIV-1 and Avian Flu A in 15 seconds.

Wall Mount Bracket for 16 oz Pump Bottle

Wire bend and rubber coated bracket to hold 16 oz Fresh Scent Hand Sanitizer bottle in a convenient location for office or production areas wherever sanitizing hand needed.



70575-01	Hand Sanitizer, Fresh Scent, 0.125oz (3g) Pouch	each
70575-02	Hand Sanitizer, Fresh Scent, 2oz Squeeze Bottle	each
70575-03	Hand Sanitizer, Fresh Scent, 1.5oz Tottle Bottle	each
70575-16	Hand Sanitizer, Fresh Scent, 16oz Pump Bottle	each
70575-64	Hand Sanitizer, Fresh Scent, 64oz Bottle	each
70575-50	Wall Mount Bracket	each

➤ Antiseptic Bio-Hand Cleaner



As infection control becomes a primary public concern, methods for effective hand washing are more important than ever before. Antiseptic Bio-Hand Cleaner is your solution for instant hand sanitizing anytime, anywhere. It kills 99.9% of disease-causing germs and reduces the risk of infection therefore helping prevent the spread of germs. Within just 15 seconds of application, hands are clean, fresh and germ free - without soap, water or towels! The unique formulation with Aloe Vera will not dry out the skin and actually leaves hands feeling softer. Meets OSHA and APIC standards.

70574-01	A.B.H.C.™ Fresh Scent, 3g Pouch	1000/bx
70574-05	A.B.H.C.™ Fresh Scent, ½ oz Pouch	150/bx
70574-40	A.B.H.C.™ Fresh Scent, 4 oz/Bottle	each
70574-64	A.B.H.C.™ Fresh Scent, 64 oz/Spray Bottle	each

**Bio-Pure™
Surfactant Wipes**

For the ease in removing dirt, grease and grime these general laboratory wipes are ideal for cleaning lab benches, door handles, pipettors, keyboards and instrument knobs.



They are lint free and they will not scratch surfaces yet they are extremely durable and will not fall apart. These wipes are 100% Biodegradable with a very low carbon footprint.

68551-12	Bio-Pure Surfactant Wipes	40/pk (68552-17)
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➤ SaniZide Plus™ - Germicidal Solution

This is ready to use, hospital grade, hard surface disinfectant/deodorizer. Our Quaternary Ammonium, alcohol-free formulation is non-flammable making SaniZide Plus™ safe to ship, as well as non-corrosive. Choosing SaniZide Plus™ helps you to comply with the OSHA Bloodborne Pathogens Standard, which requires the use of an “appropriate disinfectant” that is tuberculocidal and virocidal against HIV-1 and HBV.



Safe for use on: glass, porcelain, ceramic, metal, polyethylene, polypropylene, vinyl, polyester, rubber, bakelite, and many more hard surfaces. Packaging in a convenient spray dispenser bottle, either by pump or trigger.

70580-02	SaniZide Plus™, 2 oz Pump Bottle	each
70580-16	SaniZide Plus™, 16 oz Spray Trigger Bottle	each
70580-32	SaniZide Plus™, 32 oz Spray Trigger Bottle	each
70580-50	SaniZide Plus™, 1 gallon Bottle, for Refill	each

➤ Personal Antimicrobial Wipes -P.A.W.S.

P.A.W.S. provides sanitizing and extended antimicrobial action on the skin with an individually packaged. Pre-moistened 5”x8” towelette. Great for hands, P.A.W.S. is formulated with PCMX (Chloroxylenol -an antimicrobial agent) and Alcohol and provides the most rapid and greatest reduction of microbial counts on the skin (helping you comply with OSHA Bloodborne Pathogen Regulations). In addition, P.A.W.S. contains Aloe Vera to condition the skin and maintain dermal integrity. Packaged: 100 packets per dispenser box, and 50 towelette in a dispenser container.



70576-01	P.A.W.S. Fresh Scent Individually Wrapped	100/bx
70576-50	P.A.W.S. Fresh Scent Pull-out tub dispenser	50/bottle

➤ SaniWash™ - Antimicrobial Handwash

SaniWash™ contains gentle cleansers and special conditioners, including Aloe Vera, to wash hands without over drying or irritating the skin.



- Kills germs on contact.
- Extended antimicrobial action with PCMX.
- Pleasant fragrance.
- Conveniently packaged in pump dispenser bottles.
- Helps to control cross contamination.

70582-08	SaniWash™, 8 oz Pump Spray Bottle	each
70582-16	SaniWash™, 32 oz Pump Spray Bottle	each
70582-50	SaniWash™, 1 gallon Bottle, for Refill	each

► Organizers & Workstations

When it comes to safety, the first thing you should think of is lab organization. Everything that you need should be easily accessible at your fingertips. This will help avoid accidents, save time and money, and most important keep you in good health. Furthermore, a well organized laboratory will increase your productivity and efficiency as well as the quality of your work. These organizers and workstation and its related are designed and made from the latest PVC, ABS, HDPE technology with excellent workmanship to offer easy to clean, spacious, and attractive.

► Desktop MicroLab Organizer

You have two choices of wrap around or straight line designed. These organizers offer a protected center work area with stylist appearance.

- 3 Shelves and 2 built-in tool holder
- Built-in safety lips keep items securely on shelf.
- Book holder and 2 wipers dispensers.
- Long lasting with rugged PVC construction
- Easy to access

Organizer 1 – wrap around style measures: 36" (L) x 12" (W) x 12" (H)

Organizer 2 – straight line style measures: 24" (L) x 8.25" (W) x 12" (H). This model available optional with clear hinged acrylic doors help protect you supplies

Organizer 3 - straight line style measures: 30" (L) x 10" (W) x 15.75" (H). This model available optional with clear hinged acrylic doors help protect you supplies



Cat. #	Description	Qty
64390-02	Desktop MicroLab Organizer 1	each
64390-2D	Desktop MicroLab Organizer 1 with Acrylic Doors	each
64390-03	Desktop MicroLab Organizer 2	each
64390-3D	Desktop MicroLab Organizer 2 with Acrylic Doors	each

► The Balance-Serve Organizers



These Balance-Serves offer a generous amount of storage area, an ideal solution for those cluttered space.

- Keeps surrounding the weighing area clean
- Protect weighing supplies
- Available with or without acrylic doors
- Three convenient sizes.
- Rotating Balance-Serve: fingertip rotation for easy access.

Cat. #	Description	Dimensions			Qty
		L"	W"	H"	
64391-05	Balance-Serve A	12	5	12	each
64391-5D	Balance-Serve A with Doors				each
64391-07	Balance-Serve B	15.5	7	12	each
64391-7D	Balance-Serve B with Doors				each
64391-08	Balance-Serve C	16	7	12	each
64391-8D	Balance-Serve C with Doors				each
64391-10	Rotating Balance-Serve	13.625	12.875	13	each

► Wraparound Balance-Serve



This workstation features 13 compartments and shelves for serving the needs of the weighing task. Built-in accessory holders organize pens, markers, dissecting instruments, applicators, cotton swabs. Built-in Kimwipes dispenser.

Unit measures 33" L x 12"W x 12" H. Top shelf depth is 2 1/4", middle shelf is 3 1/4" and bottom shelf is 4 1/4"

64391-20	Wraparound Balance-Serve	each
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► The pH-Serve Organizer



The pH meter is a "common tool" in the lab, where there are usually multiple users. Spillage is common and supplies get scattered and misplaced. This unit makes excellent use of benchtop space and practically begs you to put supplies back where they belong.

- Built-in Kimwipes tissue dispenser
- Tall shelves to make room for large and tall items
- pH-Serve Model A is wrap-around, measures 36" (L) x 12" (W) x 12" (H)
- pH-Serve Model B, measures 12" (L) x 5" (W) x 12" (H)
- pH-Serve Model C, measures 24" (L) x 10" (W) x 12" (H)

Cat. #	Description	Qty
64392-36	pH-Serve Model A , Wrap-around	each
64392-13	pH-Serve Model B	each
64392-24	pH-Serve Model C	each

► Pipette Work Station

Your choice of single or double bins pipette work stations. The single unit has 4-position holder for pipettors, and the double bin unit has 7 positions.



- Clear, hinged acrylic lid
- Clear acrylic bins for easy viewing the contents
- Self closing lid

Dimensions

Cat. #	Description	L"	W"	H"	Qty
64385-09	Single Pipette Dispenser	9	7	9.5	each
64385-18	Double Pipette Dispenser	18	7	9.5	each

► Roll-Top Organizer

This organizer comes with three shelves. Shelves are progressively wider from top to the bottom, make it easy to retrieve stored item with ease.

- HDPE Construction
- Remarkable roll-top doors
- Door easily slides open or close
- Shelves with safety lips to keep contents from falling out
- Save bench-top space and improve the look of your lab.



Dimensions

Cat. #	Description	L"	W"	H"	Qty
64395-10	Mini Roll-Top Organizer	12	9	19	each
64395-01	Regular Roll-Top Organizer	24	9	19	each

► GC Column-Serve Organizers

Our GC columns make it easy to store and protect expensive, delicate glass and capillary GC columns

- Built-in tool holder
- Small part storage on top with hinged lid
- Optional light proof doors
- Small Column-Serve for 5 columns measures: 13.6" (L) x 10.5" (W) x 13.5" (H)
- Large Column-Serve for 10 columns measures: 28.25" (L) x 10.5" (W) x 13.5" (H)

Cat. #	Description	Qty
64403-50	Small GC Column-Serve	each
64403-60	Large GC Column-Serve	each
64403-51	Small GC Column -Serve w/Light-Proof Doors	each
64403-61	Large GC Column -Serve w/ Light Proof Doors	each



► Lab Safety Organizer

Designed for convenient and personal safety while one is entering or leaving the laboratory.

Acrylic doors keep dust and dirt away from supplies. Room for safety glasses, gloves, lab coat, disposable clothing, etc.

- 4 safety glass holder shelf.
 - 3 covered compartment
 - Gloves dispenser shelf
 - 3 hooks for lab-coat
 - Wall mount with cut out key holes
- Measures: 18.125" (L) x 7.2" (W) x 19.875" (H)

Cat. #	Description	Qty
64404-10	Lab Safety Organizer	each



► Rotate-Serve Stations



This all-in one turntable organizer offers neat and tidy looking for the daily-use in your lab at your reach. Made from PVC. This organizer also works well in side cabinet.



Dimensions

Cat. #	Description	L"	W"	H"	Qty
64389-10	Small Rotate-Serve Station	10.5	9.875	4.25	each
64389-20	Large Rotate-Serve Station	14.75	14.75	4.5	each
64389	Microtool & Reagent Rotate-Serve	13.25 Dia.		4.25	each

► HPLC-Serve Organizer

Keep your columns safe and tools at reach with this all inclusive organizer.

- Safely holds 10 columns
- Instant installation
- Built-in Kimwipes dispenser
- Unit measures 24" (L) x 6" (W) x 12" (H)

Cat. #	Description	Qty
64403-10	HPLC-Serve Organizer	each



➤ Organizer Bins

➤ Compartment Bins



Made from white ABS high impact plastic.

Double, triple, even quadruple your storage space

- Easy to maintain and clean
- Ideal to organize small items
- Easily access to stored items
- Available without or with Blue Acrylic doors

Cat. #	Description	Dimensions			Qty
		L"	W"	H"	
64360-5	5 Compartments and 1 Shelf	12	10.25	16	each
64360-5D	5 Compartments and 1 shelf with Doors	12	10.25	16	each
64360-8	8 Compartments (4-Plus-4)	24	10	12.5	each
64360-8D	8 Compartments (4-Plus-4) with Door	24	10	12.5	each
64360-10	10 Compartments and 1 Shelf	24	10.75	16	each
64360-10D	10 Compartments and 1 Shelf with Doors	24	10.75	16	each
64360-13	13 Compartments and 1 Shelf	12	7.25	12	each
64360-13D	13 Compartments and 1 Shelf with Doors	12	7.25	12	each

➤ Workstation Storage Dispenser Bins

- Fabricated from white and clear acrylic.
- Hinged top cover assures easy filling.
- Hinged front cover provides a generous opening for easy removal.
- All items that are stored remain dust-free, yet transparent through the clear front window.
- Available in two sizes.

Cat.#	Description	lbs	L"	W"	D"	Qty.
64364-07	Storage/ Dispenser Bin	4.8	6	6½	7	each
64364-16	Storage/ Dispenser Bin	3.0	8	5½	16	each

➤ Adjustable Compartment Bins



- Adjustable dividers allow you to change compartment size to fit the items
- Compact sizes for storing small items
- Available with or without clear acrylic doors
- Save your bench-top space

Cat. #	Description	Dimensions			Qty
		L"	W"	H"	
64384-08	8 Compartments & 2 Shelves	12	10	20	each
64384-8D	8 Compartment & 2 Shelves with Door	12	10	20	each
64384-14	14 Compartments & 2 Shelves	24	10	20	each
64384-14D	14 Compartment & 2 Shelves with Door	24	10	20	each
64384-16	16 Compartments and 2 Shelves	12	7.25	11.75	each
64384-16D	16 Compartment & 2 Shelves with Door	12	7.25	11.75	each

➤ Top-Loading Dispensing Bins



Bins are made from ¼" thick PVC. They are chemical resistant and easy to clean. Ideal for pipette tips, small vials, cassette lids, cassette base molds, cotton swabs, aluminum stubs, embedding capsules etc.

- Removable top for easy loading
- Hinged clear acrylic door
- Different sizes for your needs

Cat. #	Description	Dimensions			Qty
		L"	W"	H"	
64388-05	Small Top-Loading Bin	5.25	7.50"	9.25	each
64388-12	Medium Top-Loading Bin	11.75	7.5	9.25	each
64388-18	Large Top-Loading Bin	18.25	7.5	9.25	each

➤ Flat Bins with Lid



Organize all your personal items with these covered bins. Ideal for store pipettes, stoppers, razor blades, scalpel blades, small tools etc.

- Hinged lid protect contents from dust
- Perfect for drawer or bench top use.

Cat. #	Description	Dimensions			Qty
		L"	W"	H"	
64362-4	4 Compartment Flat Bin with Clear Lid	13	13.5	3.5	each
64362-5	5 Compartment Flat Bin with Red Lid	16.5	13.5	3.5	each
64362-11	11 Compartment Flat Bin with Green Lid	18.5	13.5	3.5	each

➤ Standing Bins



For work benches, these divided bins provide convenience access to everyday supplies.

- Lightweight – PVC resists chemicals and scratches
- Sturdy for years of service
- Variety sizes to your choice
- Corner bins will transform wasted space into useful storage

Dimensions

Cat #	Description	L"	W"	H"	Qty
64358-6	6 Compartment Standing Bin with Door	15.25	5.25	10.5	each
64358-8	8 Compartment Standing Bin no Door	20.25	5	10.5	each
64358-4C	4-Compartment Corner Bin	17	8.5	15.75	each

➤ Pipette Tip Disposal Bin (Gamma Protection)

Gamma (g) rays are produced when an unstable isotope such as ¹²⁵I enters into nuclear decay; this form of electromagnetic radiation is attenuated by lead. The gamma rays intensity increases exponentially as the thickness of the lead increases. The recommended thickness of lead for use with ¹²⁵I is 0.5mm. We use 3mm lead for all of our g protection products.



Other isotopes shielded by our products include 32P, 51CR, 35S, 33P, 3H, and 14C. The enclosed boxes are perfect for short-term storage of isotopes and contaminated labware. All our gamma disposal boxes feature a polyethylene liner and sleek black acrylic exterior.

The box measures: 6" (L) x 6" (W) x 10" (H)

64451-01	Pipette Tip Disposal Bin, Gamma Protection	each
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➤ Lab Carts

If you need mobility in the lab with all the needs at the time you perform the works, these lab carts are your answers.

➤ Lab Islands™

This mobility storage cart is the perfect unit for your lab. Made of HDPE, and comes with the roll top door offers additional safety over traditional doors.

- Waist high mobile lab bench in three sizes with up to 8' x 2' of work surface
- One large pull-out shelf with 1.5" safety lip made entirely from HDPE.
- Lockable caster wheels
- Secure locking door comes with two keys
- With translucent of HDPE, easy to see the contents inside.
- Available with variety sizes for your choice
- Some assembly required.



Dimensions

Cat. #	Description	L'	W'	H"	Qty
64400-10	Lab Island™ Model A	2 (61cm)	2 (61cm)	34.75 (88cm)	each
64400-20	Lab Island™ Model B	4 (121cm)	2 (61cm)	34.75 (88cm)	each
64400-30	Lab Islands™ Model C	8 (244cm)	2 (61cm)	34.75 (88cm)	each
64400-50	Non-Ferrous Lab Island™ Model A				
64400-60	Non-Ferrous Lab Island™ Model B				
64400-70	Non-Ferrous Lab Islands™ Model C				

➤ Tall Slanted Shelf Cart

Specially designed Slanted shelves on the cast wheels let you organize and store small or daily use items within your reach, even the protocol instruction notes

- Items are neatly organize on the open shelves
- Items mostly at eye levels and easily reach
- The slanted design offers more shelf spaces
- Filed items with slanted position prevents from sliding out.
- Smooth rolling casters come with easy lock & unlock
- Bottom compartment with clear acrylic door for storing bulk supplies
- Overall measures: 18.875" (L) x 17.5" (W) x 56.375" (H)
- Save value space in your lab.



Cat. #	Description	Qty
64401-10	Slanted Shelf Cart – Clear Door	each
64401-50	Non-Ferrous Slanted Shelf Cart	each

➤ Deluxe Lab Cart (G-1000 Series)

High capacity deluxe cart – offers versatility along with more than 17ft2 of movable storage space.

- HDPE top provides a completely inert work space.
- Heavy duty casters offer smooth rolling and lock option when needed.
- Three equally sized drawers slide on glides
- Large bottom compartment (16" L x 16" W x 14" H) with hinged blue acrylic door
- Gloves/Wiper dispenser on both sides
- Two shelf pocket on each side are 25" (L) x 3.5" (W) x 4" (H)
- Available variable top sizes for your choice. Color clear



Dimensions

Cat. #	Description	L"	W"	H"	Qty
64381	Deluxe Lab Cart, 23" Top	23	17	34.5	each
64381-29	Extended Deluxe Lab Cart, 29" Top	29	17	34.5	each
64381-50	Non-Ferrous Deluxe Lab Cart, 23" Top	23	17	34.5	each
64381-60	Non-Ferrous Extended Deluxe Lab Cart, 29" Top	29	17	34.5	each

► Space Saving Lab Cart

Store the most commonly used lab supplies in this lab saving space cart.

- Heavy-duty casters with two locking
- Built-in handle for ease of handling
- HDPE top and bottom
- 1 large compartment with hinged acrylic door
- 3-extra-wide drawers to store supplies



Cat. #	Description	Qty
64383	Space Saving Lab Cart	each
64383-50	Non-Ferrous Space Saving Cart	each

► Extra Wide Lab Cart

Large storage area with extra wide drawers and compartments, heavy-duty casters with two locking. Measures 36" (L) x 17" (W) x 34.5" (H)

- HDPE top and bottom
- Built-in handle for easy handling
- 1 large compartment with hinged acrylic door
- 3 extra-wide drawers to store supplies



Cat. #	Description	Qty
64383-20	Extra Wide Lab Cart	each
64383-60	Non-Ferrous Extra Wide Lab Cart	each

► Light Duty Lab Cart

This Light Duty Cart is constructed of high impact polystyrene. It is an indispensable assistant to the worker on the move.

- Six side compartments for storing bottles, gloves, and other supplies
- Large bulk storage area
- Trays can be removed and snapped to the top of the cart.
- Built-in clipboard
- Drawers hook on top of the cart for accessing supplies.
- Measures: 17" (L) x 15.5" (W) x 32.75" (H)



Cat. #	Description	Qty
64380-10	Light Duty Cart	each
64380-50	Non-Ferrous Light Duty Cart	each

For Compatible Drawer See Small Cavities Trays, #64372-series, page 1114.

► Locking Cart

This locking with roll-top cart has six drawers with hide-able roll-top door with handle.

- HDPE durable top
- Smooth rolling on heavy-duty with two lockable casters
- Door lockable for security
- Two keys provided
- Measures: 11.5" (L) x 16.5" (W) x 35" (H)



Cat. #	Description	Qty
64382	Locking Roll-Top Cart	each
64382-50	Non-Ferrous Locking Roll-Top Cart	each

For Compatible Drawer option, see #64372-series, page 1114.

► Heavy Duty Six Drawer Lab Cart

Six-drawer cart uses our exclusive drawers to make finding tools and supplies painless.

This heavy duty six drawer cart comes in two sizes to fit our drawer organizers. Constructed of HDPE, it is designed to hold heavy items, but flexible enough for any application. Acrylic clear door keep dust out while casters are helped mobility.



- Two sizes available
- Six spaces for drawer organizers
- MRI-compatible version available
- Easily rolling casters with lock
- Spring-closing acrylic door.

Dimensions

Cat. #	Description	L"	W"	H"	Qty
64405-10	Small 6 Shelf Cart with Trays	19.75"	19.75"	32"	each
64405-20	Large 6 Shelf Cart with Trays	24"	19.75"	32"	each
64405-50	Non-Ferrous Small 6 Shelf Cart w/ Trays				each
64405-60	Non-Ferrous Large 6 Shelf Cart w/Trays				each

► Seven Shelf Cart

The seven shelf cart is similar construction as six shelf cart. It accommodated seven shelves. Shelves are made of ABS plastic, which is 100% water repellent and withstand tough abuse.

- Hold seven ABS Shelves
- Clear Acrylic with spring shut door
- Easy rolling Rubber Casters with lock
- Available with two sizes



Dimensions

Cat. #	Description	L"	W"	H"	Qty
64406-10	Small 7 Shelf Cart (No Trays)	19.75"	19.75"	32"	each
64406-11	Small 7 Shelf Cart with Trays	19.75"	19.75"	32"	each
64406-20	Large 7 Shelf Cart (No Trays)	19.75"	19.75"	32"	each
64406-21	Large 7 Shelf Cart with Trays	24"	19.75"	32"	each
64406-50	Non-Ferrous Small 7 Shelf Cart (No Trays)				
64406-51	Non-Ferrous Small 7 Shelf Cart with Trays				
64406-60	Non-Ferrous Large 7 Shelf Cart (No Trays)				
64406-61	Non-Ferrous Large 7 Shelf Cart with Trays				

For Compatible Tray Options, see product #64370-series, on page 1113

► See-Through Cart

Crystal clear front door and back panels offer a quick and easy view of all your supplies.

- HDPE top and sides – resist harsh chemicals, provide additional mobile work space
- Four industrial quality casters (two locking)
- Adjustable shelves
- Appealing look and functional design.
- Measures: 17" (L) x 13.5" (W) x 34" (H)



Cat. #	Description	Qty
64402-10	See-Through Cart	each
64402-50	Non-Ferrous See-Through Cart	each

► **Core DX Lab Cart**

EMS introduces the new Core DX Lab Cart to organize your lab supplies and easily transport documents, glassware, chemicals, pipettes, samples, squeeze bottles, gloves and wipers. The food-grade high density polyethylene construction is rugged enough to withstand years of laboratory use. The Core DX Cart is the ideal lab cart for laboratory workers, doctors, and anyone else who frequently stores and moves supplies from place to place. The EMS Core DX is engineered with toughness in mind. The 60-pound cart is made of sturdy rustproof polyethylene and ABS, with built-in handles in the corners to push and pull with ease. As a result, both tall and short users can comfortably maneuver the cart. The 3-inch, non-marking rubber wheels, meanwhile, roll smoothly on virtually any surface, from concrete to tile to vinyl to carpet to linoleum. Best of all, the cart provides a professional appearance worthy of any situation and can be stored in a small 23 x 17" wide area against the wall. The Core DX's modest profile makes it ideal for using in small or large work areas and is virtually indestructible putting up with all the abuse you can dish out.

FEATURES:

- Made from white, chemically resistant high-density polyethylene (HDPE)
- Durable and versatile design is perfect for all types of laboratories and those needing to organize a variety of supplies
- Three, full-extension drawers give full access to lab supplies
- Locking acrylic door slides up and down to secure drawers or bulk storage
- Carries up to three times its weight of 58 pounds of lab supplies in drawers, shelves, dispensers, holders and bulk storage

- 3-inch, non-marking, rubber casters roll smoothly on most surfaces
- Easy to unpack and assemble wheels and snap on shelves mean it's only minutes before your Core DX is ready for use.

Dimensions:
Width: 23" Height: 35" Depth: 17" Weight: 58 lbs.



Cat. #	Description	
64383-02	Core DX Lab Cart	each

► **Rolling Waste Containers**

This Hazardous Waste Containers provide beta protective storage for radioactive waste. These safe storage containers may be used with disposable waste bags. Mobile containers are available in two sizes, with heavy-duty casters to help move to where you need, and easy to lift hinged lid.

- ½" acrylic to protect from beta radiation
- Or ¼" HDPE for other wastes
- Designed for disposing contaminated waste, such as tubes, pipette tips, used gloves, used glassware, etc.
- Heavy-duty corrugated cardboard waste receptacle and 3 mil poly liner available separately

Cat. #	Description	Dimensions			Qty
		L"	W"	H"	
64420-13	Small Acrylic Waste Container	13	13	19	each
64420-14	Large Acrylic Waste Container	14.25	14.25	32	each
64420-15	HDPE Waste Container	15.125	16	27.75	each
64420-40	Cardboard Insert for 64420-13,				each
	2/package				
64420-41	Cardboard Insert for 64420-14,				each
	2/package				



► **Lab Trays**

Lab Trays are made from chemical resistant ABS. They are sturdy and clean looked in white color. They served all the needs around the lab by individually or insert to the lab carts.

► **Lab Drawer Organizers – Trays**



We offer a variety of trays for your drawers or to fill in 6-Drawer Cart (64405-series) and 7-Shelf Cart (64406-series) above. These trays can store and sort supplies of all sizes and shapes. Trays are made of ABS, color white, and chemical resistant.

Cat. #	Description	Dimensions			Qty
		W"	H"	D"	
64370-19	Small Pipet Tray	17	2.5	13	each
64370-20	Large Pipet Tray	19	2.5	17.5	each
64370-49	Small Clamp Tray	17	2.5	13	each
64370-50	Large Clamp Tray	19	2.5	17.5	each
64370-29	Small General Tray	17	2.5	13	each
64370-30	Large General Tray	19	2.5	17.5	each
64370-59	Small Parts Tray	17	2.5	13	each

Cat. #	Description	Dimensions			Qty
		W"	H"	D"	
64370-60	Large Parts Tray	19	2.5	17.5	each
64370-09	Small Stopper Tray	17	2.5	13	each
64370-10	Large Stopper Tray	19	2.5	17.5	each
64370-39	Small Utility Tray	17	2.5	13	each
64370-40	Large Utility Tray	19	2.5	17.5	each
64370-69	Small Open Tray	17	2.5	13	each
64370-70	Large Open Tray	19	2.5	17.5	each

► Small Cavity Trays



These handy trays can be used on their own, or with our Mobile Light Duty Carts (64380-series) and Lock-and Roll Carts (#64382). Each tray measures 14" x 10" x 3" (H).

Cat. #	Description	Qty
64372-1	1 Cavity Tray	each
64372-2	2 Cavities Tray	each
64372-3	3 Cavities Tray	each
64372-4	4 Cavities Tray	each

► Extra Deep Trays

These deep trays with dividers, can organize your larger and bulkier supplies. They are constructed of bright white plastic with smooth surface. Available with three depths: 4, 6, and 8 inches, and with or without hinged clear lid. Measures: 17.5" (L) x 19.5" (W), with 4" (H), 6" (H) or 8" (H).



Cat. #	Description	Qty
64367-4	4" Extra Deep Tray	each
64367-4L	4" Extra Deep Tray with Lid	each
64367-6	6" Extra Deep Tray	each
64367-6L	6" Extra Deep Tray with Lid	each
64367-8	8" Extra Deep Tray	each
64367-8L	8" Extra Deep Tray with Lid	each

► 4-Slot Drawer Organizer



This 4-slot drawer organizer is a simple way to organize your small items right in your desk drawers.

Each tray measures 13" (W) x 1.75" (H) x 9" Deep.

Cat. #	Description	Qty
64359-4	4-Slot Drawer Tray	each

► Glass Pasteur Pipette Holder

- Ideal for storing 6" and 9" glass pipettes
- Hinged lid for cleanliness
- The combo box includes a small compartment for pipette bulb
- Made of durable ABS. Neon-red color



Cat. #	Description	Dimensions			Qty
		L"	W"	H"	
64376-06	6" Pipette Holder Box	9	7	2.75	each
64376-09	9" Pipette Holder Box	10	8.5	2.75	each
64376-69	6" & 9" Pipette Holder Combo Box				each

► Adjustable Pipette Storage



Two different sizes of storage for long volumetric pipettes and columns, each with adjustable dividers.

Available optional with hinged lid with neon-red color.

Cat. #	Description	Dimensions			Qty
		L"	W"	H"	
64377-08	Small Adjustable Pipette Storage	25	8	3	each
64377-8L	Small Adjustable Pipette Storage w/Lid	25	8	3	each
64377-16	Large Adjustable Pipette Storage	25	16	3	each
64377-16L	Large Adjustable Pipette Storage w/Lid	25	16	3	each
64377-DV	Additional Divider, each				

► Adjustable Trays

Made from HDPE, this adjustable tray comes with 28 separate compartments with a minimum size of 2.375 square inch.

Four built-in handles make it easy to carry. Lid is available as optional.



Cat. #	Description	Dimensions			Qty
		L"	W"	H"	
64359-28	HDPE Adjustable Tray	20	11	3	each
64359-28L	HDPE Adjustable Tray with Lid	20	11	3	each

► Pipettor Holder



- Made from High Density Polyethylene.
- Also Available in Black HDPE/UV, perfect for use in DNA Workstations, where U.V. anti-germicidal lamp are used.
- Resistant to most solvents and is easy to clean.



- Accommodates most major brands of Pipettors.
- Supplied with Non-Skid Feet
- Available in 4-place and 6-place versions.

Cat.#	Description	Wt. Lb.	Dimensions			Qty
			L"	H"	D"	
64378-04	4-Place Pipettor Holder	2.2	12	8	8	each
64378-06	6-Place Pipettor Holder	4.0	12	12	8	each
64378-6B	6-Place Pipettor Holder, Black	4.0	12	12	8	each

► Lab Shelves

We try to offer different size's shelves to accommodate the needs of you laboratory. These shelves can be used for store, lab supplies as well as chemical, dyes, cleaning solution etc.

► Double Shelf

- Reasonable price for high capacity storage
- Sturdy & Lightweight, PVC construction
- Easy to clean
- Safety lip keep content on the self securely
- Chemically resistant
- Safe lab space
- Wall mount or bench-top



Dimensions

Cat. #	Description	L"	W"	H"	Qty
64393-01	Double Shelf	12	4.625	10	each
64393-02	Double Shelf	12	6.625	10	each
64393-03	Double Shelf	12	8.625	10	each
64393-11	Double Shelf	12	6.625	12	each
64393-12	Double Shelf	12	8.625	12	each
64393-21	Double Shelf	12	6.625	14	each
64393-22	Double Shelf	12	8.625	14	each
64393-32	Double Shelf	12	8.625	16	each
64393-41	Double Shelf	24	6.625	10	each
64393-42	Double Shelf	24	8.625	10	each
64393-51	Double Shelf	24	6.625	14	each
64393-52	Double Shelf	24	8.625	14	each
64393-62	Double Shelf	24	8.625	16	each

► Triple Shelf

- Sturdy PVC construction
- Lightweight
- Safety lip keep content on the self securely
- Ideal for bench-top or wall mount
- Different sizes to fit your needs
- Wall mount or bench-top



Dimensions

Cat. #	Description	L"	W"	H"	Qty
64397-02	Triple Shelf	12	6.625	12	each
64397-03	Triple Shelf	12	8.625	12	each
64397-11	Triple Shelf	12	4.625	14	each
64397-12	Triple Shelf	12	6.625	14	each
64397-13	Triple Shelf	12	8.625	14	each
64397-21	Triple Shelf	12	4.625	16	each
64397-22	Triple Shelf	12	6.625	16	each
64397-23	Triple Shelf	12	8.625	16	each
64397-32	Triple Shelf	12	6.625	18	each
64397-33	Triple Shelf	12	8.625	18	each
64397-44	Triple Shelf	12	10.625	20	each
64397-52	Triple Shelf	24	6.625	12	each
64397-53	Triple Shelf	24	8.625	12	each
64397-62	Triple Shelf	24	6.625	14	each
64397-63	Triple Shelf	24	8.625	14	each
64397-72	Triple Shelf	24	6.625	16	each
64397-73	Triple Shelf	24	8.625	16	each
64397-83	Triple Shelf	24	8.625	18	each
64397-93	Triple Shelf	24	8.625	20	each
64397-94	Triple Shelf	24	10.625	20	each

► Tilted Safety Shelves

EMS is proud to introduce the New Tilted Safety Shelves in 4 different sizes.

These innovative Tilted Safety Shelves add new options to store and organize supplies for easy access for the demanding environments of laboratories and hospitals with the fear of the supplies rolling or falling off the shelf.

Bench top Tilted Safety Shelves are designed for saving space, secure storage and easy access.



PVC construction looks great for years and does not show scratches

The following features are standard:

- Handcrafted from chemically resistant, easy-to-clean PVC
- Specially designed tilted shelves let you securely and store boxes of supplies or other items within easy reach.
- Holds up to 23 lbs of supplies on each shelf
- Four sizes from which to choose
- Ready-to-use out of the box

Dimensions

Cat. #	Description	W"	H"	D"	Qty
64390-06	Small Tilted Safety Shelf	12	21.6	7.6	each
64390-07	Large Tilted Safety Shelf	24	21.6	7.6	each
64390-08	Double Rotating Tilted Safety Shelf	12	15.5	14.6	each
64390-09	Triple Rotating Tilted Safety Shelf	24	21.6	7.6	each

► Bench-Top Triple Shelf

- Shelves are progressively wider from top to bottom
- Easy retrieving stored items
- Optional acrylic door – protect stored supplies from dust and dirt
- Eliminates clutter on your bench top
- Safety lip keeps supplies secure.
- Available different size to fit your needs



Dimensions

Cat. #	Description	L"	W"	H"	Qty
64394-10	Table-Top Triple Shelf	12	8.625	12	each
64394-11	Table-Top Triple Shelf, w/Doors	12	8.625	12	each
64394-15	Table-Top Triple Shelf	12	8.625	16	each
64394-16	Table-Top Triple Shelf, w/Doors	12	8.625	16	each
64394-20	Table-Top Triple Shelf	12	8.625	18	each
64394-21	Table-Top Triple Shelf, w/Doors	12	8.625	18	each
64394-60	Table-Top Triple Shelf	12	8.625	20	each
64394-61	Table-Top Triple Shelf, w/Doors	12	8.625	20	each
64394-25	Table-Top Triple Shelf	24	8.625	12	each
64394-26	Table-Top Triple Shelf, W/Doors	24	8.625	12	each
64394-30	Table-Top Triple Shelf	24	8.625	14	each
64394-31	Table-Top Triple Shelf, w/Doors	24	8.625	14	each
64394-35	Table-Top Triple Shelf	24	8.625	16	each
64394-36	Table-Top Triple Shelf, w/Doors	24	8.625	16	each
64394-40	Table-Top Triple Shelf	24	8.625	18	each
64394-41	Table-Top Triple Shelf, w/Doors	24	8.625	18	each
64394-45	Table-Top Triple Shelf	24	10.625	18	each
64394-46	Table-Top Triple Shelf, w/Doors	24	10.625	18	each
64394-50	Table-Top Triple Shelf	24	8.625	20	each
64394-51	Table-Top Triple Shelf, w/Doors	24	8.625	20	each

► Combo-Shelf

This all-in-one shelf is a solution for de-cluttering your work-bench or lab desk. It comes with built-in compartment for pens or pipettes, small tools, equipment manuals, notebooks, CD's, along with shelves for small books, instruments, and open top shelf.



- Space & time saving
- Easy to reach your journal or procedure notes
- Easy to control your small items.

Dimensions

Cat. #	Description	L"	W"	H"	Qty
64398-10	Combo-Shelf	23	8.625	14	each

► Reagent Shelf

This is compact and easy to clean reagent shelf. Ideal for storing indicators, acid, base, detergent as well as all the daily needed chemicals around the lab.

- Can be store 1", 2" or 3" high reagent bottles
- Tiered shelves allow for easy access
- Lip on front of shelves prevents bottles from sliding



Dimensions

Cat. #	Description	L"	W"	H"	Qty
64398-31	1" Reagent Shelf	12	6.375	8	each
64398-32	2" Reagent Shelf	14.5	10	10.25	each
64398-33	3" Reagent Shelf,	15.75	10.3	14.25	each

► Rotating Shelves

Designed especially for the laboratory

The three-shelf unit has 12 – 6" square compartments. All shelves rotate full 360 degrees on a heavy duty turning mechanism. Single shelf can be used inside refrigerator.



- Made PVC durable and chemical resistant
- Smooth rotate with finger tip ease
- Accommodates most of the lab daily use supplies
- Easy to reach your storing items any angle
- Three models to suit your needs

Dimensions

Cat. #	Description	L"	W"	H"	Qty
64388-01	Single Rotating Shelf	12	12	2	each
64388-02	Double Rotating Shelf	12	14	12.5	each
64388-16	3-Level Rotating Shelf	12	12	14.5	each

► Wall-Mount Shelf

This multipurpose HDPE shelf can be mounted as either right side up or right side down depending on your desire. Additional, its feature draining holes in all four corners for mounted over the sink for drying purpose. Keyholes are spaced at 16" for stud anchoring.



Dimensions

Cat. #	Description	L"	W"	H"	Qty
64399-02	Wall Mount Shelf	24	12	6	each
64399-03	Wall Mount Shelf	36	12	8	each
64399-04	Wall Mount Shelf	48	12	10	each

► Roll-Top Door Shelves

These shelves feature HDPE construction with remarkable roll-top door, which protect your supplies and enhance the appearance of the shelves. The door easily slide open and close. Shelves come with safety lips to keep the contents from falling off.



Dimensions

Cat. #	Description	L"	W"	H"	Qty
64395-12	Small Roll-Top Door Shelf	12	9	19	each
64395-24	Medium Roll-Top Door Shelf	24	9	19	each
64395-36	Large Roll-Top Door Shelf	36	9	19	each

► Fume Hood Shelves

Special designed fume hood shelves to offer addition storage space for your lab.

- Designed to maintain air-flow
- Keeps hazardous materials and other items off hood floor for safety
- Increase work space under fume hood
- Available in 3 sizes



Dimensions

Cat. #	Description	L"	W"	H"	Qty
64396-01	3' Hood Shelf	36	5	8	each
64396-02	4' Hood Shelf	48	5	8	each
64396-03	5' Hood Shelf	60	5	8	each

➤ Corner Shelves



- Transform wasted corner into useful space
- Handy for your bench or cabinet
- Made of PVC
- Available in three sizes

Dimensions

Cat. #	Description	L"	W"	H"	Qty
64398-1	Large Triple Corner Shelf	20.625	10.325	15	each
64398-4	Small Triple Corner Shelf	16.875	8.5	15.75	each
64398-2	Large Double Corner Shelf	20.625	10.325	10	each
64398-3	Small Step Corner Shelf	16.875	8.5	5.75	each

➤ Holders

➤ Wipes Holder



Fabricated of durable plastic, these holders will serve for year of use, yet are inexpensive enough to have in every convenient spot in you lab.

- Instant mount with double sided tape
- Fit Kimwipes® and Accuwipe® brand wipes
- Available for small or large wipes boxes
- Color Neon-Red.

Combo-Dispenser is also available for your convenient. Designed to hold most brand of wipes and gloves. Combo dispensers come with color white only

Dimensions

Cat. #	Description	L"	W"	H"	Qty
71602	Small Wiper Dispenser	5.25	3.5	5	each
71602-L	Large Wiper Dispenser	15	3.5	5	each
71602-50	Tall Combo Dispenser	15.5	4.25	11	each
71602-51	Wide Combo Dispenser,	31	4	5.5	each

➤ Paper Towels Dispenser

- Clear polycarbonate plastic
- Holds 3 ¼ stack of "C" fold towels



Dimensions

Cat. #	Description	L"	W"	H"	Qty
64365-20	Paper Towels Holder	10.5	3.75	6.5	each

➤ Kimwipes Push-Up Box



This holder is a molded one-piece, hard plastic with a center island. Once the Kimwipes box is placed inside of this holder, Kimwipes will maintain in an up position until the last one is pulled out. Very handy for laboratory work bench, desk top or any work place.



No more digging for tissues



Remove perforated oval on bottom as well as top



Align bottom opening with push-up column



Cutaway view shows push-up action



Tissues stay at the top of the box down to the very last one

Ordering

Cat. #	Description	Qty.
71603-01	Kimwipes Push-Up Box	each
71603-02	Kimwipes Push-Up Box	2/pk.

➤ Gloves Dispenser

- Easy to mount with keyholes, tape
- Accepts most brands of gloves
- Available either top loading or side loading
- Color white and clear front



Dimensions

Cat. #	Description	L"	W"	H"	Qty
64365-01	Single Gloves Dispenser	11.5	4.75	5.25	each
64365-02	Double Gloves Dispenser	11.50	4.75	10.25	each
64365-03	Triple Gloves Dispenser	11.5	4.75	15.25	each

➤ Safety Glasses Holder



Organize your lab safety glasses with this holder, at your reach when you need it.

- Compartments are perfect size for storing safety glasses
- Durable construction with attractive appearance
- 16 Compartment will accommodate multiple pairs of glasses or goggles per slot.
- Up-Right one with acrylic window and refill from the top

Dimensions

Cat. #	Description	L"	W"	H"	Qty
64365-31	Single Safety Glasses & Pen Holder				each
64365-32	Double Safety Glasses Holder				each
64365-36	Up-Right Safety Glasses Holder Color Green	8	5.5	18.625	each
64365-38	16-Compartment Safety Glasses Holder	18	8	12	each

► Lab Hooks

- Metal free - Unbreakable construction
- Can be used for lab coat, lab keys, coats, ropes etc.
- Simple installation with either tape or keyhole mounts.

Cat. #	Description	Qty
64365-41	Single Lab Hook	each
64365-42	Double Lab Hook	each
64365-43	Triple Lab Hook	each



► Cylinder Holders

- Made from Polycarbonate
- Self-standing cylinder
- Ideal for storing up-right pipettes, markers, thermometer etc for easy access

Cat. #	Description	Qty
64375-03	3" Diameter Cylinder Holder, Green	each
64375-06	6" Diameter Cylinder Holder, Neon Red	each
64375-09	9" Diameter Cylinder Holder, Blue	each



► Pipettor Holder



- Made from High Density Polyethylene.
- Also Available in Black HDPE/UV, perfect for use in DNA Workstations, where U.V. anti-germicidal lamp are used.
- Resistant to most solvents and is easy to clean.
- Accommodates most major brands of Pipettors.
- Supplied with Non-Skid Feet
- Available in 4-place and 6-place versions.



Dimensions

Cat.#	Desc.	Wt. Lb.	L"	H"	D"	Qty
64378-04	4-Place Pipettor Holder	2.2	12	8	8	each
64378-06	6-Place Pipettor Holder	4.0	12	12	8	each
64378-6B	6-Place Pipettor Holder, Black	4.0	12	12	8	each

► Automatic Pipette Washing Set

Solve the problem of washing pipettes quickly, safely and with little effort. To use allow dirty pipettes to soak in the pipette basket in the pipette jar and when ready the basket is transferred to the washer where a constant flow of tap water rinses the pipettes clean.



Dimensions

Cat. #	Description	Wt. Lb.	H"	Dia"	Qty
64377-05	Pipette Washer	7.8	25.5	6.5	each
64377-15	Pipette Jar	4.6	25.5	6.5	each
64377-25	Pipette Basket	0.78	26	5	each

► Pipette Tip Disposal Bin (Gamma Protection)

Gamma (g) rays are produced when an unstable isotope such as ¹²⁵I enters into nuclear decay; this form of electromagnetic radiation is attenuated by lead. The gamma rays intensity increases exponentially as the thickness of the lead increases. The recommended thickness of lead for use with ¹²⁵I is 0.5mm. We use 3mm lead for all of our g protection products. Other isotopes shielded by our products include 32P, 51CR, 35S, 33P, 3H, and 14C. The enclosed boxes are perfect for short-term storage of isotopes and contaminated labware. All our gamma disposal boxes feature a polyethylene liner and sleek black acrylic exterior.



The box measures: 6" (L) x 6" (W) x 10" (H)

64451-01	Pipette Tip Disposal Bin, Gamma Protection	each
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Pipettor Workstation

- Allows you to keep the pipettor and the disposable tips handy at all times in one convenient box.
- Self-closing lid provides dust-free storage.
- Built-in rack stores up to 6 pipettors.
- The bottom, sides, and top pipettor rack are made from white acrylic.
- The bins have a transparent front for easy identification of their contents.
- Two bins, each measure 5"(H) x 8"(W) x 3"Deep.
- The holes at top are 17/32" in diameter.
- Overall measurements: 9½" (H) x 16 3/8" (W)
- Weight 5.8 lbs.



64374-01	Pipette Workstation	each
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► Refrigerator Storage & Trays

- Designed to fit in a refrigerator or freezer
- Adjustable dividers (color Blue)
- Ventilated designed to allow air movement
- Diver can be order separately
- Measures: 15.5" (L) x 15.8" (W) x 8.5" (H)



Cat. #	Description	Qty
64361-10	Refrigerator Storage & Trays	each
64361-50	Tray with Divider, Blue	each

➤ Electrode Flexi-Arm

This flexible arm works by holding and positioning pH electrode or other objects in any direction.

- Solid polyethylene base (6.5 x 4.75 x 1.5")
- 3/4" Hole diameter
- Ideal for holding pH probe in solution



64366-series

Cat. #	Description	Qty
64366-01	Single Flexi Probe Holder	each
64366-02	Double Flexi Probe Holder	each

➤ Lab Turntable

- Non-skid cork surface
- Seat on heavy-duty ball bearing base
- Handles heavy load while easily rotating
- Ideally for shared reagents and daily used solutions



64442-series

Cat. #	Description	Qty
64442	12" Diameter Lab Turntable	each
64442-08	8" Diameter Lab Turntable	each
64442-10	10" Diameter Lab Turntable	each

➤ Drawer Liners

The soft, ribbed material fits in drawers or on the shelves to keep fragile items from rolling when drawers are opened or closed.



64407-series

Cat. #	Description	Dimensions		Qty
		W"	L"	
64407-01	Ribbed Liner	12	18	each
64407-02	Ribbed Liner	16	18	each
64407-03	Ribbed Liner	18	18	each
64407-04	Ribbed Liner	18	24	each
64407-05	Ribbed Liner	24	27	each

➤ Book Holders



64364-10



64364-75



64364-40

Ideal for organize your lab books, instruction manuals or references etc. These book holders secure to the surface with double sided tape or magnets.

Cat. #	Description	Dimensions			Qty
		L"	W"	H"	
64364-10	Small Book Holder	6	1.25	4.5	each
64364-20	Large Book Holder	6	2	4.75	each
64364-25	X-Large Book Holder	10	2.5	7	each
64364-40	Freestanding 2" Book Holder	7.5	3	5.5	each
64364-50	Free-Standing 3" Book Holder	7.5	4	5.5	each
64364-60	Free Standing 4" Book Holder	7.5	5	5.5	each
64364-70	Tall Book Holder	10	1.5	8.25	each
64364-75	Closed End Book Holder	10	2.5	7.25	each
64364-00	Add-on Magnet, add				

➤ Tool Holders



64369-06



64369-20

These tool holders help keep your tools ready at your finger tip any time you need them. With double sided tape or magnet you can secure this holder at any place you want.

Cat. #	Description	Dimensions			Qty
		L"	W"	H"	
64369-20	Deluxe Tool & Book Holder	21.2	1.25	5.85	each
64369-06	6-Slot Tool Holder	9.5	1.5	4	each
64369-09	9-Slot Tool Holder	13.875	1.375	4.375	each
64369-12	12-Slot Tool Holder	22	1.5	4	each
64369-00	Magnet Add-on, add				each

➤ Wash Bottle Holder

- Made from chemical resistant plastic is easy to clean
- Provide convenient access to your wash bottles anytime you need them
- Protects bench-top from spills and stains



64373-series

Cat. #	Description	Qty
64373-01	Single 500 ml Bottle Holder	each
64373-02	Double 500 ml Bottle Holder	each
64373-03	Triple 500 ml Bottle Holder	each
64373-04	Quad 500 ml Bottle Holder	each
64373-21	Single 1 L Bottle Holder	each
64373-22	Double 1 L Bottle Holder	each
64373-23	Triple 1 L Bottle Holder	each
64373-24	Quad 1 L Bottle Holder	each

➤ Rotating Bottle Holder

- Conveniently spin the holder around and get the bottle you want
- Holds eight 500ml bottles & one 1 L bottle
- The base has 12.75" diameter.



64373-50

Cat. #	Description	Qty
64373-50	Rotating Bottle Holder	each

➤ Bottle Carriers

For the storage or carriage of wash bottles or solvents. Available in two sizes: 4" holes (white) and 27/8" holes. Six-pack storage, convenient carrying handles. Sturdy construction and they are resistant to solvents.



Cat.#	Description	Dimensions			Pack
		L"	W"	H"	
64371-04	4" Holes Bottle Carrier	13 1/2	10	11	each

► Microwave Leakage Detector

THE FACTS ARE :

- Microwave ovens have become a very useful tool in the laboratory.
- Microwave energy is capable of penetrating approximately 1.18" into living tissue.
- Human senses are unable to detect microwave energy leaks.
- Microwave oven manufacturers recommended periodic checks of the ovens seal integrity.

Over time and with use, microwave leakage often develops around door seals, hinges and the metal fittings of a microwave oven. Our Microwave Leakage Detector is designed for this reason and will determine on a pass/fail basis whether the microwave oven is safe to use or should be repaired. No batteries are required as the Detector is powered by the microwaves themselves. Magnetic strip for the attachment of the detector to the oven.

Dimensions: 4¾" x 2½" x 1¼" 6oz.

72083-00 Microwave Leakage Detector each



► AirChek® Badges

Monitor vapor levels, simply and effectively

AirChek Badges provide an innovative, simple and effective system for monitoring vapor levels, including:

- Formaldehyde,
- Glutaraldehyde
- Xylene
- Toluene
- Isopropanol



The badges are simply clipped on to the technician's clothing and a record is kept of name, location and time, providing continuous sampling for personal monitoring and allowing the measurements required under Government regulations.

One badge provides continuous sampling over 8 hours. A second badge can be used to supply information for analysis of 15-minute peak exposure periods.

Cat No.	Description	Qty.
64472-10	AirChek® Badge, Formaldehyde	6/pk
64472-20	AirChek® Badge, Glutaraldehyde	6/pk
64472-30	AirChek® Badge, Xylene	6/pk
64472-40	AirChek® Badge, Toluene	6/pk
64472-50	AirChek® Badge, Isopropanol	6/pk

► Electric Benchtop Dryers

Electric benchtop dryers offer a compact footprint and accelerate drying of labware with warm, circulating air.

Conserve benchtop space by placing single-sided models up against the wall. Double-sided models double your capacity with only a slightly larger footprint and can be turned perpendicular to the benchtop for easy access to both sides.

- 400 watts of drying power gently circulates heated air into and around items to decrease drying time.
- Heat selector knob with three temperature settings: high, medium and low.
- Power button illuminates when in use, and an 8-amp @ 120V (4-amp @ 230V) circuit breaker and independent thermo-fuse protects unit from overheating.
- Select from single and double sided models with up to 76 peg locations and 4 baskets.
- Electric drying efficiency is enhanced with a replaceable polyurethane foam filter that keeps warmed air dust free. Redirect air flow by inserting plugs instead of pegs into unused peg holes.
- Like the non-electric benchtop models these freestanding dryers have sturdy bases with excellent balance and can be placed on any flat surface.
- Removable polypropylene baskets serve as storage for small labware and extra pegs.



64400-02



64401-02



64400-03



64401-03



64402-10-S

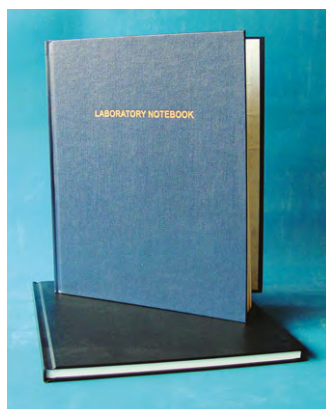
Cat#	Description	Qty
64400-02	Single-Sided, 2 Tier (2 Baskets) 19 pegs	each
64400-03	Single-Sided, 3 Tier (2 Baskets) 38 pegs	each
64401-02	Double-Sided, 2 Tier (4 Baskets) 38 pegs	each
64401-03	Double-Sided, 3 Tier (4 Baskets) 76 Pegs	each
64402-10-S	Bag of 19 small pegs and 6 plugs	each
64402-15	Bag of 19 medium pegs and 6 plugs, 4 long	each
64402-20-S	Bag of 19 medium pegs and 6 plugs, 5 long	each
64402-30	Test Tube Basket, 5L x 4W x 4.25H	each

► **Notebooks, PolyPaper®**

PolyPaper® is a Trademark of Nalgene® for a special spunbonded polyethylene “paper” designed for exceptional strength and resistance to moisture and chemicals. Records written or printed on PolyPaper® are virtually indestructible. PolyPaper® outperforms conventional papers, even with special coatings. It is unaffected by fresh or salt water. The non-absorbent, lint-free material resists mildew, tearing, fraying, curling, aging and discoloration. Chemical spills rinse off easily. PolyPaper® accepts any writing device. You can even write on it with No. 2 pencil under water.

► **Laboratory Notebooks**

Valuable notes and data are permanently secured in these hand cover, case-bound books – important for documenting research.



- Thick polyethylene cover, uncoated PolyPaper® pages
- Waterproof, and extremely chemical resistant
- 50 sheets are numbered and printed with a fine green ¼", grid or horizontal 3 lines per inch
- Pages include spaces for dates and signatures of workers and witnesses, for securing patent protection, measures: 9 1/4" x 11 1/4" (235 x 286mm)
- Other pages include instructions for keeping research records, table of contents, and the page for issuing the notebook

Cat. #	Mfr. #	Cover Color	Qty
38020-10	6300-1000	Lab Notebook, Black	each
38020-20	6300-2000	Lab Notebook, Blue	each

► **Spiral Field Notebook**

Coated PolyPaper® pages – Blue polyethylene cover



- Flexible yet durable cover, with sheets permanently bound with spiral binding
- Chemical and moisture resistance ideal for fieldwork
- Pages are printed on both sizes with a fine green ¼" grid and numbered 1 through 96
- Title and table of contents pages. Each page has space for date and signatures of workers and witnesses to research records
- Page measures 9" x 11 1/4" (229 x 286 mm)

Cat. #	Mfr. #	Description	Qty
38021-10	6303-1000	Field Notebook	each

► **Laboratory Paper Notebooks**

Paper pages – Water Resistant Cover



- These notebooks feature permanently bound pages with grid lines
- Acid free pages with spaces for dates, title, project number, book number, and witness signatures
- Each Notebook contains periodic and conversion tables in the back
- Admissible as court evidence when used as prescribed by law
- Page measures: 8 1/2" x 11" (216 x 279 mm)

Cat. #	Description	Qty
38025-10	Laboratory Notebook, 100 pages	each
38025-20	Laboratory Notebook, 200 pages	each

► **Wash Bottles**

Permanently Labeled/Color-Coded Wash Bottles. These safe wash bottles, which are permanently labeled and color-coded, eliminate the risk of dispensing the wrong liquid by mistake. All of these wide-mouth (easy transfer liquid) polyethylene bottles have polyalomer caps and a fine-tip-nozzle that may be cut back for heavier flow.

Capacity is 16 oz (500ml), low density polyethylene.



64150	Acetone Wash Bottle	each
64151	Acetonitrile Wash Bottle	each
64153	Dichloromethane* Wash Bottle	each
64154	Ethanol Wash Bottle	each
64155	Ethyl Acetate Wash Bottle	each
64157	Isopropyl Alcohol Wash Bottle	each
64158	Methanol Wash Bottle	each
64159	MEK Wash Bottle	each
64161	Soap Wash Bottle	each

64162	Toluene* Wash Bottle	each
64165	Water Wash Bottle	each

Group of Six - Variety includes: Acetone, Methanol, Water, Iso-propyl Alcohol, Ethanol and Toluene*

64167	Group of Six - Variety	6/pk
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*Short term storage only

► Disposable Boxes

These boxes are used to dispose of empty ampoules, broken glass, empty vials, biohazard wastes, etc. The outer box is made from corrugated cardboard; the inner one is a 2-mil polypropylene bag. When the box is full, the safety cap is pulled into place and the entire unit is ready for disposal or incineration.

■ Colorful graphics for quick identification.

■ Assembly instructions on each box.

■ Folding design for shipping and storage.

There are no replacement bags for these boxes.



► Glass Disposal Box

Dimensions

Cat.#	Desc.	L"	W"	H"	Opening	Wt.	Pack
64410	Bench Model	8	8	10	5"	5.4lb	6/pk
64411	Intermediate	12	12	20	7"	12.2lb	6/pk
64412	Floor Model	12	12	27	7"	15.4lb	6/pk

► Biohazard Waste Burn-Up™ Bin

Dimensions

Cat.#	Desc.	L"	W"	H"	Opening	Wt.	Pack
64414	Bench Model	8	8	10	5"	5.4lb	6/pk
64415	Intermediate	12	12	20	7"	12.2lb	6/pk
64416	Floor Model	12	12	27	7"	15.4lb	6/pk

► Sharp Objects Disposal-Pouch

Made from 10 mil solid paperboard, which opens to an oval shape by folding the bottom flaps. When full just close the top flaps and lock into place. Ideal for needles, razor blades, scalpel blades, etc. An epoxy coated steel wire pouch stand provides stable support to that keeps the pouch standing upright.

64430	Sharp Objects Disposal-Pouch	100/bx
64431	Sharp Objects Disposal-Pouch	200/bx
64432	Disposal-Pouch Stand	each



► Benchtop BioHazard Disposal Can

- Hinged swing top lid for easy access and odor control
- Holds a 25 x 25cm (10" x 10") autoclave bag
- 12.7cm (5") diam. x 19cm (7 ½") H
- Biohazard-labeled for safety
- Measures: 19cm (7 ½") high with a top diameter of 12.7cm
- Shipping weight .45kg (1lb.)

This biohazard-labeled, bench-top disposal can is ideal for quick convenient disposal of items like pipette tips, microcentrifuge tubes, lab wipes, and more. Aesthetic and durable, it is made of 400-series brushed stainless steel that resists fingerprint smudges and stains.

64419	Benchtop BioHazard Disposal Can	each
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► Safety Shields

► 1) Coated Lead Shield

This ¼" (6.4mm) thick lead shield protects against chemical reactions and nuclear radiation. The shield is coated with vinyl for a soft smooth surface which eliminates the hazard of any skin contact as well as flying debris. Size: 8½" (W) x 3" (D) x 6" (H) (22x8x15cm).

64460	Coated Lead Shield	each
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► 2) Splash Shield

Splash Protecting in Standing or Sitting Position Provides good protection personal from pipetting or pouring chemicals. An extra wide, angled viewing area and low bend allow the shield to be used from a standing or sitting position. Made from 6.4 mm (¼") thick clear acrylic with non-skid feet for stability. Acrylic base work area is 50.8 x 30.5 cm (20 x 12") deep. Face is 50.9 x 38 cm (20 x 15") high. Not recommended for Beta use.

64464	Splash Shield (Angle Shield)	each
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► 3) Micro Tube Beta Shield

This shield is a solid, molded, clear-acrylic block with 13 wells 11mm in diameter. It holds 13 of 1.5ml micro sample tubes (EMS Cat. #72363) or similar. A clear tight-fitting cover allows space for the micro tube flip top. It is ideal for DNA sequencing.

Measures 2¼" x 4¼" x 2¼" (H) (52x105x62mm). Tubes not included.

64450-00	Micro Tube Beta Shield	each
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► **Bottle and Jar Opener**

THIS UNIQUE OPENER:

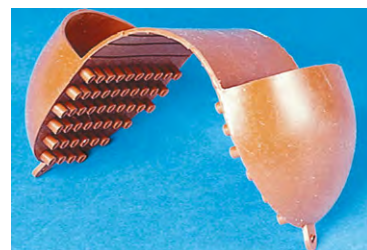
- Saves your wrist by making it easy to open bottles and jars
- Open lids up to 4.5" in diameter
- Eliminates the risk of cracking the cap by using the wrong tool



64493-20 Bottle And Jar Openers each

► **Hot Hand® Protector Pad**

Made from strong silicone and it withstands temperatures as high as 500°F (260°C). A gripping surface with built in multi suction studs for a non-slip grip. Has two pockets for thumb and fingers.



64480 Hot Hand Protector Pad each

► **Silver Bioguard Anti-Microbial Mats**



Neutralize & Protect — Nanoscale Silver particles bind with proteins to neutralize 99.9% of common microbes

Better Results — Ensure consistant sample reproduction and results by significantly minimizing workspace contamination

Reliable — Silver is used extensively in medical applications where microbial contamination is a concern

Use Anywhere — Mats are less than 1mm thick and are backed with an anti-skid coating making them perfect for the benchtop or culture hood

Cat. #	Description	Qty.
77519-1	Silver Bioguard Mat, 10" x 8"	each
77519-2	Silver Bioguard Mat, 15" x 10"	each
77519-3	Silver Bioguard Mat, 24" x 20"	each
77519-4	Silver Bioguard Mat, 30" x 22"	each

Liquid Nitrogen-Cooled Mortar
See *Cryo Supplies*, page 689 <<<<<

Finger Cots; Latex See *Specimen Prep.*, page 259. <<<<<

Gloves See *Specimen Prep.*, page 258-259 <<<<<

Cryo Gloves See *Cryo Section*, page 679 <<<<<

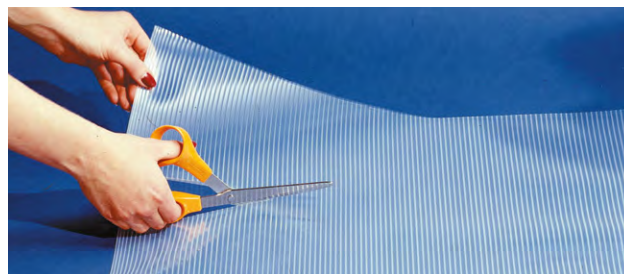
► **PTFE Surface Protectors**



A thickness of 0.001" PTFE film bonded to a 0.008" self-adhesive vinyl gives your work surface good protection. Easy to use: cut to desired size, remove the backing, and press into place.

72612 PTFE Sheet, size 25" x 15 ft. Roll each

► **COVAMAT® Lining**

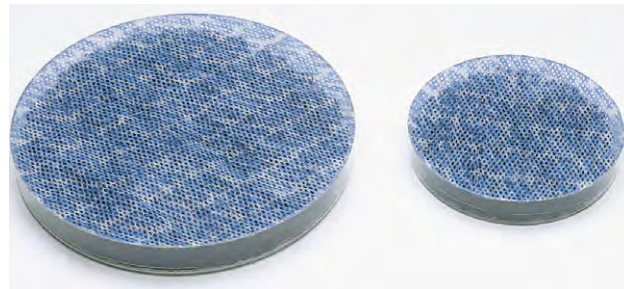


Versatile Clear Lining Material

Clear polyethylene ribbed matting can be used for lining laboratory bench top, shelves, trays, etc. It is easily trimmed and also works well under drums or carboys. 0.25mm (.010") width 0.7mm (.030") thick ribs, 76cm (30") wide x 15.2 meter (50ft) and 4.6 meter (15ft) roll. 1 roll/box.

72615-15	Covamat® Lining, 15'	Roll
72615-50	Covamat® Lining, 50'	Roll

► **Disposable Charcoal Cartridge**



Absorb Incubator Contaminants

This disposable, activated charcoal cartridge efficiently absorbs low energy 35S radioactive components during metabolic labeling. The containment problem exists in incubators and is caused by 35S-labeled amino acids, such as methionine and cysteine which are used to label proteins. The charcoal is supplied in a 100mm diameter plastic petri dish with a highly porous membrane sealed to the top edge.

64454-05 Charcoal Cartridge 5/pk

► LAB-AIR* System; Electronic Air Purifiers

A system which complies with OSHA Regulations and minimizes Occupational Exposure To Toxic Vapors.

The System that destroys the odors and fumes and doesn't just mask them. Toxic vapors are reduced as well!

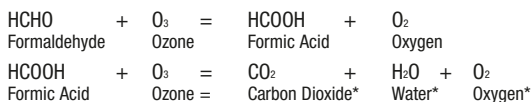
Lab-Air Units are designed to eliminate harmful fumes and annoying odors from the laboratory workplace.

How do they work ?

Electronic Air Purifiers produce a controlled level of Ozone electrically by converting molecules of Oxygen (O₂) into molecules of Ozone (O₃). Ozone, sometimes called activated oxygen, as part of the process of returning to oxygen, casts off its extra atom. That extra atom combines with the molecule of the odor's source and thereby destroys the odor by oxidation. Once Ozone's extra atom is consumed fresh air is left behind which was created by a natural process.

Lab-Air Units produce a safe unsaturated level of activated oxygen that neutralizes harmful fumes and eliminates problem odors from organic materials as well as some commonly used chemicals such as: Formaldehyde, Xylene, Toluene, Glutaraldehyde, Alcohol, Acetone.

For instance:



* All Harmless Gases (American Institute of Technology)

What is the best location for our LAB-AIR* System?

- **Histology/Pathology/EM Labs** - There are common odors and toxic vapors which are generated by fixing fluids, staining and embedding materials, autopsy samples, body odors, remains of dead animals and fumes which can exceed the capacity of the fume hood. In these cases these fumes may spread to other areas of the building.
- **Other Labs with Odors** - There are other locations within the hospital or research lab where people are using chemicals such as xylene, glutaraldehyde, formaldehyde, etc. where the LAB-AIR* SYSTEM would be very beneficial.
- **Animal Necropsy** - These are odors and fumes associated with the remains of dead animals. These odors can spread, especially in the warmer months, throughout an entire building. The LAB-AIR SYSTEM eliminates this totally.

Features and Specifications:

Lab-Air's Electronic Air Purifiers are CSA approved and come with a two year warranty. Powered by 110 VAC, 60 Hz or 220 VAC, 50 Hz.

► Model PA 2500

Features:

- Programmed timer
- 2,500 milligrams ozone per hr
- 120Volts, 75 Watts
- 14" L x 15" W x 5.5" H
- Weight: 22 lbs



Model PA 2500

► Model PA 1200

Features:

- Has an adjustable ozone output; provides up to 980 mg/hr.
- Multiple option timer: 15 min, 30 min, 1 hr, 2 hr, 4 hr, and continuous operation settings.
- It comes with non-slip feet and power cord.
- It measures 14"(L)x10"(W)x7"(H). Weight: 13 lbs
- High output—has a 220 CFM fan



Model PA 1200

► For 110 VAC:

64490-56	Lab-Air Model PA 2500	each
64490-98	Lab-Air Model PA 1200	each

► For 220 VAC:

64491-56	Lab-Air Model PA 2500	each
64491-98	Lab-Air Model PA 1200	each

► Accessories for Lab-Air

64492-25	Cleaning Kit for Model PA 2500	kit
64492-30	Cleaning Kit for Model PA 1200	kit
64492-20	Wall Mounting Bracket	each

AREA x ODOR FACTOR = MG/HR required

Cubic Feet

Measure the Cubic Footage (L x W x H) of the AREA being treated

Estimate the ODOR FACTOR as follows:

- Light Odor Factor = 0.005
- Medium Odor Factor = 0.018
- Strong Odor Factor = 0.036

Multiply the AREA by the ODOR FACTOR to determine the MG/HR on the chart below. Set OZONE on the machine to the setting nearest the required MG/HR and adjust as required.

Cubic Meters

Measure the Cubic Footage (L x W x H) of the AREA being treated

Estimate the ODOR FACTOR as follows:

- Light Odor Factor = 0.18
- Medium Odor Factor = 0.65
- Strong Odor Factor = 1.29

Multiply the AREA by the ODOR FACTOR to determine the MG/HR on the chart below. Set OZONE on the machine to the setting nearest the required MG/HR and adjust as required.

Lab-Air 9.8

MG/HR (Milligrams per hour in dry air)

340	431	522	613	704	795	886	977	1068	1159	1250
L0	1	2	3	4	5	6	7	8	9	H

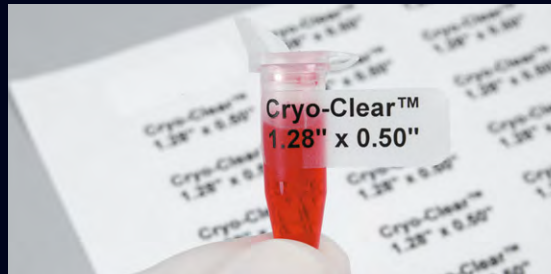
SECTION 25

Labels, Tapes, and Dispensers

Histology and Microscope Slide Labels

Temperature and Specialty Tapes & Dispensers

Tough-Tags Polyester Labels



**Electron
Microscopy
Sciences**



CAUTION: Contains FORMALDEHYDE. Toxic by inhalation and if swallowed. Irritating to the eyes, respiratory system and skin. May cause sensitization by inhalation or skin contact. Risk of serious damage to eyes. Potential cancer hazard. Repeated or prolonged exposure increases the risk.

UPCR-5008 Black on White 3/4" x 2"

77060-01

CAUTION: CONTAINS FORMALDEHYDE. Toxic by inhalation and if swallowed. Irritating to the eyes, respiratory system and skin. May cause sensitization by inhalation or skin contact. Risk of serious damage to eyes. May cause cancer. Repeated or prolonged exposure increases the risk.

UPCR-6042 Black on White with Fl. Red 1" x 2 1/4"

77060-12

**CYTOLOGY FIXATIVE
POISON**

UPCR-6043 Fl. Red 1" x 2 1/4"

77060-13

FIXATIVE

UPCR-6044 Fl. Red 1" x 2 1/4"

77060-14

10% FORMALIN

CAUTION: CONTAINS FORMALDEHYDE
Toxic by inhalation and if swallowed. Irritating to the eyes, respiratory system and skin. May cause sensitization by inhalation or skin contact. Risk of serious damage to eyes. Potential cancer hazard. Repeated or prolonged exposure increases the risk.

UPCR-6046 Fl. Red 1" x 2 1/4"

77060-16

PAP CYTOLOGY FIXATIVE

PATIENT _____
DOCTOR _____
SOURCE _____
DATE _____ HOSP. # _____

UPCR-6047 Black on White 1" x 2 1/4"

77060-17

➤ 1. Histology/Cytology Labels

Ordering: All labels are 500 each per roll

Cat.#	Description	Pack
77060-01	Model UPCR-5008, 3/4" x 2"	500/Roll
77060-12	Model UPCR-6042, 3/4" x 2"	500/Roll
77060-13	Model UPCR-6043, 1" x 2 1/4"	500/Roll
77060-14	Model UPCR-6044, 1" x 2 1/4"	500/Roll
77060-16	Model UPCR-6046, 1" x 2 1/4"	500/Roll
77060-17	Model UPCR-6047, 1" x 2 1/4"	500/Roll

LABORATORY REAGENT

PREP. DATE _____ CHECKED _____
EXPIRATION DATE _____
REAGENT _____
CONC. _____
PROCEDURE _____
MADE BY _____

UPCR-9500 Black on White 2" x 4"

77061-01

LABORATORY REAGENT

DATE PREP. _____ MADE BY _____
DATE C'KED _____ C'KED BY _____
EXPIRATION DATE _____

UPCR-9501 Black on White 2" x 4"

77061-02

REAGENT

Date prep / Lot No. _____
Date checked _____ Tech _____
Date in use _____
Rec'd _____ Exp _____

UPCR-6048 Blue 1" x 2 1/4"

77061-03

REAGENT:

TEST: _____
DATE MADE: _____ DATE OUTDATED: _____
TESTED: _____ STORAGE: _____
COMMENTS: _____

UPCR-9102 Fl. Chartreuse 1 1/2" x 3"

77061-04

➤ 2. Laboratory Reagent Labels

Ordering: All labels are 500 per roll

Cat.#	Description	Pack
77061-01	Model UPCR-9500, 2" x 4"	500/Roll
77061-02	Model UPCR-9501, 2" x 4"	500/Roll
77061-03	Model UPCR-6048, 1" x 2 1/4"	500/Roll
77061-04	Model UPCR-9102, 1 1/2" x 3"	500/Roll

➤ 4. Pathology Specimen Labels

Ordering: all labels are 500 per roll

Cat.#	Description	Pack
77063-01	Model UPCR-6052, 1" x 2 1/4"	500/Roll
77063-02	Model UPCR-6054, 1" x 2 1/4"	500/Roll
77063-03	Model UPCR-7021, 1" x 3"	500/Roll

NAME _____ Age _____
Number _____ Date _____
Doctor _____

UPCR-6052 Black on White 1" x 2 1/4"

77063-01

PATHOLOGY SPECIMEN

Name _____ Date _____
Specimen _____
Doctor _____

10% FORMALIN POISON

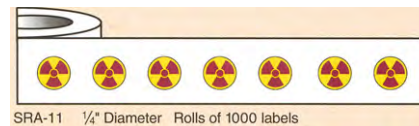
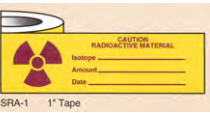
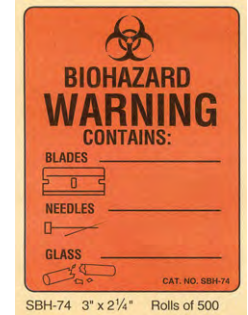
UPCR-7021 Black on White 1" x 3"

77063-03

NAME _____
Hosp. No. _____ Tech _____
Location _____ Date _____ Time _____

UPCR-6054 Black on White 1" x 2 1/4"

77063-02



SRA-11 1/4" Diameter Rolls of 1000 labels



➤ 3. Specialty Warning Labels

Ordering

Cat.#	Description	Pack
77064-01	Biohazard Model SBH-4, 1" x 3"	500/Roll
77064-02	Biohazard Model SBH-8D, 1" Dia.	500/Roll
77064-03	Biohazard Model SBH-8, 1" x 1"	500/Roll
77064-04	Biohazard Model SBH-8L, 3/8" x 1 1/4"	500/Roll
77064-10	Biohazard Model SBH-5, 3" x 2 1/2"	100/Pk
77064-15	Warning, Model SBH-74, 3" x 2 1/4"	500/Roll
77064-20*	Contaminated, Model SBH-48C, 2 x 6"	12.5 yds/Roll
77064-30	Formalin, Model SB-381H, 1" x 2"	500/Roll
77064-31	Formalin, Model SB-380H, 1 3/4" x 2 1/2"	500/Roll
77064-34*	Formalin, Model SB-500HT, 1" x 2 1/2"	60 yds/roll
77064-40	Xylene, Model SB-388H, 1" x 2"	500/Roll
77064-42	Alcohol, Model SB-389H, 1" x 2"	500/Roll
77064-50	Danger, Model SL-7, 1" x 500" Roll	12.5 yds/Roll
77064-55*	Radioactive, Model SRA-1, 1" Wide	12.5 yds/Roll
77064-56*	Radioactive, Model SRA-11, 1/4" Dia.	1,000/Roll

*Pressure-sensitive tape stick to all surfaces, yet easily remove, leaving no messy adhesive residue clean up.

► **Three Step Pathology CNI Label**

Identify and correlate pathology specimens with the Specialty CNI System (Consecutive Number Identification), a three-part labeling program that saves time and reduces errors. Three different labels are each imprinted with identical consecutive numbers, each designed to function in a different step of tissue examination.



Step 1: Numbering the cassette — The first label features the number printed in permanent, black ink on sturdy card for use inside cassettes. These 1/4" x 1 1/2" labels come in booklet form with a perforation between each label. The label has no adhesive. It fits beside the tissue, inside the cassette, and remains unaltered throughout the use of solvents.

Step 2: Numbering the paraffin block and/or specimen storage container — The second number label has pressure sensitive adhesive and measures 1/4" x 1" to fit the paraffin block. This label can also be used on the specimen storage container, correlating the whole specimen with its sections. Permanent adhesive secures the label in place and makes any removal attempt or alteration immediately evident.

Step 3: Numbering the microscope slide — A 1 5/16" square, permanent pressure sensitive adhesive label carries the number in step three. These labels hold firmly on the glass slide and ensure correct identification through examination and storage.

Package: 1000 labels each step, total 3,000 labels for three steps

Cat.#	Description	Pack
77040-03	3-Step CNI Pathology Labels	3,000/pk.

► **Specialty Expiration Labels**

Quickly identify outdated laboratory items such as reagents and controls. These labels provide space for noting the date that the items were received, opened and when it will expire. A permanent adhesive holds the label firmly in place on a variety of surfaces.

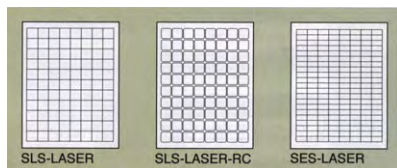


The label measures 3/4" x 1 1/2" and are supplied in rolls of 500 labels.

Cat.#	Description	Pack
77024-05	Expiration Labels	500/pk.

► **Slide Label Sheet Form for Laser Printing**

Available in standard thickness only with square corner or round corner on 8 1/2" x 11" sheet. Price is 5000 labels per carton.



Cat. #	Description	Label Size	Thickness
77021-10	Label Model SLS-LASER	1 5/16" x 1 5/16"	Standard
77021-11	Label Model SLS-LASER RC	1 5/16" x 1 5/16"	Standard
77021-12	Label Model SES-LASER	1 5/32" x 1 5/16"	Standard

► **Specialty Satin Cloth Labels**

Designed to adapt to a wide range of laboratory procedures. These labels withstand dry ice, liquid gasses, deep freezes, acids, oils, greases, salt water, fresh water and soap. Their textured surface may be marked with pen, pencil, or felt marker. Pressure-sensitive adhesive sticks to almost any surface or shape. Specialty Stain Cloth Labels are supplied pre-cut on protective backing paper. Each label is perforated making it easy to remove the label from the roll.



These labels are available in a variety of sizes. Labels 5/8" in width come in sheet form only; all other sizes come on rolls of 1000 labels.

Cat.#	Label Size	Quantity
77030-01	5/8" x 1", Sheet	1,000/pk
77030-02	5/8" x 2", Sheet	1,000/pk
77030-03	1" x 2", Roll	1,000/pk
77030-04	1" x 2 1/4", Roll	1,000/pk
77030-05	1" x 2 1/2", Roll	1,000/pk
77030-06	1 1/4" x 2", Roll	1,000/pk
77030-08	1 1/4" x 2 1/2", Roll	1,000/pk
77030-09	1 1/2" x 2", Roll	1,000/pk
77030-10	1 1/2" x 2 1/4", Roll	1,000/pk
77030-11	1 1/2" x 2 1/2", Roll	1,000/pk
77030-12	1 3/4" x 2 3/4", Roll	1,000/pk

► **Microscope Slide Labels**

These specialty Microscope Slide Labels and matching End Labels are available in standard (thin) or pathology (tissue high) thickness, and square or round corner (RC). Permanent adhesive holds labels in place during use and long-term storage.



Sheet Form Size is 5 1/4" x 8". Prices are per thousand labels

Cat. #	Description	Label Size	Thickness
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Slide Label			
77022-05	Label Model SLS-15	1 5/16" x 1 5/16"	Standard
77022-06	Label Model SLS-15-RC	1 5/16" x 1 5/16"	Standard
77022-10	Label Model SLSP-15	1 5/16" x 1 5/16"	Pathology
77022-11	Label Model SLSP-15-RC	1 5/16" x 1 5/16"	Pathology

End Label			
77021-50	Label Model SES-16	1 5/32" x 1 5/16"	Standard
77021-51	Label Model SES-16-RC	1 5/32" x 1 5/16"	Standard
77021-55	Label Model SESP-16	1 5/32" x 1 5/16"	Pathology
77021-56	Label Model SESP-16-RC	1 5/32" x 1 5/16"	Pathology

Rolls — Prices are per thousand labels

Cat. #	Description	Label Size	Thickness
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Slide Label			
77020-05	Label Model SLR-15	1 5/16" x 1 5/16"	Standard
77020-06	Label Model SLR-15-RC	1 5/16" x 1 5/16"	Standard
77020-10	Label Model SLRP-15	1 5/16" x 1 5/16"	Pathology
77020-11	Label Model, SLRP-15-RC	1 5/16" x 1 5/16"	Pathology

End Label			
77020-50	Label Model SER-16	1 5/32" x 1 5/16"	Standard
77020-51	Label Model SER-16RC	1 5/32" x 1 5/16"	Standard
77020-55	Label Model SERP-16	1 5/32" x 1 5/16"	Pathology
77020-56	Label Model SERP-16RC	1 5/32" x 1 5/16"	Pathology



► Laser Cryo-Babies® & Cryo-Tags™ Labels for Cryogenic Storage†

Temperature-Resistant – From -196°C to 150°C. Cryo-Babies and Cryo-Tags withstand freezer temperatures down to -196°C (liquid and vapor phase nitrogen), boiling water baths (100°C), autoclaving and moderate oven temperatures (150°C).

Tough – Chemically inert labels resist most organic solvents and caustic agents. They adhere to most plastics*, glass and metals without cracking, peeling or degrading.

Specially Designed – Label sheets are specially top-coated to readily accept laser printing. Heat-resistant, stay-flat sheets will not jam in laser printers.

Innovative – Made with a flexible, polyolefin* label material and acrylic adhesive. This unique combination expands and contracts together with temperature fluctuations resulting in a strong adhesive bond.

Packs are available in Individual Colors or in *Rainbow Packs (4 sheets of each color)

Blue	Green
Orange	Red
Yellow	White

1.

1.28" x 0.50"
for 1.5–2.0ml tubes
(white and colors)

3.

1.50" x 0.75"
General Purpose
(white and colors)

2.

0.94" x 0.50"
for 0.5ml tubes
(white and colors)

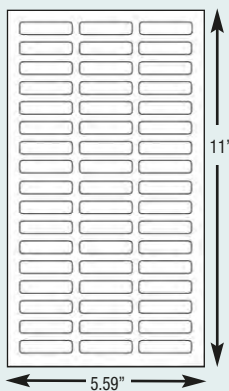
4.

1.69" x 0.75"
CryoVials
(white and colors)

NEW: Mini Sheets

51 Labels Per Sheet (3 Across - 17 Down)

Now available in our most popular label size, 1.28" x 0.50", combine the reliability of Cryo-Tags and the convenience of printing less at a time. This is a perfect solution for small experiments and clinical trials.



Cat. #	Color	Labels per Sheet	Layout Across	Layout Down	Labels per Pack
77559-W	White	51	3	17	1020

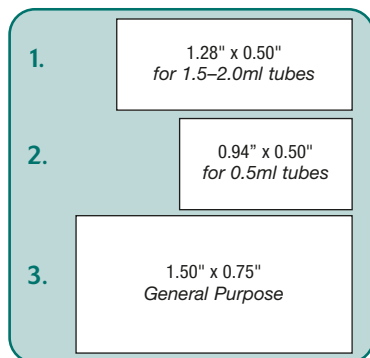
Cat. #	Color	Labels per Sheet	Layout Across	Layout Down	Labels per Pack
1. Laser Cryo-Babies 1.28" x 0.50" (33mm x 13mm) Ideal use: 1.5ml tubes					
77560-W	White	85	5	17	1,700
77560-B	Blue	85	5	17	1,700
77560-G	Green	85	5	17	1,700
77560-O	Orange	85	5	17	1,700
77560-R	Red	85	5	17	1,700
77560-Y	Yellow	85	5	17	1,700
77560-C	Clear	85	5	17	1,700
77560-05	Rainbow*	85	5	17	1,700
2. Laser Cryo-Babies 0.94" x 0.50" (24mm x 13mm) Ideal use: 1.5ml tubes					
77561-W	White	7	17	119	2,380
77561-B	Blue	7	17	119	2,380
77561-G	Green	7	17	119	2,380
77561-O	Orange	7	17	119	2,380
77561-R	Red	7	17	119	2,380
77561-Y	Yellow	7	17	119	2,380
77561-C	Clear	7	17	119	2,380
77561-05	Rainbow*	7	17	119	2,380

Cat. #	Color	Labels per Sheet	Layout Across	Layout Down	Labels per Pack
3. Laser Cryo-Tags 1.50" x 0.75" (38mm x 19mm) Ideal use: General Purpose					
7564-W	White	60	5	12	1,200
77564-B	Blue	60	5	12	1,200
77564-G	Green	60	5	12	1,200
77564-O	Orange	60	5	12	1,200
77564-R	Red	60	5	12	1,200
77564-Y	Yellow	60	5	12	1,200
77564-05	Rainbow*	60	5	12	1,200
4. Laser Cryo-Tags 1.69" x 0.75" (43mm x 19mm) Ideal use: Cryo-Vials					
77565-W	White	52	4	13	1,040
77565-B	Blue	52	4	13	1,040
77565-G	Green	52	4	13	1,040
77565-O	Orange	52	4	13	1,040
77565-R	Red	52	4	13	1,040
77565-Y	Yellow	52	4	13	1,040
77565-05	Rainbow*	52	4	13	1,040

► Cryo-Babies® & Cryo-Tags® On a Roll

Convenient – Dispensing box assists in labeling individual tubes used in small experiments.

Easy to Write on – PVC labels accept writing from most lab markers including our Solvent Resistant Pens and Teeny Writers.



1. Cryo-Babies on a Roll 1.28" x 0.50" (33mm x 13mm) Ideal use: 1.5ml tubes

Cat. #	Color	Labels per Roll
77550-W	White	1,000
77550-B	Blue	1,000
77550-G	Green	1,000
77550-O	Orange	1,000
77550-R	Red	1,000
77550-Y	Yellow	1,000

2. Cryo-Babies on a Roll 0.94" x 0.50" (24mm x 13mm) Ideal use: 0.5ml tubes

Cat. #	Color	Labels per Roll
77551-W	White	1,000



3. Cryo-Tags on a Roll 1.50" x 0.75" (38mm x 19mm) Ideal use: General Purpose

Cat. #	Color	Labels per Roll
77554-W	White	1,000
77554-B	Blue	1,000
77554-G	Green	1,000
77554-O	Orange	1,000
77554-R	Red	1,000
77554-Y	Yellow	1,000

5. 1.50" x 0.25" (Microplates)

6. 2.625" x 1.00"
For boxes, tube racks
& other containers
(white and colors)

3/8" 8. 1.28" x 0.50"
for 1.5–2.0ml tubes
(white only)

7. 3.00" x 2.00"
For bottles, tube racks, boxes
and other laboratory containers
(white only)

9. 2.50" x 0.50"
For 0.5ml – 2.0ml tubes
(white only)

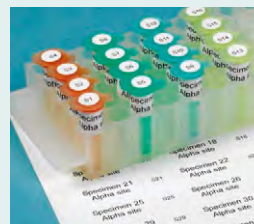
10. 1.00" x 1.00"
For Microscope
Slides
(white only)

11. 1.125" x 1.75"
For racks and boxes
(white only)

Cat. #	Color	Labels per Sheet	Layout Across	Layout Down	Labels per Pack
5. Laser Cryo-Tags 1.50" x 0.25" (38mm x 6mm) Ideal use: Microplates					
77567-W	White	156	4	39	3,120
77567-B	Blue	156	4	39	3,120
77567-G	Green	156	4	39	3,120
77567-O	Orange	156	4	39	3,120
77567-R	Red	156	4	39	3,120
77567-Y	Yellow	156	4	39	3,120
77567-05	Rainbow*	156	4	39	3,120

Cat. #	Color	Labels per Sheet	Layout Across	Layout Down	Labels per Pack
6. Laser Cryo-Tags 2.625" x 1.0" (67mm x 25mm) Ideal use: Racks and Boxes					
77566-W	White	30	3	10	600
77566-B	Blue	30	3	10	600
77566-G	Green	30	3	10	600
77566-O	Orange	30	3	10	600
77566-R	Red	30	3	10	600
77566-Y	Yellow	30	3	10	600
77566-05	Rainbow*	30	3	10	600

Cat. #	Color	Labels per Sheet	Layout Across	Layout Down	Labels per Pack
7. Laser Cryo-Tags 3.0" x 2.0" (76mm x 51mm) Ideal use: Bottles & Beakers					
77568-W	White	12	4	4	240
8. Laser Cryo-Tags Tough Spot Set					
1.28" x 0.50" with 0.375" spot, (33mm x 13mm with 9.5mm spot) Ideal use: 1.5ml tubes					
77574-W	White	68	4	17	1,360



Cat. #	Color	Labels per Sheet	Layout Across	Layout Down	Labels per Pack
9. Laser Cryo-Tags 2.50" x 0.75" (64mm x 13mm) Ideal use: 0.5 to 2.0 ml tubes					
77572-W	White	60	3	20	1,200
10. Laser Cryo-Tags 1.0" x 1.0" (25mm x 25mm) Ideal use: Microscope Slides					
77571-W	White	80	8	10	1,600
11. Laser Cryo-Tags 1.125" x 1.75" (29mm x 44mm) Ideal use: General Purpose					
77569-W	White	42	7	6	840
Laser Cryo-Tags 8.5" x 11" (216mm x 279mm)					
77570-W	White	1		Blank Sheet	20

* 100% Virgin Polypropylene tubes are recommended. Avoid the use of siliconized surfaces.
† Patented

► Cryo-Clear™ Laser Labels

Clear Cryogenic Storage Labels for Use with Laser Printers

"The Choice is CLEAR" – Contents of vials beneath labels remain visible.

Temperature-resistant – From -196°C to 70°C. Cryo-Clear labels remain fully adhered down to -196°C (liquid and vapor phase nitrogen).

Durable – Chemically inert labels resist most organic solvents and caustic agents. Labels adhere to plastics*, glass and metals without cracking, peeling or degrading.

Laser Printable – Label sheets are specially top-coated to accept laser printing and other markings. Heat-resistant, stay-flat sheets will not jam in laser printers.

Innovative – Made with a flexible, vinyl label material and permanent acrylic adhesive. This unique combination expands and contracts together as temperatures fluctuate resulting in a strong and sustained adhesive bond.



Cryo-Clear Laser Labels - Sizing Guide

1. 1.28" x 0.50" for 1.5 – 2.0ml tubes	2. 0.94" x 0.50" for 0.5ml tubes
--	--------------------------------------

Cat. #	Color	Tag Size (Inches / Millimeters)	Sheet layout	Labels/Sheet	Ideal Use	Qty.
1. 77575-C	Clear	1.28" x 0.50" / 33mm x 13mm	5 Across - 17 Down	85	1.5ml tubes	1,700/pk.
2. 77576-C	Clear	0.94" x 0.50" / 24mm x 13mm	7 Across - 17 Down	119	0.5ml tubes	2,380/pk.

* NOTE: Siliconized surfaces should be avoided. Apply to clean, dry tubes at room temperature. Tubes made of 100% virgin polypropylene are recommended.
† Patented

► Direct Thermal CryoTags®

Temperature-Resistant – From -196°C to 70°C and also freezable in liquid nitrogen.

Tough – They adhere to most plastics, glass and metals without cracking, peeling or degrading. Also resistant to scuffing and smearing.

Compatible – Tubes labeled with Direct Thermal CryoTags easily slide in and out of centrifuge rotors without binding.

Specially Designed – Labels accept printing from direct thermal printers such as Dymo LabelWriters.

Barcoding – Print popular barcode formats for fast and easy sample identification.

Effortless – Printer setup and use is easy and user friendly

Economical – Limit label waste by printing only the quantity required

New Format – Labels are now oriented vertically and are compatible with the new LabelWriter 450

Same Great Product – Users of Direct Thermal Tough-Tags will be happy to know we've expanded the temperature range of Tough-Tags and made them Cryo-Tags

Online

Support – Email us at sgkck@aol.com to request new definition files for the LabelWriter 450



* NOTE: Prolonged exposure to alcohol may cause material discoloration.

► Cryogenic Labels

These labels are made from top quality materials, a wide range of sizes, designed specially for cryogenic use.

1. DuraStick Labels (KDS-series)

For Temperature of -40°C and Below

These labels feature a smudge resistant surface. They are available in rolls for thermal transfer printing or in 8½" x 11" sheets for laser printing. All accept handwritten notations with cryo markers.

2. CryoStick Labels (FCS-series)

For Temperatures of -80°C

Ideal for use with cryotubes, these labels are best used with thermal transfer printers or cryo marker pens. Available in a wide range of sizes on sheets or rolls, they are not recommended for laser printing.

3. LiquiStick Labels (LSC-series)

For temperatures of -195°C

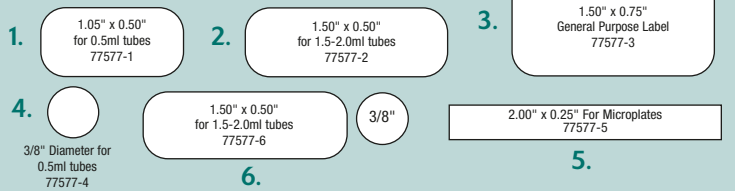
Labels feature a synthetic surface that accepts crisp bar codes from thermal transfer printers or handwritten notations cryo markers. Supplied in sheets or rolls, these labels are not recommended for use with laser printers.

4. Satin Cloth Labels (SC-series)

For temperature of -60°C

These textured labels withstand dry ice, deep freezers and liquid gases. Supplied in sheets or rolls. They are easily marked with cryo markers, not for use with automated printers.

Sizing Guide for Direct Thermal Cryo-Tags



EMS#	Color	Dimensions	Ideal Use	Labels per pack	
1. 77577-1	77593-1	White	1.05" x 0.50" / 27x13mm	0.5ml tubes	1,000
77577-7	77593-7	Blue	1.05" x 0.50" / 27x13mm	0.5ml tubes	1,000
77577-8	77593-8	Green	1.05" x 0.50" / 27x13mm	0.5ml tubes	1,000
77577-9	77593-9	Yellow	1.05" x 0.50" / 27x13mm	0.5ml tubes	1,000
77577-24	77593-24	Orange	1.05" x 0.50" / 27x13mm	0.5ml tubes	1,000
77577-25	77593-25	Red	1.05" x 0.50" / 27x13mm	0.5ml tubes	1,000
2. 77577-2	77593-2	White	1.50" x 0.50" / 38x13mm	1.5ml tubes	750
77577-10	77593-10	Blue	1.50" x 0.50" / 38x13mm	1.5ml tubes	750
77577-11	77593-11	Green	1.50" x 0.50" / 38x13mm	1.5ml tubes	750
77577-12	77593-12	Yellow	1.50" x 0.50" / 38x13mm	1.5ml tubes	750
77577-26	77593-26	Orange	1.50" x 0.50" / 38x13mm	1.5ml tubes	750
77577-27	77593-27	Red	1.50" x 0.50" / 38x13mm	1.5ml tubes	750
3. 77577-3	77593-3	White	1.50" x 0.75" / 38x19mm	2.0ml tubes	750
77577-13	77593-13	Blue	1.50" x 0.75" / 38x19mm	2.0ml tubes	750
77577-14	77593-14	Green	1.50" x 0.75" / 38x19mm	2.0ml tubes	750
77577-15	77593-15	Yellow	1.50" x 0.75" / 38x19mm	2.0ml tubes	750
77577-28	77593-28	Orange	1.50" x 0.75" / 38x19mm	2.0ml tubes	750
77577-29	77593-29	Red	1.50" x 0.75" / 38x19mm	2.0ml tubes	750
4. 77577-4	77593-4	White	⅜" diameter / 9.5mm dia	0.5ml tubes	4,000
77577-16	77593-16	Blue	⅜" diameter / 9.5mm dia	0.5ml tubes	4,000
77577-17	77593-17	Green	⅜" diameter / 9.5mm dia	0.5ml tubes	4,000
77577-18	77593-18	Yellow	⅜" diameter / 9.5mm dia	0.5ml tubes	4,000
77577-31	77593-31	Orange	⅜" diameter / 9.5mm dia	0.5ml tubes	4,000
77577-32	77593-32	Red	⅜" diameter / 9.5mm dia	0.5ml tubes	4,000
5. 77577-5	77593-5	White	2.00" x 0.25" / 51x6mm	Microplates	1,000
6. 77577-6	77593-6	White	1.50" x 0.50" - 3/8" dia spot	1.5ml tubes	1,000
77577-19	77593-19	Blue	1.50" x 0.50" - 3/8" dia spot	1.5ml tubes	1,000
77577-20	77593-20	Green	1.50" x 0.50" - 3/8" dia spot	1.5ml tubes	1,000
77577-21	77593-21	Yellow	1.50" x 0.50" - 3/8" dia spot	1.5ml tubes	1,000
77577-38	77593-38	Orange	1.50" x 0.50" - 3/8" dia spot	1.5ml tubes	1,000
77577-39	77593-39	Red	1.50" x 0.50" - 3/8" dia spot	1.5ml tubes	1,000

5. Wrap-Around Labels (WA-1)

For Freezers and Cryogenic Use

These unique labels are for sub-zero use, measures 1½" x 2¾". They feature a 1½" x 1½" area, frosted for thermal printing or marking with cryo markers. The remainder of the label is clear. It wraps around the cryo-tube to provide a protective cover for printed information while leaving a clear space for viewing the tube contents.



Ordering Information

Cryogenic Labels - Sold per 1000 labels

Label Size	series	series	series	Cloth	Around
⅜" Dia	77025-01	77026-01	77027-01	—	—
½" x ¾"	77025-10	77026-10	77027-10	—	—
¾" x 1¼"	77025-11	77026-11	77027-11	—	—
½" x 1½"	77025-LA*	—	—	—	—
½" x 1½"	—	77026-12	77027-12	—	—
¾" x 1"	—	—	—	77030-01	—
5/8" x 2"	—	—	—	77030-02	—
¾" x 9/10"	—	77026-15	77027-15	—	—
¾" x 1¼"	—	77026-16	77027-16	—	—
¾" x 1½"	—	77026-17	77027-17	—	—
1½" x 2¾"	—	—	—	—	77028-18 (frosted)
1" x 2"	—	—	—	77030-03	—
1" x 2¼"	—	—	—	77030-04	—

*Sheet for Laser Printer - 5000 per pack

► Thermal Transfer Tough-Tags & Cryo-Tags

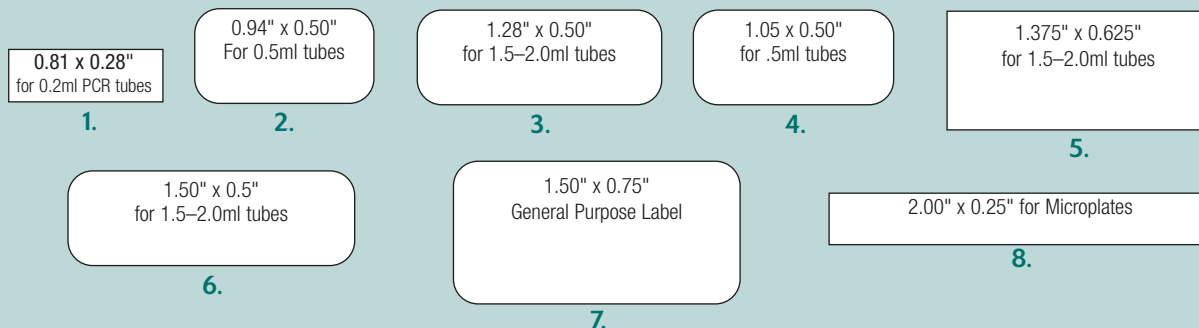
Pre-cut, Peel-Off Labels Designed for Use in Thermal Transfer Printers

Thermal Transfer Tough-Tags and Cryo-Tags are a reliable and convenient way to identify samples with text or a barcode on microtubes, microplates, bottles and other laboratory containers.

- Unique solvent-resistant, acrylic-based adhesive provides excellent cold temperature performance
- Print crisp, clear, professional quality labels
- Resists degradation from scuffing, chemicals, moisture and wide temperature fluctuations
- Specially coated for use with a resin ribbon that provides the best performance under extreme conditions
- Print as little as one label at a time, eliminating label waste and saving time and money



SIZING GUIDE: Thermal Transfer Labels for Storage in Temperatures From -196°C to 80°C



Cryo-Tags on a 1" I.D. Core with 2,000 labels per roll

Cat. #	Tag Size (Inches)	Tag Size (Millimeters)	Ideal Use	Qty.
1. 77592-65	0.81 x 0.28"	20.6 x 7mm	0.2ml PCR tubes	2000/Roll
2. 77592-70	0.94 x 0.50"	24 x 13mm	0.5 ml tubes	2000/Roll
3. 77592-75	1.28 x 0.50"	32 x 13mm	1.5 ml-2.0 ml tubes	2000/Roll
4. 77592-2	1.05 x 0.50"	27 x 13mm	0.5 ml tubes	2000/Roll
5. 77592-80	1.375 x 0.625"	35 x 16mm	1.5 ml-2.0 ml tubes	2000/Roll
6. 77592-3	1.50 x 0.50"	38 x 13mm	1.5 ml-2.0 ml tubes	2000/Roll
7. 77592-4	1.50 x 0.75"	38 x 19mm	General Purpose	2000/Roll
8. 77592-5	2.00 x 0.25"	51 x 6mm	Microplates	2000/Roll

Cryo-Tags on a 3" I.D. Core with 4,000 labels per roll

Cat. #	Tag Size (Inches)	Tag Size (Millimeters)	Ideal Use	Qty.
1. 77592-81	0.81 x 0.28"	20.6 x 7mm	0.2ml PCR tubes	4000/Roll
2. 77592-82	0.94 x 0.50"	24 x 13mm	0.5 ml tubes	4000/Roll
3. 77592-83	1.28 x 0.50"	32 x 13mm	1.5 ml-2.0 ml tubes	4000/Roll
4. 77592-84	1.05 x 0.50"	27 x 13mm	0.5 ml tubes	4000/Roll
5. 77592-85	1.375 x 0.625"	35 x 16mm	1.5 ml-2.0 ml tubes	4000/Roll
6. 77592-86	1.50 x 0.50"	38 x 13mm	1.5 ml-2.0 ml tubes	4000/Roll
7. 77592-87	1.50 x 0.75"	38 x 19mm	General Purpose	4000/Roll
8. 77592-88	2.00 x 0.25"	51 x 6mm	Microplates	4000/Roll

Tough-Tags on a 1" I.D. Core with 2,000 labels per roll

Cat. #	Tag Size (Inches)	Qty.
1. 77591-1	0.94 x 0.50"	2,000/roll
2. 77591-2	1.28 x 0.50"	2,000/roll
3. 77591-3	1.375 x 0.625"	2,000/roll
4. 77591-4	1.50 x 0.75"	2,000/roll
5. 77591-5	2.0 x 0.25"	2,000/roll

Tough-Tags on a 3" I.D. Core with 4,000 labels per roll

Cat. #	Tag Size (Inches)	Qty.
1. 77591-10	0.94 x 0.50"	2,000/roll
2. 77591-20	1.28 x 0.50"	2,000/roll
3. 77591-30	1.375 x 0.625"	2,000/roll
4. 77591-40	1.50 x 0.75"	2,000/roll
5. 77591-50	2.0 x 0.25"	2,000/roll

Thermal Transfer Accessories

Cat. #	Description	Qty.
77592-55	Resin Ribbon 2.50" x 244' for TLP 2844	each

► Cryo Labels And Markers

► **Labels:** A specially formulated material for use at ultra-low temperatures and in cryo storage conditions, such as liquid nitrogen and liquid oxygen. They are durable and adhere well to plastic as well as cardboard cryogenic storage boxes. They will not peel or shrink. Ten sheets of labels: five pre-printed, five plain. Twenty labels/sheet. Label measures: 2.5cmx5cm.

62046	Cryo Labels	200 labels/pk
62047	Cryo Labels	10pk/lot

► **Markers:** For permanently marking cloth, cardboard, and plastic. It will not fade at ultra-low temperatures. Smudge-proof. Package consists of four, extra fine point pens in assorted colors (red, green, blue and black).

62050	Cryo Markers	4/pk
62051	Cryo Markers	6pk/cs



► Laser Tough-Tags®

Labels for Microcentrifuge Tubes and Other Containers

Temperature-Resistant – From -40°C to 121°C. Tough-Tags resist boiling water baths, autoclaving and moderate freezer temperatures.

Tough – Chemically inert, polyester sheets resist most organic solvents and caustic agents. They adhere to most plastics*, glass and metals without cracking, peeling or degrading.

Compatible – Tubes labeled with Tough-Tags easily slide in and out of centrifuge rotors without binding.

Specially Designed – Label sheets are specially top-coated to readily accept laser printing. Heat-resistant, stay-flat sheets will not jam in laser printers.



Laser sheets are available in individual colors and also in Rainbow Packs

1. Laser Tough-Tags® size 1.28" x 0.50" (33mm x 13mm).

Ideal Use: 1.5 ml tubes.

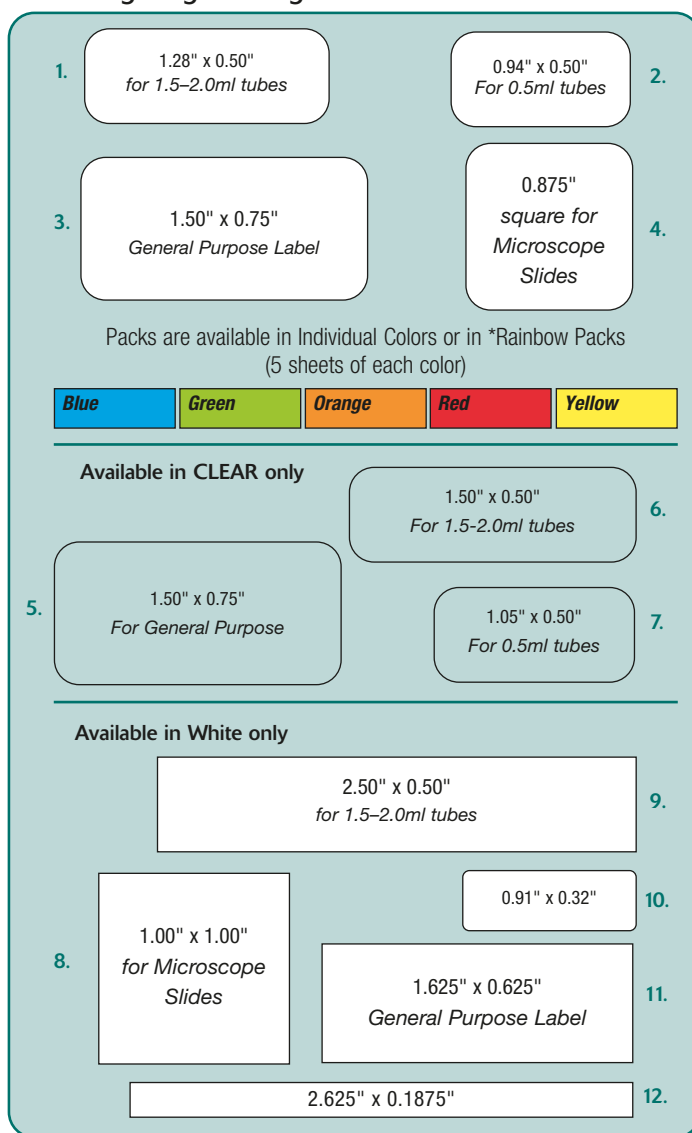
Cat. #	Color	Labels per sheet	Lay out Across	Layout Down	Labels per pack
77520-W	White	85	5	17	2125
77520-B	Blue	85	5	17	2125
77520-G	Green	85	5	17	2125
77520-O	Orange	85	5	17	2125
77520-R	Red	85	5	17	2125
77520-Y	Yellow	85	5	17	2125
77520-6	Rainbow	85	5	17	2125

2. Laser Tough-Tags® size 0.94" x 0.50" (24mm x 13mm).

Ideal Use: 0.5 ml tubes.

Cat. #	Color	Labels per sheet	Lay out Across	Layout Down	Labels per pack
77521-W	White	119	7	17	2975
77521-B	Blue	119	7	17	2975
77521-G	Green	119	7	17	2975
77521-O	Orange	119	7	17	2975
77521-R	Red	119	7	17	2975
77521-Y	Yellow	119	7	17	2975
77521-6	Rainbow	119	7	17	2975

Laser Tough-Tags - Sizing Guide



3. Laser Tough-Tags® size 1.50" x 0.75" (38mm x 19mm).

Ideal Use: general purpose.

Cat. #	Color	Labels per sheet	Lay out Across	Layout Down	Labels per pack
77522-W	White	60	5	12	1500
77522-B	Blue	60	5	12	1500
77522-G	Green	60	5	12	1500
77522-O	Orange	60	5	12	1500
77522-R	Red	60	5	12	1500
77522-Y	Yellow	60	5	12	1500
77522-6	Rainbow	60	5	12	1500

4. Laser Microscope Slide Tough-Tag size 0.875" x 0.875" (22 x 22mm)

Ideal Use: general purpose.

Cat. #	Color	Labels per sheet	Lay out Across	Layout Down	Labels per pack
77523-W	White	96	8	12	2400
77523-B	Blue	96	8	12	2400
77523-G	Green	96	8	12	2400
77523-O	Orange	96	8	12	2400
77523-R	Red	96	8	12	2400
77523-Y	Yellow	96	8	12	2400
77523-6	Rainbow	96	8	12	2400

► Laser Tough-Tags® (continued)

5. CLEAR Laser Tough-Tag® 1.50" x 0.50" (38 x 13mm)

Ideal Use: 1.5 to 2.0 ml tubes

Cat. #	Color	Labels per sheet	Lay out Across	Layout Down	Labels per pack
77530-C	Clear	80	5	16	1600

6. CLEAR Laser Tough-Tag® 1.05" x 0.50" (27mm x 13mm)

Ideal Use: 0.5 ml Tube

Cat. #	Color	Labels per sheet	Lay out Across	Layout Down	Labels per pack
77531-C	Clear	96	6	16	1920

7. CLEAR Laser Tough-Tag® 1.50" x 0.75" (38mm x 19mm)

Ideal Use: General Purpose

Cat. #	Color	Labels per sheet	Lay out Across	Layout Down	Labels per pack
77532-C	Clear	60	5	12	1200

8. Laser Tough-Tag® 1.0" x 1.0" (25mm x 25mm)

Ideal Use: Microscope slide

Cat. #	Color	Labels per sheet	Lay out Across	Layout Down	Labels per pack
77526-W	White	80	8	10	1600

9. Laser Flag Tough-Tag® 2.50" x 0.50" (64mm x 13mm)

Ideal Use: 0.5 to 2.0 ml tubes

Cat. #	Color	Labels per sheet	Lay out Across	Layout Down	Labels per pack
77525-W	White	60	3	20	1500

10. Laser Teeny Tough-Tag® 0.91" x 0.32" (23mm x 8mm)

Ideal Use: 0.2ml PCR tubes

E	Cat. #	Color	Labels per sheet	Lay out Across	Layout Down	Labels per pack
	77524-W	White	154	7	22	3850

11. Laser Tough-Tag® 1.625" x 0.625" (41mm x 16mm)

Ideal Use: General Purpose

Cat. #	Color	Labels per sheet	Lay out Across	Layout Down	Labels per pack
77528-W	White	64	4	16	1600

12. Laser Slender Edge Tough-Tag® 2.625" x 0.1875" (67mm x 5mm)

Ideal Use: for 384-well plates, half skirted PCR plates, petri dishes etc.

Cat. #	Color	Labels per sheet	Lay out Across	Layout Down	Labels per pack
77529-W	White	99	3	33	2475

13. Laser Tough-Tag® Sheet, 8.5" x 11" (216mm x 279mm)

Ideal Use: Cut to size

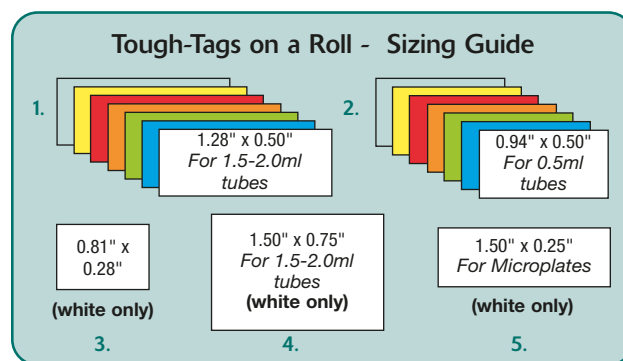
Cat. #	Color	Labels per sheet	Lay out Across	Layout Down	Labels per pack
77527-W	White		NA	NA	25

► Tough-Tags® on a Roll



Compatible – Tough-Tags are pre-cut, peel-off labels that accept any marking instrument. They are perfectly sized to fit microcentrifuge tubes and other containers in the laboratory.

Convenient – Dispensing box assists in labeling individual tubes used in small experiments.



1. Tough-Tag® 1.28" x 0.50" (33mm x 13mm)

Ideal Use: 1.5 ml Tubes

Cat. #	Color	Labels per roll
62045-20	White	1000
62045-B	Blue	1000
62045-G	Green	1000
62045-O	Orange	1000
62045-R	Red	1000
62045-Y	Yellow	1000
62045-10	Clear	1000

2. Tough-Tag® 0.94" x 0.50" (24mm x 13mm)

Ideal Use: 0.5 ml Tubes

Cat. #	Color	Labels per roll
62044-20	White	1000
62044-B	Blue	1000
62044-G	Green	1000
62044-O	Orange	1000
62044-R	Red	1000
62044-Y	Yellow	1000
62044-10	Clear	1000

3. Teeny Tough-Tag® 0.81" x 0.28" (21mm x 7mm)

Ideal Use: 0.2ml PCR tubes

Cat. #	Color	Labels per roll
77536-W	White	1500

4. Tough-Tag® 1.50" x 0.75" (38mm x 19mm)

Ideal Use: 1.5 to 2.0 ml tubes

Cat. #	Color	Labels per roll
77537-W	White	1000

5. Sidewall Tough-Tag® 1.50" x 0.25" (38mm x 6mm)

Ideal Use: Micro plates

Cat. #	Color	Labels per roll
77538-W	White	1000

► Direct Thermal Tough-Tags®

For Use in Direct Thermal Printers

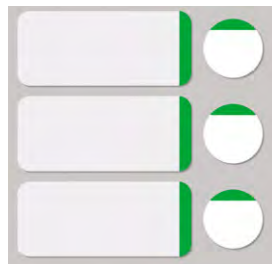
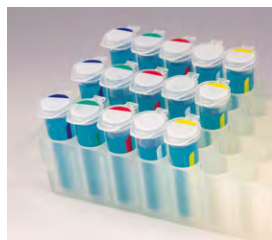
- Withstands temperatures from -40°C to 70°C
- Freezable in liquid nitrogen when label ends overlap (not applicable to round labels)
- Resistant to scuffing, smearing and chemicals
- Print barcodes for easy sample tracking
- Limit label waste by printing the quantity required
- Quick and easy setup for PC's or MAC's
- Small printer takes up little space

Cat. #	Label Size (Inches/Millimeters)	Ideal Use	Qty.
1. 77593-1	1.05" x 0.50" / 27mm x 13mm	0.5ml tubes	2000/Roll
2. 77593-2	1.50" x 0.50" / 38mm x 13mm	1.5ml tubes	2000/Roll
3. 77593-3	1.50" x 0.75" / 38mm x 19mm	2.0ml tubes	2000/Roll
4. 77593-4	3/8" diameter / 9.5mm diameter	0.5ml tubes	2000/Roll
5. 77593-6	1.50" x 0.50" - 3/8" diameter spot	1.5ml tubes	2000/Roll
6. 77593-5	2.00" x 0.25" / 51mm x 6mm	Microplates	2000/Roll

Note: All labels are White and are on 1" I.D. cores with 2,000 per roll. 100% Virgin Polypropylene tubes are recommended for optimal performance. Avoid the use of siliconized surfaces.

► Color-Coded Dual Tough-Tags™

- 500 tag and spot sets per roll
- Matte surface is suitable for accepting pencil, pen or marker writing
- Labels fit 0.5ml – 1.5ml tubes
- Will not come off in rotors, cyclers or racks
- Resistant to extreme temperatures



Cat. #	Color	Qty.
77539-B	Blue	500/roll
77539-G	Green	500/roll
77539-R	Red	500/roll
77539-W	White	500/roll
77539-Y	Yellow	500/roll

► Bake Tough-Tag®

1.50" x 0.75" (38 x 19mm) Ideal Use: Oven Sterilization

Bake Tags are oven-safe marking labels that withstand conventional oven-sterilization (typically 180°C) or heating to inactivate RNase, DNase and other enzymes. Bake Tags will withstand autoclaving, cryogenic freezer storage conditions and boiling baths, without peeling or falling off.



Cat #	Color	Labels/roll	Qty/pk
77540-W	White	250	each

1.

1.05" x 0.50"
for 0.5ml tubes
77593-1

2.

1.50" x 0.50"
for 1.5-2.0ml tubes
77593-2



3.

1.50" x 0.75"
General Purpose Label
77593-3

4.

3/8" diameter
for 0.5ml tubes
77593-4

3/8"

5.

1.50" x 0.50"
for 1.5-2.0ml tubes
77593-6

6.

2.00" x 0.25" For Microplates
77593-5

INNOVATIVE LABEL SOLUTIONS

Combo Tough-Tag / Tough-Spot label set allows for quick and easy labeling of tube tops as well as the side of the tube.

Removable Tough-Tags®

Durable labels cleanly removes from reusable surfaces

No Residue - Easily remove from surfaces without leaving any adhesive

Track Samples - Use labels to follow samples from purification to processing

Resistant - Resistant to most laboratory solvents and have shown short-term resistance to Acetone and Xylene

Useful - Great for beakers, bottles, flasks, glass vials, tubes, tube racks and pipettes

Multiple Formats - Available on rolls for hand writing or for direct thermal printing using the Dymo® LabelWriter®



Cat. #	Size	Color	Labels per roll
77517-01	1.50" x 0.50", For Handwriting	White	1000
77517-02	1.50" x 0.75", For Handwriting	White	1000
77517-03	1.05" x 0.50", Direct Thermal/Thermal	White	1000 t
77517-04	1.50" x 0.50", Direct Thermal/Thermal	White	750
77517-05	1.50" x 0.75", Direct Thermal/Thermal	White	750

► CLEAR-over-WHITE Laser Tough-Tag®

2.75" x 0.625" (70mm x 16mm)

Labels per Sheet: 26 – Ideal Use: protect print on label

Description: 1.45" (37mm) is clear and 1.30" (33mm) is white of the total 2.75" length to allow effective wrap around



Cat #	Color	Sheet Layout Across	Sheet Layout Down	Quantity Labels/sheet
77533-CW	Clear/White	2	13	520

► **Micro Tube Label; Tough-Tags™**

Pre-cut, peel-off, pressure sensitive labels. They are sized to fit microcentrifuge tubes, cryo tubes and many other containers.

■ They can be boiled, froze, and autoclaved.

- They are chemically resistant.
- They are thin and will not jam in the centrifuge rotor.
- They will not dry out, fall-off, or tear.

**Tough-Tag® 1.28" x 0.50" (33mm x 13mm),
Ideal Use: 1.5 ml Tubes**

Cat. #	Color	Labels per roll
62045-20	White	1000
62045-B	Blue	1000
62045-G	Green	1000
62045-O	Orange	1000
62045-R	Red	1000
62045-Y	Yellow	1000
62045-10	Clear	1000

**Tough-Tag® 0.94" x 0.50" (24mm x 13mm),
Ideal Use: 0.5 ml Tubes**

Cat. #	Color	Labels per roll
62044-20	White	1000
62044-B	Blue	1000
62044-G	Green	1000
62044-O	Orange	1000
62044-R	Red	1000
62044-Y	Yellow	1000
62044-10	Clear	1000



► **Laser Tough-Spots®**

Pre-Cut Peel-Off Labels for Microcentrifuge Tube Tops

Temperature-Resistant – Withstands freezer temperatures down to 196°C (liquid and vapor phase nitrogen), boiling water baths (100°C), autoclaving and moderate oven temperatures (150°C).

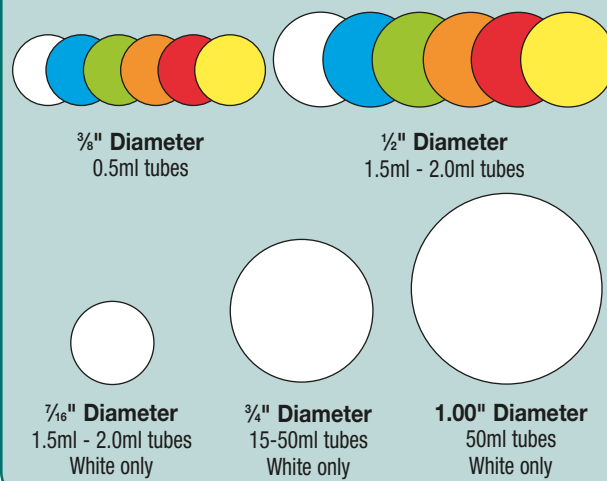
Tough – Chemically inert labels resist most organic solvents and caustic agents. They adhere to plastics*, glass and metals without cracking, peeling or degrading.

Specially Designed – Label sheets are specially top-coated to readily accept laser printing. Heat-resistant, stay-flat sheets will not jam laser printers.

Innovative – Made with a flexible, polyolefin¹ label material and acrylic adhesive. This unique combination expands and contracts together with temperature fluctuations, resulting in a strong adhesive bond.



Laser Tough-Spots - Sizing Guide



EMS#	Color	Labels per sheet	Lay out Across	Layout Down	Size	Labels per pack
77585-W	White	192	12	16	3/8"	3,840
77585-B	Blue	192	12	16	3/8"	3,840
77585-G	Green	192	12	16	3/8"	3,840
77585-O	Orange	192	12	16	3/8"	3,840
77585-R	Red	192	12	16	3/8"	3,840
77585-Y	Yellow	192	12	16	3/8"	3,840
77585-05	Rainbow*	192	12	16	3/8"	3,840
77585-44	White	234	13	18	7/16"	4,680
77587-W	White	192	12	16	1/2"	3,840
77587-B	Blue	192	12	16	1/2"	3,840
77587-G	Green	192	12	16	1/2"	3,840
77587-O	Orange	192	12	16	1/2"	3,840
77587-R	Red	192	12	16	1/2"	3,840
77587-Y	Yellow	192	12	16	1/2"	3,840
77587-05	Rainbow*	192	12	16	1/2"	3,840
77588-75	White	108	9	12	3/4"	2,160
77588-100	White	63	7	9	1"	1,260

* Rainbow Pack: includes 4 sheets of each color: Blue, Green, Orange, Red, Yellow

► Tough Spots® On a Roll

Pre-cut Peel-off Round Labels for Microcentrifuge Tube Tops

Easy To Write On – PVC labels accept writing from most lab markers including our Solvent Resistant Pens and Teeny Writers.

Convenient – Dispensing box assists in labeling individual tubes used in small experiments.

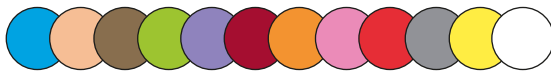
Options – A variety of sizes, colors and formats ensures the right label for the job.



Tough-Spots on a Roll Sizing Guide

1. 3/8" diameter

for 0.5ml tubes



2. 1/2" diameter

for 1.5ml - 2.0ml tubes



3. 3/16" diameter

for 0.2ml tubes
White only



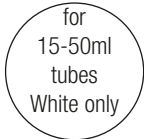
4. 7/16" diameter

for 1.5 - 2.0ml tubes
White only



5. 3/4" diameter

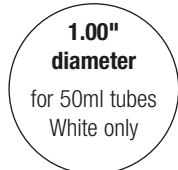
for
15-50ml
tubes
White only



6.

1.00"
diameter

for 50ml tubes
White only



EMS#	Color	Labels per roll	Diameter
77582-18	White	1500	3/16"
77580-W	White	1000	3/8"
77580-B	Blue	1000	3/8"
77580-CO	Coffee	1000	3/8"
77580-GO	Gold	1000	3/8"
77580-G	Green	1000	3/8"
77580-LA	Lavender	1000	3/8"
77580-MA	Maroon	1000	3/8"
77580-O	Orange	1000	3/8"
77580-R	Red	1000	3/8"
77580-SI	Silver	1000	3/8"
77580-Y	Yellow	1000	3/8"
77580-05	Rainbow*	1000	3/8"
77580-44	White	1000	7/16"
EMS#	Color	Labels per roll	Diameter
77581-W	White	1000	1/2"
77581-B	Blue	1000	1/2"
77581-CO	Coffee	1000	1/2"
77581-GO	Gold	1000	1/2"
77581-G	Green	1000	1/2"
77581-LA	Lavender	1000	1/2"
77581-MA	Maroon	1000	1/2"
77581-O	Orange	1000	1/2"
77581-P	Pink	1000	1/2"
77581-R	Red	1000	1/2"
77581-SI	Silver	1000	1/2"
77581-Y	Yellow	1000	1/2"
77582-75	White	500	3/4"
77582-100	White	500	1"

► 5 Across Tough-Spots®

White or assorted roll with 1,000 spots each of Blue, Green, Lavender, Red & Yellow



77586-10	White	5000	3/8", 5 up
77586-11	Assorted	5000	3/8", 5 up
77586-20	White	5000	1/2", 5 up
77586-21	Assorted	5000	1/2", 5 up



► Tough-Tag Dispenser

The Tough-Tag Dispenser – For use with Tough-Tags, Cryo-Babies and Tough-Tag Spots up to 1 3/8" wide. Hold up to 4 rolls. Outer Dimension: 7" W x 5" D x 4" H

Cat. #	Description	Qty. each
77590	Tough-Tag Dispenser	each

► Tough-Tag Station

Conveniently holds up to 6 rolls of Tough-Tags, Tough-Spots or Cryo-Tags. Utilize the ledge to easily write on labels for sample identification.

*77582-100 does not fit the Tough-Tag Station

Cat. #	Description	Qty. each
77590-10	Tough-Tag Station	each

➤ Chameleon Tough-Tags

Autoclave Indicating – Labels change color* from Green to Purple when exposed to autoclave temperatures.

Tough – Chemically inert, polyester labels resist most organic solvents and caustic agents. They adhere to most plastics, glass and metals without cracking, peeling or degrading.

Temperature-Resistant – From 40°C to 121°C, Chameleon Tough-Tags resist boiling water baths, autoclaving and moderate freezer temperatures.

Ideally Sized – Fits a variety of microcentrifuge tubes, microscope slides and other laboratory containers. Tubes labeled with Chameleon Tough-Tags will easily slide in and out of centrifuge rotors.

Compatible – Labels accept writing from any lab marker.



Before Autoclaving After Autoclaving

Cat. #	Color	Label Size	Qty.
77541-GP	Green>Purple	0.94" x 0.50" / 24mm x 13mm	1,000/roll
77542-GP	Green>Purple	1.28" x 0.50" / 33mm x 13mm	1,000/roll

*Labels will have a slight "textured" look to them due to the nature of the ink.

➤ Specialty Tough-Tags®



Temperature Resistant - From -196°C to 80°C

Save Time - Preprinted Tough-Spots make labeling and identifying samples quick and easy. Use the numbered Tough-Spots to identify a series of samples - no handwriting or printing needed.

Color Coded - The best of both worlds! Each color coded ToughSpot has a distinctly different color to identify similar samples and also includes a white area to clearly write a quick note about it.

Safety - Lab safety is always a top priority. Use the Biohazard or Radioactive Tough-Spots to identify tubes or other vessels containing hazardous materials.

Cat. no.	Label size	Description	Unit
77593-9	3/16" Bullseye Tough-Spots	Dark Blue	1000
77593-11	3/16" Bullseye Tough-Spots	Dark Green	1000
77593-12	3/16" Bullseye Tough-Spots	Copper	1000
77593-13	3/16" Bullseye Tough-Spots	Plum	1000
77593-14	3/16" BioHazard Tough-Spots	BioHazard	1000
77593-15	Printed Tough-Spots	1 to 10	1000
77593-16	Printed Tough-Spots	1 to 100	1000
77593-17	Printed Tough-Spots	microplates	1000
77593-18	3/16" Tough-Spots	Radioactive Warning	1000

➤ Wash-Off Labels™

Rinses Away Leaving No Adhesive Residue

Easy Removal – Labels Wash-Off in 1 rinse cycle at any water temperature

Autoclavable – Labels resist exposure to steam* at 121° C

Environmentally Safe – 100% biodegradable and FDA-compliant

Temperature-Resistant – Long term storage best between 32° F to 70° F (0° C to 21° C)

Laser Printable – Accepts laser printing and other markings

Labels dissolve under running water in less than 30 seconds.



*Build-up of liquid water on the label surface will dissolve the material

Cat. #	Color	Size (Inches / Millimeters)	Qty.
71826-10	White	2.625" x 1.00" / 67mm x 25mm	750/pk.
71826-20	White	4.00" x 1.00" / 102mm x 25mm	500/pk.

➤ Pre-Printed Wash Off Labels



Pre-printed Wash-Off Labels make it easy to mark bottles containing harmful chemicals or reagents. These convenient labels will save time and improve the safety of every lab. Wash the labels away when the label is no longer needed.



71826-21	Warning: Flammable	1"x1" (25 x 25mm)	250/roll
71826-22	Warning: Poison	1"x1" (25 x 25mm)	250/roll
71826-23	Warning: Biohazard	1"x1" (25 x 25mm)	250/roll
71826-24	Warning: Corrosive	1"x1" (25 x 25mm)	250/roll
71826-25	Warning: Radioactive	1"x1" (25 x 25mm)	250/roll
71826-26	Warning: Ready for Use	1"x1" (25 x 25mm)	250/roll
71826-27	Warning: Do Not Use	1"x1" (25 x 25mm)	250/roll
71826-28	Warning: Flammable	3"x2" (76 x 51mm)	250/roll
71826-29	Warning: Poison	3"x2" (76 x 51mm)	250/roll
71826-30	Warning: Biohazard	3"x2" (76 x 51mm)	250/roll
71826-31	Warning: Corrosive	3"x2" (76 x 51mm)	250/roll
71826-32	Warning: Radioactive	3"x2" (76 x 51mm)	250/roll
71826-33	Warning: Ready for Use	3"x2" (76 x 51mm)	250/roll
71826-34	Warning: Do Not Use	3"x2" (76 x 51mm)	250/roll

► Pre-cut, Peel-off Labels for Thermal Transfer Printers

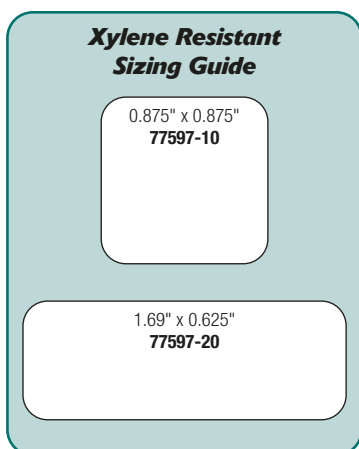
Xylene-Resistant - Polyester labels provide strong solvent resistance, specifically to multiple xylene washes as well as longer term exposure to xylene.

Versatile - Temp. Range: -40°C to 121°C. Xylene labels resist boiling water baths, autoclaving and moderate freezer temperatures.

Specially Designed - Rolls are specially top-coated to readily accept thermal transfer printing.

Convenient - Labels are available in a microscope slide size as well as a unique general purpose size for multiple uses.

Note: 100% Virgin polypropylene tubes are recommended. Avoid the use of siliconized surfaces



Cat. no.	Label size	Ideal Use	Unit
77598-10	0.875 x 0.875" (22x22mm)	Microscope Slides	1000/roll
77598-20	1.69"x0.625" (43x16mm)	General Purpose	1000/roll

► Wet Grip

Labels for Moist, Frosty or Frozen Tubes

- "GRIPS" to wet, frost-covered and frozen surfaces
- Temperature resistant to -40°C
- Compatible with centrifuge rotors
- Resistant to chemicals and solvents
- Adheres to plastics, glass, metals and even paperboard boxes
- Print on sheets with Laser printers or use rolls for Direct Thermal printers

► Direct Thermal (Temp. Range: -40°C to 70°C)

Cat. #	Label SIZE		Ideal Use	Qty.
	(Inches/Millimeters)			
77594-10	1.05" x 0.50"	27mm x 13mm	0.5ml tubes	each
77594-20	1.50" x 0.50"	38mm x 13mm	1.5ml tubes	each
77594-30	1.50" x 0.75"	38mm x 19mm	2.0ml tubes	each
77594-40	3/8" diameter	9.5mm diameter	0.5ml tubes	each
77594-50	2.00" x 0.25"	51mm x 6mm	Microplates	each
77594-60	1.50" x 0.50"	3/8" diameter spot	1.5ml tubes	each

► Laser Sheets (Temp. Range: -40°C to 100°C)

Cat. #	Color	Tag Size (Inches / Millimeters)	Sheet layout	Labels/Sheet	Ideal Use	Qty.
77595-10	White	1.28" x 0.50" / 33mm x 13mm	5 Across - 17 Down	85	1.5ml tubes	1,700/pk.
77595-20	White	0.94" x 0.50" / 24mm x 13mm	7 Across - 17 Down	119	0.5ml tubes	2,380/pk.
77595-30	White	1.50" x 0.75" / 38mm x 19mm	5 Across - 12 Down	60	1.5ml - 2.0ml tubes	1,500/pk.
77595-40	White	0.875" x 0.875" / 22mm x 22mm	8 Across - 12 Down	96	Microscope Slides	2,400/pk.

► Xylene Resistant Thermal Transfer Labels

Polyester labels provide strong solvent resistance, specifically to multiple washes as well as long term exposure to xylene.

Temperature range -40°C to 121°C. Xylene labels resist boiling water baths, autoclaving and moderate freezer temperature.

Available in roll with special top-coated to readily accept thermal transfer printing. Labels are available in microscopy slide end as well as unique general purpose. 1,000 labels per roll.

Note: 100% Virgin polypropylene tubes are recommended. Avoid the use of siliconized surfaces

Cat. #	Label Size	Ideal Use
77597-10	0.875 x 0.875" (22x22mm)	Microscope Slide
77597-20	1.69"x0.625" (43x16mm)	General Purpose
77592-55	Resin Ribbon - 2.50" x 244'	

SIZING GUIDE: Xylene Resistant Thermal Transfer Labels

0.875" x 0.875"
77597-10

1.69" x 0.625"
77597-20

► Light-Bloc Labels

Security – Protect light sensitive chemicals and reagents including fluorescent label conjugated antibodies

Pre Sized – Ideally sized for 15ml and 50ml centrifuge tubes makes label application easy

Multiple Uses – Ideal for labeling live cells, bacteria, DNA, protein with fluorescent labels or making up and storing light sensitive fluorescent label stock solution



77597-10	4.75" x 2.25" (12.07cm x 5.7cm)	15ml centrifuge tubes	100/roll
77597-20	4.75" x 3.75" (12.07cm x 9.5cm)	50ml centrifuge tubes	100/roll



ALL LABELS ARE CLEAR, ON 1" I.D. CORES WITH 1,000 LABELS/ROLL.

Dymo and LabelWriter are registered trademarks of the Dymo Corp., an Esselte Office Products Co.

Cat. #	Description	Qty.
77577-50	Dymo® LabelWriter® 450	each

► On A Roll (Temp. Range: -40°C To 100°C)

Cat. No.	Label Size	Use	Unit
77595-60	1.28" x 0.50"/33mm x 13mm	1.5ml tubes	1,000/roll
77595-65	1.50" x 0.75"/38mm x 19mm	1.5ml - 2.0ml tubes	1,000/roll

➤ **Labeling Tape**

- Markable** – Use pen, pencil or marker
- No Residue** – Leaves no adhesive residue when peeled off
- Water Resistant** – Also oil and acid resistant
- Temperature** – Withstands cold (-23°C) and hot (121°C) temperatures



Cat. #	Size	Color	Qty.
77627-W	0.75" x 500" (19mm x 12.7m)	White	roll
77627-Y	0.75" x 500" (19mm x 12.7m)	Yellow	roll
77627-G	0.75" x 500" (19mm x 12.7m)	Green	roll
77627-B	0.75" x 500" (19mm x 12.7m)	Blue	roll
77627-R	0.75" x 500" (19mm x 12.7m)	Red	roll
77628-W	0.75" x 2160"	White	roll
77628-Y	0.75" x 2160"	Yellow	roll
77628-G	0.75" x 2160"	Green	roll
77628-B	0.75" x 2160"	Blue	roll
77628-R	0.75" x 2160"	Red	roll

➤ **Solvent-Resistant Pens & Teeny Writers**

Solvent Resistant Pens feature an ultra-permanent ink.

- Resistant to xylene, alcohol, acetone and formalin
- Ideal for histology and cytology
- Markings will not run on embedding cassettes or frosted/painted slides and labware, even after repeated washes and solution treatments
- Remove markings with acetic acid, an ethanol/xylene mixture or paraffin. Testing advised before use

Teeny Writers are perfect general use lab markers.

- The Twin-Tip Teeny Writer has a fine tip and an ultra fine tip
- The original Teeny Writer has an extra fine tip
- Both are ideal for writing on Tough-Tags and Tough-Spots
- Use for labeling samples stored at room temperature and not exposed to chemicals and/or caustic agents

The Twin-Tip Too laboratory marking pen provides a new option for all writing needs. It is the best of both worlds. It is resistant to most mild laboratory chemicals and gives the flexibility of a twin tip pen for fine tip writing on small tubes and labels. Keep it close by utilizing the included handy pocket clip.

Testing is recommended.



Twin-Tip Teeny Writer

Cat. #	Description	Color	Tip (Millimeters)	Qty.
62053-B	Solvent Resistant	Black	Extra Fine (0.6)	each
62053-R	Solvent Resistant	Red	Extra Fine (0.6)	each
62054-B	Twin-Tip	Black	Fine/Ultra Fine (0.7/0.3)	each
62052-B	Teeny Writer	Black	Extra Fine (0.4)	each

➤ **Write Protect™**

A Clear Adhesive Overwrap to Protect Writing

Write Protect is a clear adhesive tape designed to cover and protect writing or printing on labels, on the surface of microtubes and on other laboratory containers. The clear tape comes in a handy dispenser and will adhere to all plastics, glass, metals and label materials. The tape is provided in perforated, pull-off segments for 0.5ml and 1.5ml tubes. Write Protect will not dry out, peel or fall off and will withstand temperatures ranging from -196°C to 150°C.

77626-10	Write Protect Tape (1.25 x 0.50" / 32 x 13mm)	1,000/roll
77626-20	Write Protect Tape (1.60 x 0.63" / 41 x 16mm)	1,000/roll

➤ **Perf-Tape™**

Slit-Perforated Laboratory Tape – No Scissors Needed!



Convenient - Slit-perforated every 1.25" to allow for clean tearing every time

Quick - Don't waste time with scissors, simply tear and apply!

"Invisible" Perfs - High-tech perforations are designed to remain "invisible" when tape is marked and may be written over

Strong - Perf-Tape™ won't tear while it is being unrolled

No residue - Leaves no adhesive residue when peeled off

Water resistant - Also oil and acid resistant

Temperature - Withstands cold (-23°C) and hot (121°C) temperatures

0.75" x 500" (19mm x 12.7m) w/1.25" perforation

Cat. #	Color	Qty.
3676-W	White	Roll
3676-Y	Yellow	Roll
3676-G	Green	Roll
3676-B	Blue	Roll
3676-R	Red	Roll

0.75" x 2,160" (19mm x 54.9m) w/1.25" perforation

Cat. #	Color	Qty.
3677-W	White	Roll
3677-Y	Yellow	Roll
3677-G	Green	Roll
3677-B	Blue	Roll
3677-R	Red	Roll

➤ **Rocker Tape**

Double-Sided Adhesive Film for Laboratory Containers



Mounting Convenient - No more fumbling with clamps

Versatile - Use with rockers, shakers, incubators or nutators

Strong - Easily rock and roll up to 300rpm and beyond*

Long Lasting - Re-usable based on load capacity and vessel number

Resistant - Keeps on rockin' even in the presence of most solvents and caustic agents

* RPM limits may vary based on load and vessel contact area. Test load recommended

Ordering:

77512-12	1.50" x 20' (38mm x 6m)	roll
77512-20	Rocker Tape Sheets, 12" x 12"	3/pk



➤ Hi/Lo Write-On Temperature Tape

➤ Color Tape

These color-coded label tapes work well with all glass and plastic labware, racks, tubing, bags, boxes, and cabinets. It adheres to any surface, including Teflon® and peels off without leaving a sticky residue. Tapes resist moisture and most solvents and can withstand autoclaving (250°F). It may be used as well down to -73°C. All rolls fit on a standard 1" (25.4 mm) or 3" (76 mm) core. Tape is available in widths of ½" (12.7 mm), ¾" (19 mm), and 1" (25.4 mm), 40 yards (36.6 M) long.



Write -On Label Tape

Cat #	Core	Width mm (in)	Length, yards	Color	Pack
77009-W1	1"	12.7 (½")	15 (13.7m)	White	each
77009-W2	1"	19.0 (¾")	15 (13.7m)	White	each
77009-W3	1"	25.4 (1")	15 (13.7m)	White	each
77010-W1	3"	12.7 (½")	40 (36.6m)	White	each
77010-W2	3"	19.0 (¾")	40 (36.6m)	White	each
77010-W3	3"	25.4 (1")	40 (36.6m)	White	each
77011-W1	3"	12.7 (½")	60 (54.8m)	White	each
77011-W2	3"	19.0 (¾")	60 (54.8m)	White	each
77011-W3	3"	25.4 (1")	60 (54.8m)	White	each
77010-R1	3"	12.7 (½")	40 (36.6m)	Red	each
77010-R2	3"	19.0 (¾")	40 (36.6m)	Red	each
77010-R3	3"	25.4 (1")	40 (36.6m)	Red	each
77009-Y1	1"	12.7 (½")	15 (13.7m)	Yellow	each
77009-Y2	1"	19.0 (¾")	15 (13.7m)	Yellow	each
77009-Y3	1"	25.4 (1")	15 (13.7m)	Yellow	each
77010-Y1	3"	12.7 (½")	40 (36.6m)	Yellow	each
77010-Y2	3"	19.0 (¾")	40 (36.6m)	Yellow	each
77010-Y3	3"	25.4 (1")	40 (36.6m)	Yellow	each
77009-G1	1"	12.7 (½")	15 (13.7m)	Green	each
77009-G2	1"	19.0 (¾")	15 (13.7m)	Green	each
77009-G3	1"	25.4 (1")	15 (13.7m)	Green	each
77010-G1	3"	12.7 (½")	40 (36.6m)	Green	each
77010-G2	3"	19.0 (¾")	40 (36.6m)	Green	each
77010-G3	3"	25.4 (1")	40 (36.6m)	Green	each
77010-B1	3"	12.7 (½")	40 (36.6m)	Blue	each
77010-B2	3"	19.0 (¾")	40 (36.6m)	Blue	each
77010-B3	3"	25.4 (1")	40 (36.6m)	Blue	each
77010-O1	3"	12.7 (½")	40 (36.6m)	Orange	each
77010-O2	3"	19.0 (¾")	40 (36.6m)	Orange	each
77010-O3	3"	25.4 (1")	40 (36.6m)	Orange	each

➤ Cloth-Textured Hi/Lo Temperature Tape

These tapes mold tightly to any container, withstands acids, alkalis, oils and greases. It's will not crack peel or fall off in 550°F dry oven temperatures. Hi/Lo Temperature tape also sticks tightly in the dry ice, liquid gases and deep freeze of cryogenic temperatures. Tape is available in widths of ½", ¾" and 1" on 250" roll. (This tape must be cut with scissors)

Cat.#	Description	Pack
77012-05	Hi/Lo Cloth Tape, ½" wide	each
77012-07	Hi/Lo Cloth Tape, ¾" wide	each
77012-10	Hi/Lo Cloth Tape, 1" wide	each

➤ Hi Temperature Indicator Tape



Specialty cloth-textured Hi Temperature Indicator tape shows the word "STERILIZED" in bold, black letters after standard sterilization processing. The tape sticks to almost any surface or shape, holds fast in 550°F dry oven temperatures. Available in widths of ½", ¾" and 1" on 250" rolls.

Cat.#	Description	Pack
77015-05	Indicator Tape, ½" wide	each
77015-07	Indicator Tape, ¾" wide	each
77015-10	Indicator Tape, 1" wide	each

➤ Steam Autoclaves Imprinted Tape



Indicate the status of all laboratory items to be sterilized with these tape labels. The word "STERILIZED" appears after processing at 250°F under normal sterilization conditions. Tape is available in widths of ¾" and 1" on 60 yard roll, 3" core.

Cat.#	Description	Pack
77016-07	Imprinted Tape (A) ¾"	each
77017-07	Imprinted Tape (B) ¾"	each
77018-07	Imprinted Tape (C) ¾"	each
77016-10	Imprinted Tape (A) 1"	each
77017-10	Imprinted Tape (B) 1"	each
77018-10	Imprinted Tape (C) 1"	each



➤ **Scotch 811 Removable Magic Tape**

This transparent tape can be removed as easily as it goes on. Ideal for taping before photocopying, leaving notes and memos, taping transparencies onto frames, etc., 3" core.

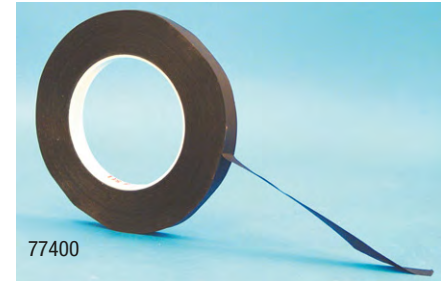
77200	Removable Magic Tape ½" x 72 yds	2 rolls/bx
77210	Removable Magic Tape ½" x 72 yds	5bx/lot



➤ **Scotch 810 Magic Tape**

The ever popular tape that is invisible when applied. Can be written on. Resists yellowing, cracking, and moisture. Ideal for mending, slicing, and many other permanent applications. 3" core.

77300	810 Magic Tape, ½" x 72 yds	2 rolls/bx
77310	810 Magic Tape, ½" x 72 yds	5bx/lot
77301	810 Magic Tape ¾" x 72yds	each



➤ **Scotch 235 Photographic Tape**

Black, crepe paper, pressure-sensitive tape that is designed for use in commercial as well as private photography. It can be used for making negatives, positives, and transparencies. Conformable, opaque, and it has low light reflectance. 3" core.

77400	235-Photographic Tape, ½"x60 yds	each
77410	235-Photographic Tape, 1"x60 yds	each

➤ **Scotch 616 Lithographer's Tape**

This ruby-red transparent tape is for use in opaquing, stripping, and edging on film materials. 3" core.

77500	616-Lithographer Tape, ½"x72 yds	each
77510	616-Lithographer Tape, ½"x72 yd	5 roll/lot



➤ **Scotch 850 Color Tape**

Good for making glass knife boats as well as for hanging, protecting and stripping. 3" core.

77700	Silver Tape ¾" x 72 yds	each
77710	Gold Tape ¾" x 72 yds	each
77720	Black Tape ¾" x 72 yds	each
77701	Silver Color Tape ½" x 72yds	each

➤ **Scotch Double Sided Tape:**

➤ **1) Without backing paper: Scotch 665**

This is a non-conductive transparent tape with adhesive on both sides. There is no liner to remove and it is long lasting for permanent applications. 3" (77mm) core, ¼"(6.35mm)Wx 72yds (32.9m)L. Comes 2 rolls inside a protective box.

77100	3M® 665, Double Sided, ¼" W x 36yds (6.4mm x 32.9m)	each
77110	3M® 665, Double Sided, ¼" W x 36yds (6.4mm x 32.9m)	5/pk
77101	3M® 665, Double Sided, ¾" W x 72yds (9.5mm x 65.8m)	each
77102	3M® 665, Double Sided, ¾" W x 36yds (19mm x 32.9m)	each

➤ **2) With paper liner: Scotch 666**

This is a non-conductive transparent tape with adhesive on both sides and white paper as a liner, which is slit in the center to facilitate its removal. This produces good adhesion and cleanliness.

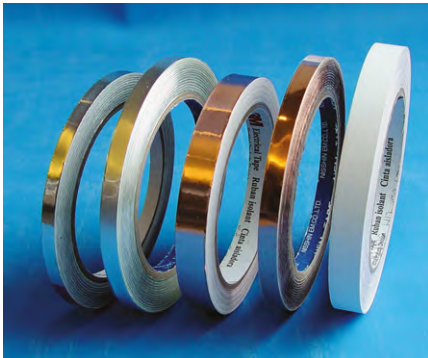
Comes 3 rolls inside a protective box, 3" core, ¼" (6.35mm) W x 36 yds (32.9m) L.

77115	Scotch 666 Double Sided Tape	each
77116	Scotch 666 Double Sided Tape	5/box
77117	Scotch 666 Double Sided, ¾" x 36yds	each
77118	Scotch 666 Double Sided, ¾" x 36yds	each
77119	Scotch 666 Double Sided, 1" x 36yds	each



► Conductive Adhesive Tapes

► 1) Scotch Conductive Tapes:



We offer two types of foil: Aluminum foil tape (Scotch 1170) and copper foil tape (Scotch 1181) with conductive adhesive. 3" core, 1/4" (6.35mm) width x 54 ft (16.5m) long

Technical Data	Copper	Aluminum
Foil Thickness, mils	1.4	2
Total Thickness, mils (mm)	3(.076)	4(.102)
Adhesion oz/in (N/10mm)	35(3.81)	35(3.81)
Electrical Resistance		
Through Adhesive ohm/in(ohm/cm)	.005(.032)	.01(.07)
Continuous Long Term °C	155°	155°
Functional Days-Weeks °C	175°	175°

77800	Aluminum Tape, Single Sided 1/4" x 18yds	1 roll
77799	Aluminum Tape, Single Sided 1/2" x 18yds	1 roll
77798	Aluminum Tape, Single Sided 1" x 18yds	1 roll
77801	Copper Tape, Single Sided 1/2" x 18yds	1 roll
77802	Copper Tape, Single Sided 1/4" x 18yds	1 roll

Double Sided Copper Conductive Tape

With the same technical properties of our 77802 shown above this conductive tape is 12.7mm(W)x16.4m(L).

77802-22 Copper Conductive Tape, Double Sided each

► 2) SEM Conductive Tapes:



Technical Data	Cu Contained Nickel Tape	Al Contained Nickel Tape
PAD	Pressed thin Cu	Pressed thin Al
Overall Thickness	0.075mm	0.09mm
PAD	0.035mm	0.05mm
Adhesive	0.040mm	0.04mm
Conductive resistivity	0.004ohm/sq. Inch	0.008ohm/sq. Inch
Adhesive Power/25mm width	920 gf	840 gf
Capacity after 60 min	0.1mm	0.1mm

We now offer a new line of conductive tapes, that are electrically conductive and offer a clean background. They were developed especially for SEM.

77810	Copper/Nickel Tape	each
77811	Copper/Nickel Tape	5 Rolls/pk
77813	Aluminum/Nickel Tape	each
77814	Aluminum/Nickel Tape	5 Rolls/pk

► 3) Double Sided Carbon Tape

With carbon double-sided tape, small particle sizes, such as 15-20 microns, can be mounted on the adhesive and produce good background structure. Our Double sided Carbon tape is also available in five widths to accommodate varying specimen mount surface sizes and applications.

Double sided Carbon Tape	
PAD	Isolate unwoven cloth
Overall Thickness	0.16mm
PAD	0.07mm
Adhesive	0.045mmx2
Conductive resistivity	50ohm/sq. Inch
Adhesive Power/25mm width	1,000 gf
Capacity after 60 min	0.2mm

77817-05	Double Sided Carbon Tape, 5mm(W)x20m(L)	each
77816	Double Sided Adhesive Carbon Tape 8mm(W) x 20m(L) (5/16" x 65)	each
77817	Double Sided Adhesive Carbon Tape 8mm(W) x 20m(L) (5/16" x 65)	5 Rolls/pk
77817-12	Double Sided Carbon Tape, 12mm(W)x20m(L)	each
77817-20	Double Sided Carbon Tape, 20mm(W)x20m(L)	each
77817-50	Double Sided Carbon Tape, 50mm(W)x20m(L)	each

Same as above however with Aluminum base as opposed to the unwoven base above. Offers a smoother surface

77817-05-AL	Double Sided Carbon Tape, 5mm(W)x20m(L)	each
77817-08-AL	Double Sided Carbon Tape, 8mm(W)x20m(L)	each
77817-12-AL	Double Sided Carbon Tape, 12mm(W)x20m(L)	each
77817-20-AL	Double Sided Carbon Tape, 20mm(W)x20m(L)	each
77817-50-AL	Double Sided Carbon Tape, 50mm(W)x20m(L)	each

► 3a) Carbon Conductive Tape, Double Coated

EMS introduces this unique double sided carbon tape which is 260 microns in thickness. The base which is Polycarbonate and 200 microns thick has on both of its sides 30 microns of conductive glue giving it a total thickness of 260 microns. The tape has one transparent liner on one side and a white thicker one on the reverse which protects the tape in shipping.

Specifications:

Core Diameter:	3" (76mm)
Adhesive:	Carbon Filled Acrylic Glur
Remover:	Ethyl acetate, ethanol, isopropanol and or alcohol
Temperature:	60°C(140°F)-Maximum
Impurities:	Cu, Si, Sb, S, Na, P, Fe and Mg*

* These are considered to be small impurities but they may be present

77819-12	Double sided Carbon Conductive Tape, 12mm (W) x 5m (L)	each
77819-25	Double Sides Carbon Conductive Tape, 25mm (W) x 5m (L)	each
77819-65	Carbon Conductive Tape in sheet form, 65mm (W) x 300mm (L)	each

► 4) Double Sided Conductive Cohesive Sheets



Features:

- Minimum impurities - Maximum conductivity.
- Produces minimum gas under vacuum conditions.
- Easy handling.

These conductive cohesive sheets offer good adhesion to the specimen and yield good conductivity and background structures, even with particles as small as 15 microns.

Sheet size: 5cm(W)x12cm(L)

Technical Data	Thickness	Adhesive Power	Conductive Resistivity
Silver Sheet	0.13mm	880 gf/25mm	0.00ohm/5mm ²
Carbon Sheet	0.16mm	1,100 gf/25mm	4,000ohm/5mm ²
77820	Silver Cohesive Sheet		5/pk
77822	Carbon Cohesive Sheet		10/pk
77822-01	Carbon Cohesive Sheet (Technical Grade)		10/pk

► **XYZ-Axis Electrically Conductive, 3M™ Double Sided Tape 9712**

3M™ XYZ-Axis Electrically Conductive Tape 9712 is an isotropically conductive pressure sensitive tape. The tape consists of a 3M adhesive loaded with conductive fibers. The result is a double-sided tape providing both good adhesion and good electrical performance with very high conductivity.



The 9712 Tape is an excellent choice when needing to bond your samples for all SEM work.

Specification:

Adhesive Type:	Filled Acrylic
Filler Type	Conductive Fibers
Release Liner	Silicone treated PolyCoated Kraft Paper
Paper Remover:	Acetone
Thickness Approximate:	Tape Only; .005" (.127mm) Release Liner; .004" (.010mm)
Temperature Range:	Short Term Exposure; 250°F (121°C) Long Term Exposure; 158°F (70°C)

► **XYZ-Axis Electrically Conductive, 3M™ Double Sided Tape 9713**

3M™ XYZ-Axis Electrically Conductive Tape 9713 is an isotropically conductive pressure sensitive tape. 3M tape 9713 conducts electricity through the thickness (Z-axis) and in the plane of the adhesive (X, Y planes) and is ideal for EMI/RFI shield and EMI/RFI gasket attachment to metal surfaces. The tape consists of a high performance 3M adhesive loaded with conductive fibers. The result is a double-sided tape providing both good adhesion and good electrical performance. The conductive fibers in 3M tape 9713 also provide improved handling characteristics. The 9713 Tape is an excellent choice when needing to bond your samples for all SEM work

Specification:

Adhesive Type:	Filled Acrylic
Filler Type	Conductive Fibers
Release Liner	Silicone treated PolyCoated Kraft Paper
Remover:	Acetone
Thickness Approximate:	Tape Only; .0035" (.0889mm) Release Liner; .004" (.010mm)
Temperature Range:	Short Term Exposure; 250°F (121°C) Long Term Exposure; 158°F (70°C)
Outgassing (ASTM E-595):	Total Mass Loss (TML); 1.60%
Collected Volatile	
Condensed Materials (CVMC):	0.03%
Water Vapor Recovered (WVR)	0.36%

► **Z-Axis Electrically Conductive, 3M™ Double Sided Tape, 9703**

3M™ Electrically Conductive Adhesive Transfer Tape 9703 is a pressure sensitive adhesive (PSA) transfer tape with anisotropic electrical conductivity. The PSA matrix is filled with conductive particles which allow interconnection between substrates through the adhesive thickness (the "Z-axis") but are spaced far enough apart for the product to be electrically insulating in the plane of the adhesive. The PSA tack properties and lack of any thermal curing make tape 9703 easy to use in all applications requiring a conductive tape.

Electrical Properties: Contact Resistance

Substrate Tested			
Aluminum/Aluminum	Aluminum/Stainless Steel	Copper/Aluminum	Copper/Copper
<24Ω	<21.5Ω	<16Ω	<.66Ω

Based upon four wire (Kelvin probe) resistance measurements made with crossed pieces of Foil/Type 9712 or 9713/Rigid plate construction using a 1.0" x 1.0" square piece of 3M tape Type 9712 or 9713. The rigid metal surface was prepared with a Scotch-Brite™ pad to roughen the surface and cleaned with isopropyl alcohol.

Adhesion Properties:

Substrate	Adhesion in oz./in(g/cm)			
	20 Min at 72°F (22°C)	24 Hours at 72°F (22°C)	20 Min at 158°F (70°C)	24 Hours at 72°F (22°C)
Stainless Steel	>41(457)	>42(468)	>43(479)	>53(590)
Aluminum	>35(390)	>33(367)	>36(401)	>43(479)
Copper	>47(412)	>39(434)	>43(479)	>55(613)

The tape is available in 3 sizes and it comes on a 3" Core(76mm)

Cat. #	Description	Qty
77808-63	XYZ-Axis Electrically Conductive, 3M™ Double Sided Tape, 9712, 6.35mm (W) x 32.9m (L)	each
77808-12	XYZ-Axis Electrically Conductive, 3M™ Double Sided Tape, 9712, 12.7mm (W) x 32.9m (L)	each
77808-25	XYZ-Axis Electrically Conductive, 3M™ Double Sided Tape, 9712, 25mm (W) x 32.9m (L)	each

Electrical Properties: Contact Resistance

Substrate Tested			
Aluminum/Aluminum	Aluminum/Stainless Steel	Copper/Aluminum	Copper/Copper
<2.5Ω	<2.0Ω	<1.0Ω	<0.5Ω

Based upon four wire (Kelvin probe) resistance measurements made with crossed pieces of Foil/Type 9712 or 9713/Rigid plate construction using a 1.0" x 1.0" square piece of 3M tape Type 9712 or 9713. The rigid metal surface was prepared with a Scotch-Brite™ pad to roughen the surface and cleaned with isopropyl alcohol.

Adhesion Properties:

Substrate	Adhesion in oz./in(g/cm)				
	15 min. at 72°F (22°C)	1 hr. at 72°F (22°C)	24 hr. at 72°F (22°C)	1 hr. at 158°F (70°C)	24 hr. at 158°F (70°C)
Stainless Steel	> 30 (335)	> 45 (502)	> 50 (558)	> 50 (558)	> 55 (613)
Aluminum	> 20 (223)	> 35 (390)	> 40 (446)	> 40 (446)	> 55 (613)
Copper	> 20 (223)	> 40 (446)	> 45 (502)	> 40 (446)	> 60 (669)

The tape is available in 5 sizes and it comes on a 3" Core(76mm)

Cat. #	Description	Qty
77809-12	XYZ-Axis Electrically Conductive, 3MTM Double Sided Tape, 9713, 12.7mm (W) x 32.9m (L)	each
77809-25	XYZ-Axis Electrically Conductive, 3MTM Double Sided Tape, 9713, 25mm (W) x 32.9m (L)	each
77809-100	XYZ-Axis Electrically Conductive, 3MTM Double Sided Tape, 9713, 100mm (W) x 32.9m (L)	each
77809-60	XYZ-Axis Electrically Conductive, 3MTM Double Sided Tape, 9713, 0.61m (W) x 98.6m (L)	each
77809-61	XYZ-Axis Electrically Conductive, 3MTM Double Sided Tape, 9713, 0.61m (W) x 32.9m (L)	each

Specification:

Adhesive Type:	Filled Acrylic Pressure Sensitive
Release Liner	Silicone treated PolyCoated Kraft Paper
Remover:	Acetone
Temperature Range:	Short Term Exposure; 2500F (1210C) Long Term Exposure; 1580F (700C)
Outgassing: (ASTM E-595)	Total Mass Loss (TML); 0.7%

Cat. #	Description	Qty
77809-70	Z-Axis Electrically Conductive, 3MTM Double Sided Tape 9703, 6.35mm x 32.9m (1/4" x 36yds)	each
77809-80	Z-Axis Electrically Conductive, 3MTM Double Sided Tape 9703, 12.7mm x 32.9m (1/2" x 36yds)	each

► Write-On™ Tape Dispenser

This tape dispenser offers you a convenient writing platform, suitable for both left- and right-handed users. The epoxy-coated platform with finger holes and built-in cutting edge, make dispensing and cutting the tape a simple one-handed action. The weighted base with non-skid bottom pads assures stability. The 3" (76mm) core fits standard tape rolls up to 1" (25mm) wide. The weighted base with non-skid bottom assures stability when in use. Weight: 4 lbs (1.8kg). The dispenser accepts series 77010-tapes shown above. The tape is not included.

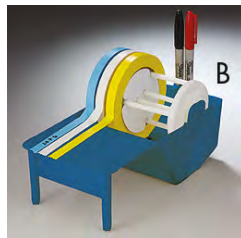


77001-00 Single Roll Write-On Tape Dispenser each

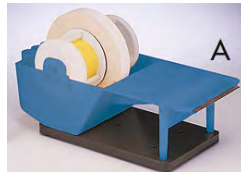
► Write-On Label Tape Dispenser

This dispenser holds 1 & 3" core Write-On Label Tape. Measures: 302 x 143 x 160 mm H (12 x 5 5/8 x 4 3/16"H)-Two types.

77001-20 Dual Core Write-On Tape Dispenser, Standard, see picture B each



77001-30 Dual Core Write-On Tape Dispenser, Heavy Base, see picture A each



► Multi-Roll Write-On™ Tape Dispenser

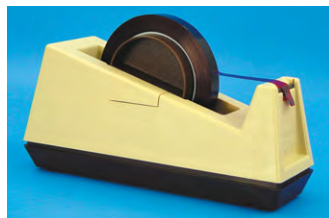
This tape dispenser allows tape rolls of various widths and colors to be mounted on a single drum and reeled off individually as needed. Accepts all 3" (76mm) core roll tapes. Separators keep tape rolls apart. Writing platform is 4" x 6" (102x152mm) with a serrated cutting edge. The weighted base with non-skid bottom pads assures stability. Made from epoxy coated steel. It measures 10 1/4" x 6" x 4 3/8" (H) (260 x 150 x 110mm). Weight: 5 lbs (2.3kg). Tape not included.



77002-00 Multi-Roll Write-On™ Tape Dispenser each

► Scotch C-25 Heavy Duty Dispenser

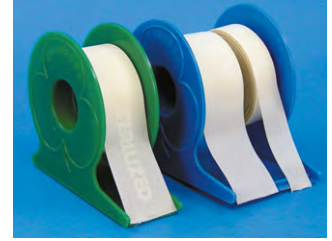
Durable and economical; high impact resistant plastic dispenser. It features a permanently attached tape drum to eliminate loss. A rubber base prevents slipping. Two tone brown and beige. Holds tape up to 1" wide. 3" core.



77000 Tape Dispenser each

► Single Roll Dispensers

Lightweight and easy to use. Hand dispenser holds 500" tape rolls. They are made from durable plastic that can be reused many times with a safety cutting edge that protects fingers.



Cat.#	Description	Pack
77052-01	Single Roll Dispenser, Model SDH-1	each
77052-02	Single Roll Dispenser, Model SDH-2	each

► Stationary Dispensers

Made from durable plastic. For use with 60-yard tape rolls.

Model SD-2 is for one or more rolls, up to 2" wide. Measures: 10" long x 4" wide x 5" high.

Model SD-6 is for multi-rolls up to 6" wide. Measures: 10" long x 6" wide x 5" high.



Cat.#	Description	Pack
77053-02	Tape Dispenser, Model SD-2	each
77053-06	Tape Dispenser, Model SD-6	each

► Multi-Roll Dispensers

We offer three different size dispensers to accommodate your 500" tape rolls (1" core) on countertop or cart; and one size dispenser for 2160" tape rolls (3" core). They provide easy dispensing while keeping all tape in one convenient location. A unique design allows easy addition or replacement of every other roll on the dispenser. Made from sheet metal.



77050-25



77050-35



77050-50

Cat.#	Description	Pack
77050-25	Tape Dispenser, Model MD-250, 2 1/2" x 12 1/2" (w) x 3 1/2" (h)	each
77050-35	Tape Dispenser, Model MD-350, 3 1/2" x 12 1/2" (w) x 3 1/2" (h)	each
77050-50	Tape Dispenser, Model MD-500, 5" x 12 1/2" (w) x 3 1/2" (h)	each
77050-60	Tape Dispenser, Model MD 2160, 7 1/2" x 13 1/2" (w) x 3 1/2" (h)	each

SECTION 30

Starter EM Kits

Kits for TEM Preparation

CleanKit for SEM, TEM and Microtomy



**Electron
Microscopy
Sciences**



Start off on the right foot with EMS's convenient Starter Kits



► Starter Kits for TEM

Electron Microscopy Sciences offers a complete discount package for new labs and established labs starting new projects. This package is arranged to enable a laboratory to perform standard preparations of biological specimens with enough supplies to last.

► Chemkit - Cat #14750

Fixation:

19100	Osmium tetroxide crystal	5x1g
19150	Osmium tetroxide 4% solution	10x2ml
16320	Glutaraldehyde EM Grade 50%	10x10ml
16020	Glutaraldehyde EM Grade 8%	10x10ml
19202	Paraformaldehyde, Prill	1 kilo
15710	16% Paraformaldehyde	10x10ml

Buffers:

21190	Sodium phosphate monobasic	500g
21180	Sodium phosphate dibasic	500g
21160	Sodium hydroxide pellets	100g
12300	Sodium cacodylate trihydrate	100g

Dehydrants:

20410	Propylene oxide	4x500ml
10010	Acetone	4x1qt

Embedding Media:

14120	EMbed-812 kit	1 kit
14300	Low viscosity kit (Dr. Spurr)	1 kit

Stains:

22050	Toluidine Blue	50g
21130	Sodium Borate, Tetra	500g
22400	Uranyl acetate	25g
27800	Lead citrate	2x25g
14950	Epoxy tissue stain	100ml

► Labkit - Cat #14760

0200-Cu	Grids, 200 mesh, copper	5 vials
0300-Cu	Grids, 300 mesh, copper	3 vials
0100-Cu	Grids, 100 mesh, copper	1 vial
H200-Cu	Grids, Hex 200 mesh, copper	1 vial
71152	Grid storage box, for 50 grids	1 dz
71170	Grid mats, round	3 mats
70680	Petri dishes, round	pk/100
70010-B	Embedding Capsules	pk/500
70900	Flat embedding molds	2 ea.
60950	Tri-pour beakers 50ml	pk/100
70960-1	Pipettes, 2cc	pk/500
72300	Wood applicators	bx/1000
71112	Latex gloves	bx/100
72631-10	Shell vials	pk/144
71960	Razor blades, carbon steel	bx/100
72550	Trimaide	2 pcs
72660	Dental wax	1 lb
70705	Duster w/nozzle	1 kit
72120	Marker pen, black	pk/12
72510	Syringes, 10ml	pk/100
78320-5	#5 Tweezer	2 pair
78322-7	#7 Tweezer	1 pair



► Cleankit - Cat #14780

A collection of cleaning supplies for the SEM, TEM and Microtome offered at a quantity kit discount.

71752	Lint-free cloth	pk/300
71090	Lint-free gloves	pk/6pr
70705	Duster w/nozzle	1 can
70707	Duster Refills (Environmentally Safe)	1 cs
71700	Lens tissue	2 bxs
72340	Wooden picks	2pk/100
71830	Metal polish, POL	1 tube
71112	Latex gloves	pk/100
60510	Alconox	4 lb. box
71054	Micro Cleaning Solution	1 quart
71620	Wipes	1 dozen
72310	Cotton Tipped Applicators	2/pk
71020-MTH	1800 Ultra Sonic Bath	each

When ordering any of the special kits, please specify particular sizes and any reasonable substitutions. Thank you and we hope you take advantage of this special money-saving opportunity.



Listing of Technical Datasheets and Newsletters

For a copy of any of the data sheets or newsletters that are listed below please call, write or visit our website today.

Title #	Title
10-1010	CHROMACal™ FAQ
10-1010a	CHROMACal™ Good Microscopy Practices
1200	Using Graphene in for TEM Lacey Grids
1232	Epofix™ Cold-Setting Embedding Resin
1234	Unimount Kit
1256	AcryMount Embedding Resin Instructions
1265	Acrylic Dye Set
1270	Poly Mount
1276	Poly-Acrymount Embedding Kit
3380, 3390, 3400	SEM/TEM Carbon Coaters Techniques and Applications
7641	LatticeAx™ FAQ
7641a	LatticeAx™ 220 – Site Prep Guide
10205, 10207	Agaroses
	Agarose for the Separation of Biological Molecules by Gel Electrophoresis
11430	Bismuth Stain Kit-Specific En-Bloc Staining
11434	Bismuth Stain Kit-Enhancing Contrast in General
11436	Bismuth Stain Kit-Mucosubstances & Polysaccharides
11500	Sym-Collidine Buffer
11860	Butvar B-98 Solution
12630	Colloidal Silver Liquid
12642-14	Conductive Silver Epoxy Kit
12644	Conductive Silver Pen
12664	CCC Carbon Adhesive
12667	Leit-C Plast
12668	Tempfix Mounting Adhesive
12780-05	FIRM - Fluorophore-Infiltreated Resin Microscopy (Cresyl Fast Violet)
13080	3,3'-Diaminobenzidine Tetrahydrochloride (DAB.4HCl)
13510 to 13514	DPX & DEPEX Mounting Mediums
13519	Sub-X® Mounting Medium
13900	Araldite 502 Kit
13920	Araldite 6005 Kit
13940	Araldite 502/Embed 812 Kit
14000	DER 732/736 Embedding kit
14010	Diethylene Glycol Distearate (DEGDS/DGD)
14040	Durcupan ACM
14115	Hard Plus Resin 812 Kit
14020	Fluka Durcupan: Water-Soluble Embedding Medium
14120	Embed 812 Kit
14130	Embed 812/DER 736 Kit
14200	GMA Embedding Kit
14210	MicroBed Resin
14220	Hydroxypropyl Methacrylate (HPMA) Kit
14250	PEG - GMA Embedding Medium
14260	Immuno-Bed Embedding Kit
14270	JB-4 Embedding Kit
14272	JB-4 Plus Embedding Kit
14300	Spurr's Low Viscosity Kit
14310	Ultra Bed Low Viscosity Epoxy Kit
14330	Lowicryl Letters
	Lowicryl Embedding Media
14330 to 14360	Lowicryl K4M, K11M, Lowicryl HM 20/HM23
14335	Lowicryl Monostep Embedding Media
14370	LR Gold Processing and Polymerization
14380 to 14382	Using LR White for EM Immunocytochemistry
	LR White Embedding Medium
	LR White for Electron Microscopy
	LR White for Hard Tissue
	LR White for Immunohistochemistry
	LR White for Light Microscopy
14390	Histocryl Data Sheet
14640	Quetol 651 - NSA Kit
14520	Methacrylate Embedding Kit
14650	Styrene Monomer Polyester Embedding Kit
14653	Technovit® 7100 Routine staining, enzyme histochemistry according to Gerrits
	Technovit® 7100 Sections for Histological and Industrial Application
	Glycol Methacrylate Embedding for Soft Tissues
14653 to 14654	Staining Protocols for Lymphoid Tissue Technovit® H7100/H8100
	Sectioning and Mounting Protocol
	Prussian Blue Stain for Glycol Methacrylate Sections
	Periodic Acid Schiff Stain for Glycol Methacrylate Sections
	Glycol Methacrylate Embedding for Materials Samples
	Giemsa Stain For Glycol Methacrylate Sections
	Alkaline Phosphatase for Glycol Methacrylate Sections
	Acid Phosphatase for Glycol Methacrylate Sections
14654	Glycol Methacrylate Embedding for Immunohistochemistry
	Technovit® 8100 Sections Specifically for Immunohistochemistry
14654-60, 14654-70	Technovit® 3040 Histobloc®
14655	Technovit® 9100 Methyl Methacrylate Application Information from Heraeus Kulzer
	Technovit® 9100 Routine Staining, Immune Reactions, Enzyme Histochemistry, In-Situ Hybridization
	Technovit® 9100 Short Instructions
	Technovit® 9100 Histology Technology Accessories
14660	Unicryl Embedding Resin
14700	Vestopal-W Embedding Medium
14800	Entellen Mounting Medium
14900	Determination of Proportion of Epoxy Resin
14942	EMS Cured Epoxy Remover
14950	Epoxy Tissue Stain
15285	Fast Frozen Stain Kit
15320	Eukitt Mounting Medium
15550	Ferritin Cationized
15675	Formaldehyde/Zinc Fixative
15720	Karnovsky's Fixative
15920	Gach Kit
15940	May-Grunwald and Geimsa for Bone Marrow
16580	Gold Sols Preparation
16905	Imidazole
17894	Biomount™
17970	Citifluor AF1, AF2 & AF3
17976	Citifluor AF87
17978	Citifluor CFPVOH and AF100
17983-20/-100	FluoroGel with Para Phenylenediamine (PPD) Anti fading Mounting Medium
17984	Fluoromount-G Aqueous Mounting Medium
17984-24	Dapi-Fluoromount-G™
17985-01 to -04	EMS Shield with DABCO, Anti-Fading Mounting Medium
17985-05 to -08	EMS-Mount Mounting Medium
17985-09/-100	EMS Shield Mount
17985-10	Fluoro-Gel
17985-12/-17	Clear-Mount, with Tris Buffer or Pipes Buffer, A Permanent Aqueous Mounting Medium
17985-30	Fluoro-Gel Mounting Medium with TES Buffer
17985-50/-51	Fluoro-Gel II with Dapi
17985-60/-61	FLUORO-Gel III Mounting Medium With Propidium Iodide (PI)
17985-150/-200	EMS Shield Mount with Anti-Fading
17987-01	Limonene-Mount Mounting Medium
17988-30	In Situ Mounting Medium
17994	Cargille Meltmount™
17994	MeltMount™ Quick-Stick™ Series
19100	Neutralization Of Osmium Tetroxide
19230	Pipes
19312	Polyester Wax
19320	Poly L Lysine Solution
20410	Propylene Oxide (Reagent Grade)
22400	Uranyl Acetate
22405	UAR-EMS Uranyl Acetate
20700	Ruthenium Tetroxide 0.5% Aqueous Solution
21630	EMS Sure Cut Surfactant
21700	Tannic Acid
21900	TCH - Thiocarbonylazide
23410	EMS Xylene-Subs
24141	Formaldehyde Spill Response™ Kit
24142-01	Glutaraldehyde Spill Control
24200	Crystal Clear® Series Clear Urethane Casting Resins
24210	Acrylic Casting Resin
25100 to 25550	Newsletter 1: Optimised Immuno Labelling using AURION BSA-c™ and AURION Blocking Solutions
	Newsletter 3: In Situ Hybridization for Light and Electron Microscopy using Ultra Small ImmunoGold Detection and Silver Enhancement
	Newsletter 4: The Dot-Spot Test: a Simple Method to Monitor Immunoreagent Reactivity and Influence of Fixation on Antigen Recognition
	Newsletter 5: Ultra Small Gold Reagents and R-Gent SE-EM in Pre-embedding Single and Double Labeling
	News Flyer 1: Background Suppression in Immunoperoxidase Cytochemistry using AURION BSA-c
	News Flyer 2: a) Double Label Immunohistochemistry for the Separate Observation of Two Antigens using Epi-Polarization Microscopy for the ImmunoGold-Silver Technique and Fluorescence Microscopy for the Alkaline Phosphatase Staining
	b) A Comparison between the Streptavidin-Biotin-Alkaline Phosphatase Method and the ImmunoGold Technique using Ultra Small Gold Particles and Silver Enhancement
	Ultra Small Immunogold Labeling and Optimizing Signal-noise Ratios
	ImmunoGold (Silver Staining) Incubation

Listing of Technical Datasheets and Newsletters

	Protocol for General Applications	26367	Masson' Trichrome for Connective Tissue	60539	LQ9™ Critical-Cleaning Liquid Detergent
	Post-embedding Immuno Incubation Protocol	26369	A Modified Verhoeff Elastic-Van Gieson Stain	60540-01	EMS Bell Jar Shine
	Pre-embedding Immuno Incubation Protocol	26370	Weigert's Resorcin Fuchsin	60804	Atomizer Rubber Bulb for Slide Coating Device
	Light Microscopy Immuno Incubation Protocol	26374	Verhoffs Van Geison	62190	Glass Knife Pliers
25880	Universal Immunoassay Buffer™ 10x	26381	Carstairs' Method for Fibrin & Platelets	62300	Tissue Embedding Center (pdf only)
25885	Universal Antibody Dilution Buffer™	26385	Modified Movats	62327	CellSafe Biology Inserts
26041	Harris Hematoxylin	26386	Goldner's Trichrome Method	62706	Retriever Operation Manual
26046	Van Gieson's Solution	26392	Wilder Modification of the Bielschowsky Stain for Reticulum	62804-52	CureMount™ Mounting Medium
26052	Schiff's Reagent	26396	Jones' Method for Kidney	62806-01	Cryo-Gel
26060	Wright Stain Solution	26401	Dane's Method for Prekeratin, Keratin, & Mucin	62830	Gentle Jane Snap Freezer
26064	May-Grunwald and Geimsa for Bone Marrow	26450	Mallory-Heidenhain Azan-Gomeri's Modification for Islet Cells	62550-01	O.C.T. Compound
26087	Kinyoun's Solution	26458	Maldonado's Method for Pancreatic Islet Cells	62820	PSA Tape-Transfer System
26090	Alcoholic Congo Red Solution	26472	Toren's Method for Mast Cells	63020	Marking Dyes for Tissue
26096-25/-50/-75	Differential Quik Staining Kit (Modified Giemsa)	26481	Methenamin Silver Method for Argentaffin Cells	63201	Forceps Warmer
26102	Truant's Fluorescent Method for Acid Fast Organisms	26500	Herxheimer Technique for Fat	63484	Illustrated Instructions for Assembling ProPlate™ Slide Modules
26105	Brown and Brenn Method for Gram Positive and Gram Negative Bacteria	26503	Fat Stains in Supersaturated Alcohol	63484	Microarraying Products References
26106	Brown-Hopps Method for Gram Positive and Gram Negative Bacteria	26511	Nile Blue A	63510	Double Neubauer Ruled Metallized Counting Chamber
26108	Taylor's Method for Bacteria	26516	Pearse's Method for Phospholipids	63511	Etched - Transparent Field Double Neubauer Counting Chambers
26109	Gridley's Method for Endamoeba Histolytica	26603	Johnson's Method for Iron	63512-10	Fuchs Resenthal Counting Chamber
26110	Giemsa for H-Pylori and Mast Cells	26604	Lillie's Method for Iron	63512-20	Petroff-Hausser Counting Chamber
26114	May Grunwald Giemsa for H-Pylori	26609	Oil Red O Method for Lipofuchsin	63512-55	Howard Mold Counter
26116	Genta Robason and Graham Stain for Simultaneous Visualization of Helicobacter Pylori and Gastric Morphology	26674	Darrow Red	63512-56	Speirs-Levy Eosinophil Counting Chamber
26119	Modified Steiner Using Chapman's Modification	26611	Hall's Method for Bilirubin	63512-75	McMaster Egg Slide Chamber
26120	Gridley's Method for Fungi	26613	Prussian Blue Method for Hemosiderin	63514	Leica Bright-Line Counting Chamber
26123	Combined Hematoxylin and Eosin	26614	Gomoris' Methenamine Silver for Urate Crystals	63560	Cellometer Disposable Cell Counting Chamber
26131	Pinkerton's Method for Rickettsia	26658	PTAH Method for Central Nervous System Tissue	64142-01,	
26132	Wolbach's Giemsa Method	26671	Vogt's Method for Nerve Cell Products	64142-02	Trypsin Reagent
26149	Wright-Giemsa Stain Method	26681	Kluver-Barrera Method for Myelin and Nerve Cells	64142-03,	
26153	Giemsa Thin Film Stain	26684	Woelck's Method for Myelin Sheath	64142-04	PRONASE Reagent, Ready to use
26154	Giemsa Thick Film Stain	26693	Bodians Protargol Method	64142-05,	PEPSIN Reagent, Ready to use,
26155	Thomas' Method for Malarial Parasite	26698	Hirano-Zimmerman for Nerve Cells & Fibers	64142-06	Antigen Retriever
26156	Price's Giemsa Stain Method	26753	Ehrlich's Hematoxylin	64142-07,	Citrate Buffer pH6.0 (10X)
26161	Prussian Blue Stain for Non-Hemoglobin Iron	26754	Harris Hematoxylin (With or Without Mercury)	64142-08	Antigen Retriever
26162	Rhodinile Blue Stain	26758	Weigert's Iron Hematoxylin with Methachromatic Dyes	64142-09,	EDTA Buffer, pH8.5, 10X;
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Ordering Information and Conditions of Sale

Office Hours:

6 am-6:30 pm Eastern time, Monday-Friday.

Ordering:

To make the ordering process as easy and fast as possible, Electron Microscopy Sciences offers three easy ways to order:

1. Phone: 1-(800) 523-5874

1-(215) 412-8400

2. Fax: 1-(215) 412-8450 or 8452
(24 hours a day-7 days a week)

3. Mail: Electron Microscopy Sciences
P.O. Box 550
1560 Industry Road
Hatfield, PA 19440

4. email: sgkck@aol.com or stacie@ems-secure.com

5. Internet: <http://www.emsdiasum.com>

No Minimum Order is Required.

Confirmation Orders are Not Required.

Standing and blanket orders are encouraged. The benefits offered you on these types of orders are:

- minimization of paperwork
- quantity discounts
- firm pricing for the period of the order
- regardless of price fluctuations in the market

C.O.D. orders are accepted and will be shipped by either UPS or Federal Express; Customers' choice.

Pricing:



Every effort will be made to keep prices firm, but they are subject to change without notice. Unless instructed otherwise, we will ship items that have increased in price as long as the increase is no more than 10%. When any increase is greater than 10%, we will contact you for authorization to ship

Terms and Conditions:

Terms of payment are net 30 days.

Orders will be shipped F.O.B. Hatfield, PA with transportation charges prepaid and added as a separate item on the invoice. All shipping charges are the exact cost of charges from the carrier that we have incurred.

Personal orders and checks are accepted with proper identification. We are pleased to announce that we accept American Express, Discover, MasterCard, and VISA for your convenience.

*Service and Shipping Information:

Here at ELECTRON MICROSCOPY SCIENCES we strive to offer you the best service, quality, pricing, and technical support that is possible. Management is always available to discuss any customer problems or suggestions. We can't fix a problem if we don't know about it. So, please feel free to call either Stacie Kirsch with any comments about our products, technical staff, or customer service.

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***UPS®:** Either ground, Orange (3 day), Blue (2nd day), or Red (next day)

***Federal Express®:** Express Saver, Economy (2nd day), or Priority (next day)

Motor Freight: for excessive weight

Unless you otherwise specify, we will choose the most practical shipping method.

*To assure you the lowest possible shipping costs we have set up special accounts with UPS, Federal Express, DHL & Airborne where you will benefit from our corporate discounts.

Business Classification:

Woman owned - small business.

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In the past year the Department of Transportation has enforced new rules and regulations regarding the packaging and shipping of regulated chemicals. Compliance to these regulations is mandatory. Therefore, a hazardous packing charge will be added to your invoice for only those materials requiring special packaging (Poison B's and extremely flammable). We will try our best to keep the expense to a minimum.

Returns - Breakage - Discrepancies:

- Returns may not be made without prior authorization.
- No custom orders or equipment may be returned
- To make a return, please repackage very carefully and include the following information:

Customer's name and address.

Customer's phone number.

Original purchase order number.

EMS invoice number.

- Items that are ordered in error and are returned are subject to a 15% restocking charge.
- Returns are not accepted after 60 days from the day of invoice.
- Shipments should be inspected immediately upon receipt.
- All breakage and discrepancy claims should be made promptly. We can not be responsible for shortage or breakage of which we have not been informed within 7 days after receipt of shipment.

Internet Resources:

Our site puts valuable technical support at your fingertips 24 hours a day. Our web site features not only our entire printed catalog on the web, but a complete encyclopedia of technical tips, reprints of all of our technical data sheets for all of our products, technical assistance, order information and ordering forms to order direct from our site, as well as up to the minute new product releases and much more. (See our sample home page at the back of the catalog).

Legal Liability:

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All the information and references presented in this catalog have been compiled from sources considered reliable to the best of our knowledge.

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Whether you require assistance in choosing a correct product, troubleshooting a product, procedure or protocol, or you just want to discuss an application, our technical team and specialists remain at your disposal. Our technical service is available by phone, fax, e-mail, or internet.

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Development, Manufacturing and Customer Service since 1970

What have we achieved in this period?

- Ultra 45[®] the first diamond knife with an absolutely score-free, hydrophilic cutting edge.
- Best of the first diamond knife for alternating sectioning aldehydes/semithin.
- Cryo the diamond knife for sectioning at low temperatures.
- Mite the first diamond knife for semithin sections for light microscopy.
- Ultra 35[®] the diamond knife for optimized sectioning results in almost all applications.
- Static Line II the knife for eliminating electrostatic charging in ultramicrotomy.
- Cryo-PI a cryo knife with a patented platform for section pick-up.
- Cryo Immuno the optimized cryo diamond knife for the Tokuyasu technique.
- Ultra Santic the oscillating diamond knife for room temperature sectioning.
- Cryetrim 45 and 28 for optimizing trimming with diamond blades.
- Ultra AFM & cryo AFM the first diamond knives for AFM at room and low temperatures.
- Cryo 20[®] for sectioning frozen hydrated specimens.
- Trimodal 45[®] and 28[®] trimming tools for both room and cryo temperatures.
- Manipulator for easy handling and mounting section ribbons.

These developments were possible by the cooperation with you, our valiant customers. We are convinced that our future developments will allow diamond knives to be used for many new applications.

What services can we offer you?

- Technical assistance in all fields of ultramicrotomy.
- Free sectioning tests for all types of samples.
- Make use of our many years of experience in perfecting our knives.
- With a telephone call, an e-mail or a fax message we can inform you of any details you require.

Contact us or visit us at any of the upcoming shows:

- Microscience Congress
July 1-3, 2014
Manchester, UK
- Microscopy & Microanalysis
August 3-7, 2014
Hartford, CT, USA
- International Electron Microscopy Congress
September 7-12, 2014
Prague, Czech Republic

For a complete list of shows please see the [Meetings Section](#)
We are looking forward to hearing from you soon!
Your DIATOME Team

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Cryer
Cryo
Cryo Immuno
Histology
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Static Line
Trimmers
Ultra Santic

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AFM Cryo & Ultra | Cryer | Cryo | Cryo Immuno | Histology | Manipulator | Static Line | Trimmers | Ultra | Ultra Santic

manip

For easy handling and mounting of section ribbons. The mounting of the manipulator is easy. The original piece on the cryochamber is removed, the manipulator is fixed in 5 minutes.

Applications

- Frozen hydrated biological samples (EMCRYO/ES)
- Room temperature sectioning of water sensitive samples.
- On site sectioning of biological samples for chemical analysis.
- On site sectioning of industrial samples such as polymers.

Functionality

- The left manipulator moves a conductive fibre on which the sections are attached by electrostatic force; the growing ribbon is guided.
- The right manipulator guides the grid very precisely below the section ribbon; the sections are attached to the carbon film with electrostatic force.

Your benefits of working with Diatome

Free customer service
Sectioning tests with biological and material research specimens of all kinds.

See and on the sections along with the support sample, a report on the results obtained and a recommendation of a suitable knife.

Complete discretion when working with proprietary samples.

Re-sharpening and reworking service

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AFM | Cryo | Cryo Immuno | Histology | Ultra | Ultra Santic | Accessories

AFM Diamond Knife

Item#	Knife	Angles	Size	Cutting Range	Application
Ultra-AM	35°	2.0, 3.0mm	10-100nm	Surface sectioning for biological and material specimens for AFM investigation	
Cryo-AM	35°	2.0, 3.0mm	10-100nm	Surface sectioning for biological and material specimens for AFM investigation	

Ordering:

Select AFM Knife: Select Quantity:

Select Edge Size: Total Price: \$0.00

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Knife Handling & Use Manual | Cryomicrotomy Handling & Use | Perfect Loop For Cryo Sectioning | Why Use DIATOME

Perfect Loop for Cryo Sectioning

1. Pull the sections away from the cutting edge of the diamond knife with an eyelash.
2. Dip the LOOP in isopropanol or surmountech/ethanol.
3. [Image showing the loop being used to pick up a section ribbon]
4. [Image showing the loop being used to pick up a section ribbon]

find technical information...

DIATOME U.S.

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The Electron Microscopy Sciences web site is the answer to every researchers' (biological and materials science) and clinicians' needs. Since our beginning 45 years ago, Electron Microscopy Sciences has been specializing in the manufacturing, preparation, and distribution of only the highest quality chemicals, supplies and equipment for microscopy, and all of its related fields.

Because of our commitment to, and close contact with the research community at large, we feel that our web site should not only be a vehicle for sales, but an instrument of reference and assistance. At our web site, you can browse our complete on-line catalog, place an order, and stay abreast of the most up-to-date information on the microscopy and histology market. Many helpful items can be accessed in our site such as MSDS's for the majority of our chemicals, technical tips, the newest recently published technical articles, as well as technical data sheets which will assist you in performing your job efficiently.

The screenshot shows the top navigation bar of the emsdiasum.com website. It includes the company logo and four main product categories: Electron Microscopy Sciences, Diatome, Summers Optical, and Dumont. Each category is accompanied by a small image of a representative product.

This screenshot displays the 'Catalog' section of the website. It features a sidebar with navigation options like 'Online Catalog Table of Contents' and 'Chemicals for Electron Microscopy, Light Microscopy and Histology'. The main content area lists various chemical products with their respective categories and sub-categories.

This screenshot shows the 'Technical' section of the website. It includes a 'Technical Summary' table listing various products and their specifications. Below the table, there are sections for 'EMMS Technical Data Sheets' and 'Download Product Brochures and Catalog Addendums'.

browse our online catalog...

find technical information...

This screenshot displays the 'Review your cart' section of the website. It shows a table with columns for 'Catalog Item Name', 'Quantity', 'Unit Price', and 'Total'. The table lists several items, including 'Direct Thermal DryType 1.5mm tubes' and 'Direct Thermal DryType 1.5mm tubes'. Below the table, there are fields for 'User Name' and 'Email'.

This screenshot shows the 'Download Product Brochures and Catalog Addendums' section of the website. It features a list of available documents, including 'EMMS Catalog Addendums' and 'EMMS Technical Data Sheets'. Each document is accompanied by a small thumbnail image.

place an order...

download brochures...

Visit the Electron Microscopy Sciences site...today!

This screenshot displays a featured article on the website titled 'Introducing Datacolor ColorChecker™ Color Calibration System!'. The article includes images of the ColorChecker system and text describing its benefits for color calibration in microscopy. Below the article, there is a section for 'Recent Catalog Addendums' listing various new products.

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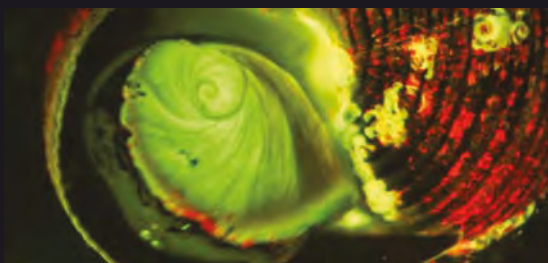
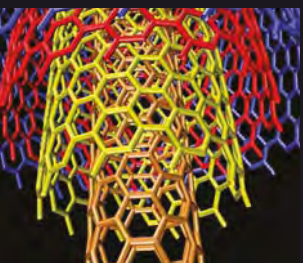
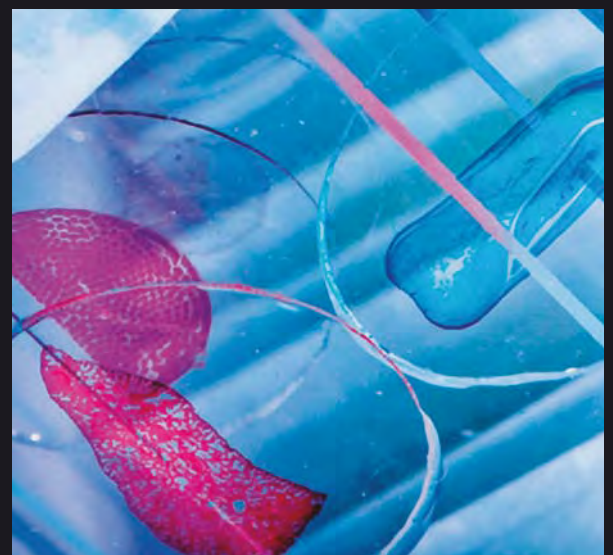
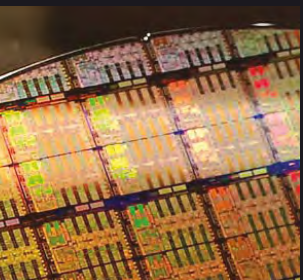
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