

# 18 - SEM and TEM accessories

## Magnetic field cancelling systems



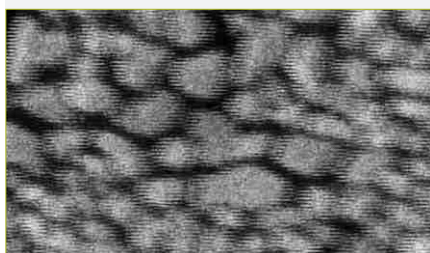
High performance electron beam instruments are very sensitive to changing ambient magnetic fields. The fields move the beam causing loss of resolution and measurement accuracy. Fields which exceed the manufacturer's environmental specification are common, being created by nearby machinery and equipment as well as by external sources. Operation in such fields prevents the instrument from reaching its full performance.

Magnetic field cancelling systems provide an effective solution for dampening ambient magnetic fields, allowing high resolution performance of TEM, SEM and FEG SEM instruments. The system comprises of a magnetic field control unit, magnetic field sensor and three multicore cables. The cables are installed in the room on the X, Y and Z axes. The sensor measures the strength and phase of the field in real time. The signals are fed to the control unit where three power amplifiers drive anti-phase currents through the multicore cables to effectively nullify the field.

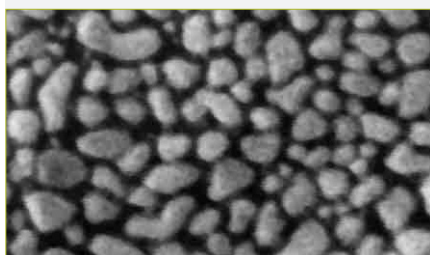
The SC22 system includes a magnetic field control unit, an AC magnetic field sensor and three multicore cables. It automatically responds to field changes within 100  $\mu$ s. The SC22 does not cancel DC field changes from sources such as elevators, trains and traffic. For higher level fields, and where there is a DC component to the fields, the model SC20 should be chosen. The SC20 system can provide AC or DC cancelling depending on the sensors installed. It recognises the sensors used and selects the internal filters. The sensor mixer function is built into the SC20 and becomes active when two sensors are plugged in.

**B7436** SC22 magnetic field cancelling system

**B7434** SC20 magnetic field cancelling system

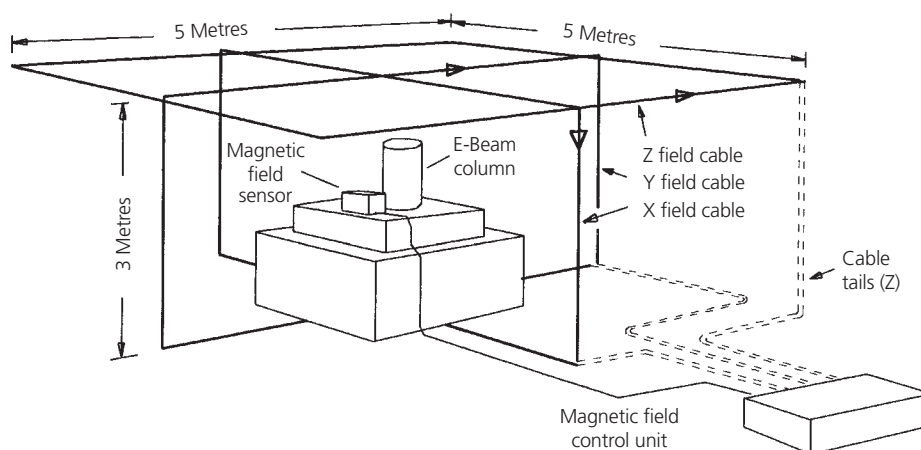


Cancelling OFF



Cancelling ON

### Standard installation



## Water chillers



Most electron microscopes require a cooling source for the diffusion pump and lenses for which a water chiller/circulator is recommended. The constant temperature and pressure provided by the chiller ensure good lens stability, as well as conserving water. The use of re-circulated water also prevents small diameter lens cooling coils becoming blocked, which can occur with continuous use of mains water.

Water chiller/circulators are also suitable for coating units and other laboratory equipment. Agar offers a free advisory service on the choice of water chillers for particular applications. Please contact us giving details of the instrument(s) to be cooled, including requirements for water pressure and flow rate, if known.

## Fischione plasma cleaner

The Fischione model 1020 plasma cleaner is the ideal tool for effective prevention and removal of hydrocarbon contamination from both TEM and SEM samples. A range of special holder ports, which can be easily interchanged, enables the cleaner to be used in conjunction with most of the common TEMs and SEMs from all manufacturers.



For full details, please refer to section 16.

## Detectors

A range of SEM accessories is available, which can be fitted to most microscopes with a free port on the specimen chamber to accept either the detector hardware or vacuum feedthrough. For detectors mounted on a movable arm, the port should have an unobstructed path to the optical axis at a suitable height.

Please specify the microscope model and dimensions of the port to be used when ordering.

## Probe current meter

A free standing, battery operated meter allowing measurement of electron beam probe current for quantitative analytical and back-scatter imaging applications. It is capable of detecting currents from below 1 pA to 2  $\mu$ A, in five switched ranges. The small size of the unit allows it to be located near the SEM itself. A Faraday cup is supplied with each unit to enable accurate measurements of probe current.

- 0.1999 pA accuracy  $\pm$  5 % of full scale
- 1.999 nA accuracy  $\pm$  5 % of full scale
- 19.99 nA accuracy  $\pm$  2 % of full scale
- 199.9 nA accuracy  $\pm$  2 % of full scale
- 1.999  $\mu$ A accuracy  $\pm$  2 % of full scale

**B7431** Probe current meter



## Specimen current-EBIC amplifier

This specimen current-EBIC amplifier is designed to operate with the small currents absorbed by the sample in the SEM. It not only gives accurate absorbed current measurements, but will also provide images over a wide range of probe currents. TV rate images are possible at the higher probe currents, and low noise images can be produced at slow scan rates. Its differential input capability permits the specimen to be floated by up to 5 volts from ground.

**B7723** Specimen current amplifier



### Infrared chamberscopes



The infrared (IR) chamberscope is intended for continuous monitoring of the inside of the SEM's specimen chamber using a compact low profile camera and IR illumination. It offers a clear view of detector, lens and manipulator positions with respect to the specimen, helping to avoid possible damage. The airside infrared source is mounted directly to the metal work, allowing much higher light levels to be obtained without overheating the source.

The infrared chamberscope 25 is similar to the established infrared chamberscope, it has a mounting hole of just 25 mm, allowing it to be mounted on the smallest of ports. It is designed with its lens, CCD chip and IR illuminators normally mounted on a swivel head inside the chamber, allowing either up/down or left/right adjustment to achieve the desired view. However the camera is also capable of being demounted and positioned anywhere in the chamber.

- B7746** Infrared chamberscope
- B7746-25** Infrared chamberscope 25

### Solid state backscattered electron detector



This state-of-the-art backscattered detector uses a large silicon diode exclusively manufactured to a specific design and characterised for electron detection. The detector can be mounted directly under the polepiece or can be fitted to a retractable or swinging arm mount to move it to a position where it causes least interference to specimen movement when not in use. It is very compact with a four quadrant annular construction. Selection of all four quadrants to positive will give compositional or atomic number contrast. With alternate segments switched to negative polarity, topographic images are obtained. Three versions of the detector are available. The standard version operates with primary beam energies down to 4 keV, the low kV device operates down to 1 keV and the ultra low detector down to 400 eV.

- B7721** Solid state detector 4 keV
- B7741** Solid state detector 1 keV
- B7742** Solid state detector 400 eV
- B7722** Swinging arm for detector
- B7724** Sliding arm for detector

### Centaurus detector system



The Centaurus detector is a high efficiency versatile scintillation type BS detector which performs well in both compositional and topographic modes. It is particularly useful for imaging uncoated specimens at low kV. In addition, its removable tip design allows it to be converted to a cathodoluminescence detector in seconds, giving an additional function without compromising the quality of results.

- B7743** Centaurus detector system
- B7744** Cathodoluminescence tip
- B7745** STEM detector tip

### Paper for video printers
















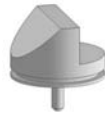

A range of print packs and paper rolls is available for current and older models of Sony and Mitsubishi video printers.

Please ask for details.


## SEM specimen stubs

A wide variety of stubs is available for a range of instruments. Unless otherwise stated, all stubs are manufactured from free cutting aluminium and can also be supplied in brass or copper.

Chemical profiles available on request.

LEO/CAMBRIDGE, FEI/PHILIPS, CAMSCAN, TESCAN, ZEISS	LEO/ZEISS	LEO/CAMBRIDGE, FEI/PHILIPS, CAMSCAN, TESCAN, ZEISS	AMRAY
			
12.5 mm dia, pin length 8 mm <b>G301</b> Pin stubs. Pack of 100 <b>G301B</b> Brass pin stubs. Pack of 10 <b>G301C</b> Copper pin stubs. Pack of 10	12.5 mm dia, pin length 6 mm <b>G301F</b> Pin stubs, short pin. Pack of 100	12.5 mm dia, no groove, pin length 8 mm <b>G301A</b> Pin stubs, no groove. Pack of 100	12.5 mm dia, pin length 15 mm <b>G3325</b> Amray stubs. Pack of 50
LEO/CAMBRIDGE, FEI/PHILIPS, CAMSCAN, TESCAN, ZEISS	LEO/ZEISS	LEO/CAMBRIDGE, FEI/PHILIPS, CAMSCAN, TESCAN, ZEISS	LEO/CAMBRIDGE, FEI/PHILIPS, CAMSCAN, TESCAN, ZEISS
			
25 mm dia, pin 3.2 x 8 mm <b>G399</b> Aluminium pin stubs, 25 mm dia. Pack of 50 <b>G399B</b> Brass pin stubs, 25 mm dia. Pack of 10	25 mm dia, pin length 6 mm <b>G399F</b> Pin stubs, short pin, 25 mm dia. Pack of 50	12.5 mm pin type 20° chamfer <b>G3020A</b> Pin stubs, 20° chamfer. Pack of 100	12.5 mm pin type with 45° chamfer <b>G3020</b> Pin stubs, 45° chamfer. Pack of 10
LEO/CAMBRIDGE, FEI/PHILIPS, CAMSCAN, TESCAN, ZEISS	LEO/CAMBRIDGE, FEI/PHILIPS, CAMSCAN, TESCAN, ZEISS	LEO/CAMBRIDGE, FEI/PHILIPS, CAMSCAN, TESCAN, ZEISS	LEO/CAMBRIDGE, FEI/PHILIPS, CAMSCAN, TESCAN, ZEISS
			
12.5 mm pin type angled 45° <b>G301E</b> Pin stubs, angled 45°. Pack of 10	32 mm dia, pin length 8 mm <b>G400</b> Aluminium pin stubs, 32 mm dia. Pack of 50 <b>G400B</b> Brass pin stubs, 32 mm dia. Pack of 10	12.7 mm dia, pin length 7.8 mm <b>G3160</b> Pin stub, 45/90°	12.7 mm dia, pin length 9.5 mm <b>G3162</b> Pin stub, 45/90°
LEO/CAMBRIDGE, FEI/PHILIPS, CAMSCAN, TESCAN, ZEISS	LEO/CAMBRIDGE, FEI/PHILIPS, CAMSCAN, TESCAN, ZEISS	LEO/CAMBRIDGE, FEI/PHILIPS, CAMSCAN, TESCAN, ZEISS	LEO/CAMBRIDGE, FEI/PHILIPS, CAMSCAN, TESCAN, ZEISS
			
12.7 mm dia, pin length 9.5 mm <b>G3161</b> Pin stub, low profile 45°	12.7 mm dia, pin length 9.5 mm <b>G3163</b> EBSD pin stub, low profile 70°	25 mm dia, pin length 9.5 mm <b>G3164</b> Pin stub, 45/90°	25 mm dia, pin length 9.5 mm <b>G3165</b> Pin stub, double 90°

## SEM specimen stubs

CAMBRIDGE ANALYSIS	CAMBRIDGE S600	ISI/ABT/TOPCON	ISI/ABT/TOPCON
			
32 mm dia, re-entrant base <b>G305</b> Cambridge analysis stubs. Pack of 50	32 mm dia, 10 mm high <b>G318</b> S600 stubs. Pack of 50	15 mm dia, 10 mm high <b>G307</b> ISI/ABT/Topcon stubs. Pack of 50	15 mm dia, angled stub, 45° chamfer <b>G308</b> ISI/ABT/Topcon angled stubs. Pack of 10
JEOL	JEOL	JEOL	JEOL
			
10 mm dia, 10 mm high <b>G306</b> JEOL stubs, aluminium. Pack of 50 <b>G306B</b> JEOL stubs, brass. Pack of 50	For JEOL heating stage 10 mm dia, 5 mm high <b>G306A</b> JEOL heater stubs. Pack of 50	10 mm dia, stub angled 45° <b>G3309</b> JEOL stubs, angled 45°. Pack of 10	12.5 mm dia, 10 mm high <b>G3384</b> JEOL stubs, 12.5 x 10 mm. Pack of 50
JEOL	JEOL	JEOL	JEOL
			
12.5 mm dia, 5 mm high <b>G3385</b> JEOL stubs, 12.5 x 5 mm. Pack of 50	32 mm dia, 20 mm high <b>G3386</b> JEOL stubs, 32 x 20 mm. Pack of 50	50 mm dia, 10 mm high <b>G3387</b> JEOL stubs, 50 mm. Pack of 50	32 mm dia, 5 mm high <b>G3376</b> JEOL 32 x 5 mm stubs. Pack of 50
JEOL	JEOL	JEOL	JEOL
			
<b>G3021</b> JEOL 15 x 5 mm stubs. Pack of 50 <b>G3022</b> JEOL 50 x 5 mm stubs. Pack of 50	<b>G3023</b> JEOL 25 x 5 mm cylinder stubs. Pack of 50 <b>G3024</b> JEOL 25 x 10 mm cylinder stubs. Pack of 50	10 mm dia, 10 mm high <b>G3166</b> JEOL 10 x 10 mm stubs, angled 45°	15 mm dia, 10 mm high <b>G3167</b> JEOL 15 x 10 mm stubs, angled 45°

## SEM specimen stubs

JEOL	JEOL	JEOL	JEOL
			
15 mm dia, 10 mm high <b>G3168</b> JEOL 15 x 10 mm stub, angled 70° for EBSD	25 mm dia, 20 mm high <b>G3169</b> JEOL 25 x 20 mm stub, angled 30°	25 mm dia, 20 mm high <b>G3170</b> JEOL 25 x 20 mm stub, angled 45°	25 mm dia, 16 mm high <b>G3171</b> JEOL 25 x 16 mm stub, angled 45/90°
JEOL	HITACHI	HITACHI	HITACHI
			
25 mm dia, 16 mm high <b>G3172</b> JEOL 25 x 16 mm stub, double angled 90°	15 mm dia, 6 mm high, M4 thread <b>G3313</b> Hitachi 15 mm stubs. Pack of 50	25 mm dia, 6 mm high, M4 thread <b>G3377</b> Hitachi 25 mm stubs. Pack of 50	32 mm dia, 10 mm high, M4 thread <b>G3318</b> Hitachi 32 mm stubs. Pack of 50
HITACHI	HITACHI	HITACHI	HITACHI
			
25 mm dia, threaded pin <b>G3025</b> Hitachi 25 mm, threaded pin. Pack of 50	15 mm dia, 10 mm high, M4 thread <b>G3313A</b> Hitachi 15 mm stub, angled 45°	15 mm dia, 10 mm high, M4 thread <b>G3313D</b> Hitachi 15 mm stub, angled 45/90°	15 mm dia, 12 mm high, M4 thread <b>G3313B</b> Hitachi 15 mm stub, angled 70° for EBSD
HITACHI	FEI-ESEM	Deben coolstage specimen stubs	Forensic science stubs
			
25 mm dia, 16 mm high, M4 thread <b>G3377A</b> Hitachi 25 mm stub, angled 45/90°	<b>G3205</b> ESEM stubs, aluminium. Pack of 100 <b>G3205C</b> ESEM stubs, copper. Pack of 50 <b>G3206</b> ESEM stubs, cupped. Pack of 100	<b>G3208</b> Flat topped coolstage stubs. Pack of 100 <b>G3209</b> Dished coolstage stubs. Pack of 100	Gun residue holders, 25.4 mm square (1"). <b>G3595</b> Forensic stubs. Pack of 100

### SEMClip™ specimen mounts

SEMClip spring loaded mounts are designed for quick, easy and clean mounting of specimens up to 2 mm thick onto stubs. Samples are held securely by a small spring loaded clip without use of adhesives, allowing easy exchange of samples. They are available with 1, 2 or 3 clips, and are ideal to hold silicon chips, paper, wire, threads, thin films, sheet metal, etc. SEMClip mounts with multiple clips can be used to hold either large samples or multiple small samples.

### SEMClip™ pin mounts

Pin stub versions of SEMClip mounts are available in 18 to 50 mm diameters, and can be used with all SEMs using pin stubs.



**G3032-181** SEMClip, 18 mm pin mount, 1 clip  
**G3032-251** SEMClip, 25 mm pin mount, 1 clip  
**G3032-321** SEMClip, 32 mm pin mount, 1 clip

**G3032-381** SEMClip, 38 mm pin mount, 1 clip  
**G3032-501** SEMClip, 50 mm pin mount, 1 clip



**G3032-252** SEMClip, 25 mm pin mount, 2 clips  
**G3032-322** SEMClip, 32 mm pin mount, 2 clips

**G3032-382** SEMClip, 38 mm pin mount, 2 clips  
**G3032-502** SEMClip, 50 mm pin mount, 2 clips



**G3032-253** SEMClip, 25 mm pin mount, 3 clips  
**G3032-323** SEMClip, 32 mm pin mount, 3 clips

**G3032-383** SEMClip, 38 mm pin mount, 3 clips  
**G3032-503** SEMClip, 50 mm pin mount, 3 clips



**G3033-12** SEMClip, 12.5 mm, 90°, pin mount, 1 clip  
**G3034-25** SEMClip, 25 mm, double 90°, pin mount, 2 clips



**G3035-25** SEMClip, 45/90°, 25 dia x 16 mm, pin mount, 2 clips

### SEMClip™ mounts for Hitachi

Cylinder mount SEMClips for Hitachi SEMs, with M4 thread. Available in 15, 25 and 32 mm.



**G3032-151H** SEMClip, 15 x 6 mm M4 cylinder mount, 1 clip  
**G3032-251H** SEMClip, 25 x 6 mm M4 cylinder mount, 1 clip  
**G3032-321H** SEMClip, 32 x 10 mm M4 cylinder mount, 1 clip



**G3032-252H** SEMClip, 25 x 6 mm M4 cylinder mount, 2 clips  
**G3032-322H** SEMClip, 32 x 10 mm M4 cylinder mount, 2 clips



**G3032-253H** SEMClip, 25 x 6 mm M4 cylinder mount, 3 clips  
**G3032-323H** SEMClip, 32 x 10 mm M4 cylinder mount, 3 clips



**G3035-25H** SEMClip, 25 x 16 mm M4 cylinder mount, 45/90°, 2 clips



**G3034-25H** SEMClip, 25 x 16 mm M4 cylinder mount, double 90°, 2 clips

## SEMClip™ mounts for JEOL

Cylinder mount SEMClips for JEOL SEMs. Available in 15, 25 and 32 mm diameters.



**G3032-151J** SEMClip, 15 x 10 mm cylinder mount, 1 clip

**G3032-251J** SEMClip, 25 x 8 mm cylinder mount, 1 clip

**G3032-321J** SEMClip, 32 x 10 mm cylinder mount, 1 clip



**G3032-252J** SEMClip, 25 x 8 mm cylinder mount, 2 clips

**G3032-322J** SEMClip, 32 x 10 mm cylinder mount, 2 clips



**G3032-253J** SEMClip, 25 x 8 mm cylinder mount, 3 clips

**G3032-323J** SEMClip, 32 x 10 mm cylinder mount, 3 clips



**G3032-25A** SEMClip, 25 x 20 mm cylinder mount, 45°, 1 clip



**G3035-25J** SEMClip, 25 x 16 mm cylinder mount, 45/90°, 2 clips



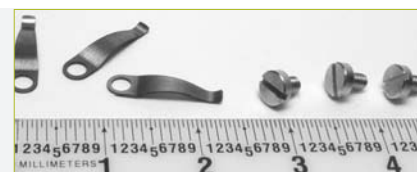
**G3034-25J** SEMClip, 25 x 16 mm cylinder mount, double 90°, 2 clips

## Replacement clips and screws

SEMClips are made from a spring grade beryllium-copper alloy. Each clip is 0.25 mm thick, 12.7 mm long and 1.6 mm wide at the tip.

**G3032C** SEMClip clips. Pack of 10

**G3032S** SEMClip screws, brass. Pack of 10



## Aluminium pin stubs – high purity

Standard stubs are manufactured from an aluminium alloy which contains approximately 5 % copper. For analytical applications, these stubs are made from an alloy with lower levels of impurities.

**G301P** High purity aluminium pin stubs. Pack of 100

Chemical analysis available on request.

### Bench top microscopes

We can supply a range of stubs, tweezers, small tools and sample preparation kits suitable for use in combination with the following bench top microscopes:

- Hitachi TM-1000 and TM3000
- JEOL NeoScope™
- FEI Phenom™

In addition we also offer calibration standards suitable for use with bench top SEMs.

### Rectangular SEM mounts for Hitachi S-5200 and S-5500

Rectangular specimen mounts, precision machined from high quality aluminium.



**G3210** Hitachi type 1,  
4.0 x 5.5 x 11 mm



**G3211** Hitachi type 2,  
3.5 x 5.5 x 11 mm



**G3212** Hitachi type 3,  
5.5 x 5.5 x 11 mm



**G3213** Hitachi type 4,  
2.0 x 5.5 x 11 mm

### Numbered stubs

Sequentially numbered stubs (1 - 10) for easy identification of samples.

**G301N** 12.5 mm pin stubs (G301), numbered 1 - 10  
**G301FN** 12.5 mm pin stubs (G301F), numbered 1 - 10  
**G306N** 10 mm cylinder stubs, JEOL, numbered 1 - 10

**G3384N** 12.5 mm cylinder stubs, JEOL, numbered 1 - 10  
**G3313N** 15 mm M4 thread, Hitachi, numbered 1 - 10

### Low profile pin stubs for FIB applications

These low profile aluminium pin stubs are available as flat or 90°, as well as with specific angles to accommodate specimens with small working distances in FIB applications. The 38° complimentary angle pin stub is suitable for FEI DualBeam™ and FIB systems, while the 36° complimentary angle pin stub is for Zeiss/Leo CrossBeam® and NVision systems. The stubs are fully compatible with standard pin stub mounts (3.2 mm diameter pin) for sample storage and transport. These stubs can also be used with adapters in Hitachi, JEOL and ISI systems.



12.7 mm dia  
**G3026** Flat pin stub. Pack of 10



12.7 mm dia  
**G3027** 90° pin stub. Pack of 10



12.7 mm dia  
**G3028** 38° pin stub. Pack of 10



12.7 mm dia, with 6 mm pin,  
total height 7 mm  
**G3030** Flat pin stub. Pack of 10



12.7 mm dia, with 6 mm pin,  
total height 9.15 mm  
**G3031** 90° pin stub. Pack of 10



12.7 mm dia, with 6 mm pin,  
total height 9.15 mm  
**G3029** 36° pin stub. Pack of 10

## Carbon stubs

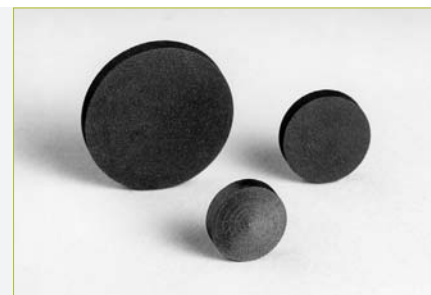
If the background radiation from an aluminium stub is undesirable, a stub made of spectroscopically pure carbon may be used. Supplied individually.

LEO/CAMBRIDGE, FEI/PHILIPS, CAMSCAN, TESCAN, ZEISS	JEOL	JEOL	ISI/ABT/TOPCON
			
12.5 mm dia <b>G321</b> Carbon pin stub	10 mm dia, 10 mm high <b>G323</b> JEOL carbon stub, 10 mm	12.5 mm dia, 10 mm high <b>G3427</b> JEOL carbon stub, 12.5 mm	15 mm dia, 10 mm high <b>G325</b> ISI/ABT/Topcon carbon stub, 15 mm
CAMBRIDGE ANALYSIS	HITACHI	JEOL	ISI/ABT/TOPCON
			
32 mm dia, re-entrant base <b>G327</b> Cambridge carbon stub, 32 mm	15 mm dia, 6 mm high, M4 thread <b>G3423</b> Hitachi carbon stub, 15 mm	10 mm dia, angled <b>G3424</b> JEOL carbon stub, 10 mm, angled	15 mm dia, angled <b>G3425</b> ISI/ABT/Topcon carbon stub, 15 mm, angled

## Carbon discs

A range of 3 mm thick carbon discs for mounting specimens. Available in 12.5, 15 and 25 mm diameters.

- G3420A** Carbon discs, 12.5 mm dia. Pack of 10
- G3421** Carbon disc, 15 mm dia
- G3421A** Carbon discs, 15 mm dia. Pack of 10
- G3422** Carbon disc, 25 mm dia
- G3422A** Carbon discs, 25 mm dia. Pack of 10



## Carbon disc on stub

A 3 mm thick carbon disc mounted on a conventional 12.5 mm stub that provides an economical solution for microanalysis or low emission surface imaging applications requiring light element stubs. 10 stubs supplied in an Agar stub storage box.

- G3420** Carbon disc mounted on 12.5 mm pin stub. Box of 10



Vitreous carbon planchettes

High purity, 3 mm thick planchettes with smooth polished surfaces, impermeable to gases and liquids. Suitable for analytical work and X-ray investigations.

- G3428 Vitreous carbon planchette, 12.7 mm dia
- G3429 Vitreous carbon planchette, 25 mm dia

SEM carbon foils

These carbon foils, manufactured by ACF Metals USA, provide a quick and easy method for covering specimen stubs with a well characterised, clean and inert conductive surface. They have minimal X-ray background, and are available in thicknesses ranging from 1 to 300 nm.

Further details available on request.

Silicon mounts



Super smooth, polished silicon mounts are ideal for applications where the machined surface of aluminium or carbon stubs can cause interference, such as the examination of small particles with fine structure, mounting cell structures and determining resolution and contrast capabilities of the 'in-the-lens' field emission SEMs. The silicon chips are opaque, of low electrical resistance, have surface properties equal to glass and may be attached to any type of specimen stub. The chips are cleaned before packaging, and are supplied as a pre-cut 10 cm wafer.

- G3390 Silicon wafer, chips 5 x 5 mm. Pack of approx 270
- G3388 Silicon wafer, chips 5 x 5 x 0.5 mm. Pack of 36
- G3391 Silicon wafer, chips 5 x 7 mm. Pack of approx 187
- G3390-10 Silicon wafer, chips 10 x 10 x 0.5 mm. Pack of approx 55

Other sizes are available on request.

Silicon wafers



These silicon wafers of 2" (50.8 mm), 3" (76.2 mm) and 4" (102 mm) diameter can be used either as substrates for thin film research or to make small silicon substrates by dicing the wafer into smaller pieces using a scribe. Wafers generally have flats or notches cut into one or more sides indicating the crystallographic plane and doping type. These silicon wafers are available as either P-type (boron doped) wafers which are cut with a primary flat or N-type (phosphor doped) wafers that are cut with an additional secondary flat (cut 45° to the primary flat). The crystallographic orientation is (111). The wafers are 460 - 530 µm thick, polished on one side and do not have a silicon dioxide top coating. Each wafer is shipped in a wafer carrier.

- G3336-2 2" (50.8 mm) silicon wafer
- G3336-3 3" (76.2 mm) silicon wafer
- G3336-4 4" (102 mm) silicon wafer

## Mica

Freshly cleaved ruby muscovite mica surfaces are extremely even and flat. They are also quite transparent and free from scratches and contamination. Cleaved mica is traditionally used in electron microscopy for the production of carbon support films, cell growing and thin film coating research. Ruby muscovite mica surfaces are also suitable as substrates for high resolution atomic force microscopy studies.

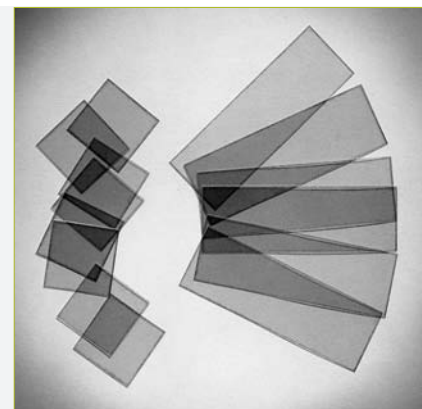
The mica cleaving process involves insertion of a sharp edge or point into an edge or corner of the mica sheet and gently separating the natural layers of the mica. A thin double edged razor blade is extremely good for this purpose.

The freshly exposed cleaved surface should be used immediately to utilise the clean and even surface. The starting thickness of the mica sheets varies between 0.10 - 0.25 mm.

Ruby muscovite is a hard material with excellent cleaving properties. It has a minimal tendency to cracking and splits more easily into thin films along natural cleavage planes.

- G250-3** Mica 11 x 11 mm, 0.15 mm thick. Pack of 20
- G250-2** Mica 25 x 25 mm, 0.15 mm thick. Pack of 20
- G250-1** Mica 75 x 25 mm, 0.15 mm thick. Pack of 20
- G250-4** Mica 100 x 20 mm, 0.15 mm thick. Pack of 20
- G250-5** Mica 150 x 150 mm, 0.15 mm thick. Pack of 3
- G250-6** Mica 9.9 mm dia, 0.1 mm thick, ultra-clean. Pack of 10
- G250-7** Mica 20 x 20 mm, 0.25 mm thick ultra-clean. Pack of 10

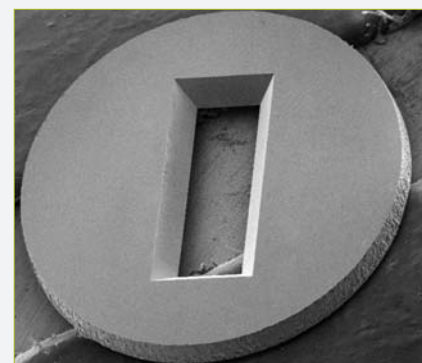
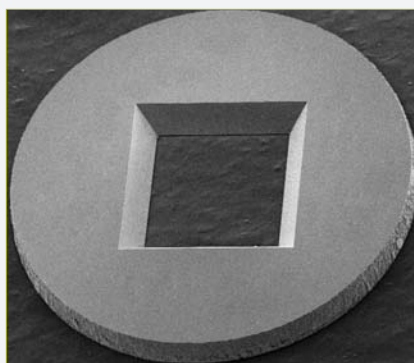
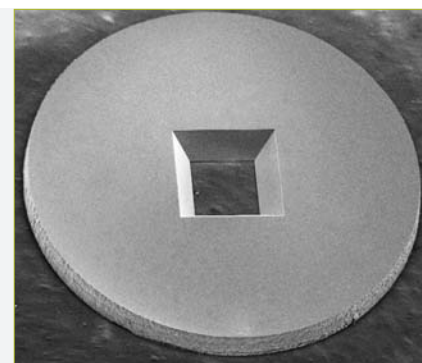
Other sizes are available on request.



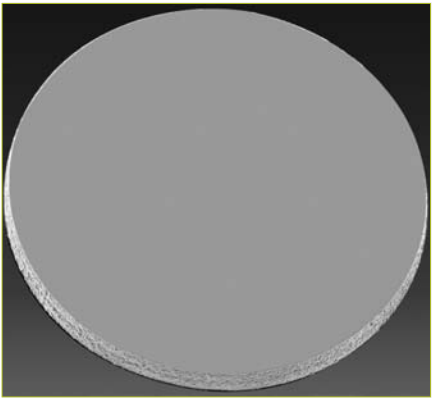
## Silicon nitride aperture frames

Silicon aperture frames are 3 mm diameter discs of 200  $\mu$ m thickness containing square or rectangular apertures of three sizes. They are suitable for use as a support frame to attach TEM lamellae made with FIB instruments to allow for subsequent sample processing and TEM imaging. They are fully compatible with standard TEM holders. The aperture openings have a side window angle of 35.26° to allow for easy access. Supplied as 10 frames in a grid box.

- G3337-05** Silicon aperture frame, 0.5 x 0.5 mm. Pack of 10
- G3337-10** Silicon aperture frame, 1.0 x 1.0 mm. Pack of 10
- G3337-15** Silicon aperture frame, 0.5 x 1.5 mm. Pack of 10



Silicon nitride coated discs (blanks)

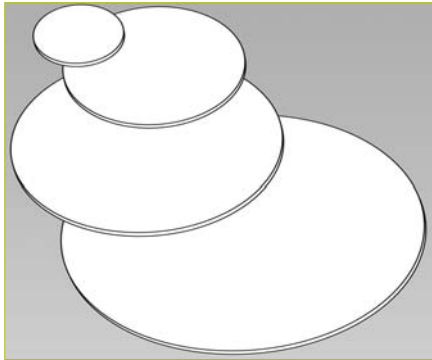


These 200 µm thick 3 mm silicon support discs have a low stress, ultra-flat 50 nm layer of silicon nitride on both sides. The film is non-stoichiometric and is closer to SiN than Si<sub>3</sub>N<sub>4</sub>. The discs are perfectly round, free from debris and with a specially designed edge for ease of handling.

The discs have a mean surface roughness of 0.45 nm ± 0.2 nm. They can be used for a number of applications, including specimen mounts for SEM and FESEM applications and as specimen discs for AFM applications. Silicon nitride coated discs are also available with a hydrophilic surface coating which consists of a 5 nm atomic layer of hydroxylated aluminium deposited onto the membrane surface. Supplied in packs of 10.

- G3343** Silicon nitride discs, 3 mm dia. Pack of 10
- G3343H** Silicon nitride discs with hydrophilic coating, 3 mm dia. Pack of 10

Quartz substrate discs



Quartz discs, or wafers, are made from high quality fused quartz, ground and polished to optical grade on both sides. The discs are ideal for use as substrates for thin film research and are also suitable for many optical applications. Quartz wafers have excellent chemical resistance against a wide variety of solvents, as well as exceptional heat resistance, with high dimensional stability over a wide temperature range. They are available in sizes from 1" (25.4 mm) to 4" (102 mm) with thicknesses of 1/16" (1.59 mm) and 1/8" (3.18 mm).

Type	Thickness	
	1/16"	1/8"
Quartz disc, 1" (25.4 mm) dia	<b>G3708-1</b>	<b>G3708-2</b>
Quartz disc, 2" (50.8 mm) dia	<b>G3708-3</b>	<b>G3708-4</b>
Quartz disc, 2.5" (63.5 mm) dia	<b>G3708-5</b>	<b>G3708-6</b>
Quartz disc, 3" (76.2 mm) dia	<b>G3708-7</b>	<b>G3708-8</b>
Quartz disc, 4" (102 mm) dia	<b>G3708-9</b>	<b>G3708-10</b>

SEM stub for TEM grids



In some SEM/EDX applications it is advisable to have particulate samples mounted on thin films which are first deposited on TEM grids. This pin-type aluminium stub allows four TEM grids to be held securely for SEM work. There is a hole below each grid to reduce the back-scatter component in electron collection, and prevent extraneous X-ray collection.

- G3662** SEM stub (pin format) for TEM grids

Also available in copper for cryo applications.

- G3662A** SEM stub (pin format), copper, for TEM grids

## Stub adaptors

These adaptors allow JEOL, ISI/ABT/Topcon and Hitachi system users to accommodate the standard pin type stub format of the European and USA manufacturers. The conversion cylinder contains a clip to hold the pin stub.

- G3660** Converter for JEOL, 10 mm dia cylinder
- G3658** Converter for JEOL, 12.5 mm dia cylinder
- G3661** Converter for ISI/ABT/Topcon, 15 mm dia cylinder
- G3659** Converter for Hitachi, 15 mm dia cylinder, with M4 internal thread
- G3659A** Converter for Hitachi, 15 mm dia cylinder, with M4 internal thread and with 45° angle



## Slotted specimen stub

12.5 mm aluminium pin stub with a slot and two grub screws, allowing specimens to be clamped for examination. The slot is 4 mm wide. Supplied with an allen key.

- G301D** Slotted specimen stub



## Gripping stub

A small gripping stub enabling specimens to be mounted edge-on for SEM examination. It may also be used to hold multi-laminous tissue during the final stages of dehydration and subsequent processing, before being viewed. Fits any stage using standard pin type stubs.

- G3392** Gripping stub



Developed at the University of Leicester. McTurk, G., Bulman, S., Ockleford, C.D. *J.Microsc.* 127, 233. 1982.

### Specimen holders and mounts for SEM

A range of multi-stub specimen holders and specimen clamping devices to fit most scanning electron microscopes is available. These holders extend the versatility of the instrument by allowing a number of stubs to be loaded into the SEM in one operation in the case of the multi-stub holders or, alternatively, samples of unusual shape can be examined by using a specimen clamping device. Clamping devices are also employed when samples cannot be affixed to a stub in the usual manner.

When ordering, please quote the make and model of SEM and also which accessories are fitted, eg. EDS system.

#### Multi-stub holder



The multi-stub holder is based on a cone shape, the angle of the cone being 45°. The top half of the cone has been cut away allowing samples to be examined at zero tilt. The standard 65 mm diameter holder accommodates 20 pin type (12.5 mm) stubs, 12 of which are angled.

Overall diameter: 65 mm

Height (excluding base mount): 15 mm

**G3370** Multi-stub holder

#### Multi-stub holder (conical)



This brass conical holder accommodates six pin type, 12.5 mm stubs, angled at 45°.

Overall diameter: 39 mm

Height (excluding base mount): 16 mm

**G3368** Conical multi-stub holder for 6 stubs

#### Multi-stub holder (flat top)



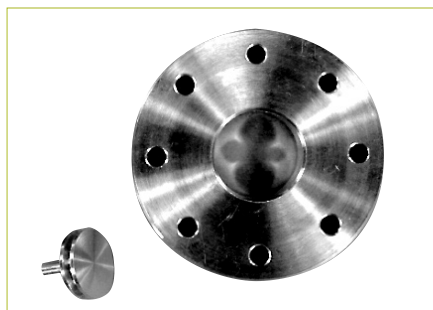
This flat top brass carousel holds seven pin type, 12.5 mm stubs.

Overall diameter: 39 mm

Height (to the top of the holder): 16 mm

**G3367** Flat top multi-stub holder for 7 stubs

#### Multi-stub holder (flat top)



This aluminium carousel holds eight pin type, 12.7 mm stubs.

Overall diameter: 46 mm

Height (excluding pin base): 10 mm

**G3593** Flat top multi-stub holder for 8 stubs

## Clamping bar

This brass bar clamp with a stub type mount at the back, accommodates specimens up to 72 mm in length. The reversible jaws operate independently, allowing the region of interest to be positioned within the travel limits of the microscope stage.

Overall length: 102 mm  
 Width including jaw mechanism: 42 mm  
 Width of bar: 16 mm  
 Height (excluding base mount): 19 mm  
 Maximum jaw opening: 72 mm

**G3371** Clamping bar



## Thumb wheel clamp

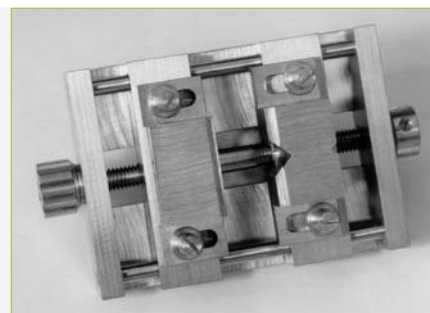
Thumb wheel clamp with symmetrical vice motion clamp bars. The bars are reversible to give different sized indentations, allowing irregular shaped specimens to be accommodated. Two sizes are available, with maximum jaw widths of 34 and 51 mm.

Base length: 62 mm  
 Base length including thumb wheel mechanism: 72 mm  
 Width: 44 mm  
 Height (excluding base mount): 27 mm  
 Maximum jaw opening: 34 mm

**G3372** Thumb wheel clamp, 34 mm

Base length: 82 mm  
 Base length including thumb wheel mechanism: 96 mm  
 Width: 58 mm  
 Height (excluding base mount): 30 mm  
 Maximum jaw opening: 51 mm

**G3373** Thumb wheel clamp, 51 mm

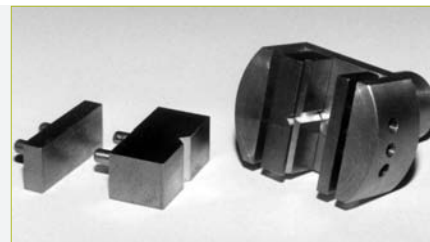


## Specimen clamp

Specimen clamp with five interchangeable jaws to accommodate samples up to 20 mm in width.

Overall length: 39 mm  
 Overall width: 26 mm  
 Height (excluding base mount): 16 mm

**G3369** Specimen clamp with five jaws



## SEM metallurgical mount sample holders

These holders with pin stub mounts accept standard metallurgical mounts. Available in three sizes.

**G3590** SEM metallurgical mount holder, accepts 1¼" (31.8 mm)  
**G3590A** SEM metallurgical mount holder, accepts 1½" (38.0 mm)  
**G3590B** SEM metallurgical mount holder, accepts 1" (25.4 mm)

Available for microscopes using other mounts on request.



### Hitachi three stub holder



Aluminium holder with M4 threads to accommodate three 15 mm Hitachi stubs.

**G3591** Hitachi three stub holder

### Hitachi holder for six pin stubs



M4 threaded holder to accommodate six pin stubs.

Diameter: 45 mm

Height: 9 mm

**G3592** Hitachi six stub holder

### Holder for three microanalysis standards

This 25 mm holder has positions for three microanalysis standards.

**G3594** Holder for three standards

This holder can be manufactured in any size, with as many positions for standards as the rim will take. Please ask for a quotation.

### Pin type adaptor for Cambridge analytical stub



Adaptor allowing 32 mm Cambridge stubs with re-entrant bases to be used in a stage designed for pin type stubs.

**G3657** Adaptor for re-entrant stub

### Freeze drying holder for pin stubs



A simple holder for five 12.5 mm pin type stubs. It can be used to accommodate samples for carbon or metal coating or freeze drying.

Dimensions: 37.5 (dia) x 12.5 (h) mm.

**G3695** Freeze drying holder

### SEM preparation stand



This 78 mm diameter x 12 mm high aluminium stand is useful for holding stubs while mounting specimens, or to hold specimens during carbon/metal coating. It can accommodate 14 pin stubs on one side, and 14 cylinder stubs on the reverse.

**G3696** Preparation stand for pin type and 10 mm cylinders

**G3698** Preparation stand for pin type and 12.5 mm cylinders

**G3697** Preparation stand for pin type and 15 mm cylinders

## Agar fast drying silver suspension

A very fine flake silver is suspended in methyl isobutylketone (4-methylpentan-2-one) and forms a thin, smooth, highly conductive silver film which is both adherent and flexible. Equivalent to DAG 1415 M.

**G302** Fast drying silver suspension. 50 g *Highly flammable, harmful*

**R1272** Diluent. 100 ml *Highly flammable, harmful*

This fast drying silver suspension is also available with a brush, for ease of application. The container has a narrow neck which helps to reduce solvent evaporation.

**G3691** Fast drying silver suspension with brush. 25 g *Highly flammable, harmful*

**R1272** Diluent. 100 ml *Highly flammable, harmful*



## Acheson Silver DAG 1415 M

The genuine replacement for DAG 915, used widely in electron microscopy and electronic circuitry for capacitor terminations, electrostatic screening, coating of UHF reflectors and electroplating on non-conductors. A certificate of conformity can be supplied if required.

**G3648** Acheson Silver DAG 1415 M. 50 g *Highly flammable, harmful*

**G3649** Acheson Silver DAG 1415 M. 150 g *Highly flammable, harmful*

**R1272** Diluent. 100 ml *Highly flammable, harmful*

Acheson DAG 1415 M is also available with a handy applicator.

**G3692** Acheson Silver DAG 1415 M with brush. 25 g *Highly flammable, harmful*

**R1272** Diluent. 100 ml *Highly flammable, harmful*



## Conductive silver paint

Fast drying, alcohol based silver paint. Forms a flat surface texture, with an average grain size of less than 10 µm.

**G3790** Conductive silver paint. 30 g *Flammable*

**G3791** Diluent. 25 ml *Flammable*

## PELCO® high performance silver paste

This paste containing silver flakes (20 µm) in an inorganic silicate aqueous solution has good thermal and electrical conductivity. It has no hydrocarbons, making it suitable for demanding specimen preparation in ultra high vacuum applications, FEM, SEM, etc. It can be used at cryogenic temperatures and up to 927 °C. Cures at room temperature but requires two hours at 93 °C to achieve high conductivity.

**G3304** High performance silver paste. 50 g



### Silver epoxy kit



Two part, electrically conductive silver epoxy suitable for mounting SEM samples. Also suitable for solderless electronic connections for repairing circuit boards.

**G3349** Silver epoxy kit. 14 g

### EPO-TEK® H20E

EPO-TEK H20E is a two component, silver filled, epoxy system consisting of a silver resin paste and a silver resin hardener. The pure silver powder is dispersed in both the resin and the hardener. It mixes to a smooth thixotropic paste, characterised by outstanding high temperature properties and excellent solvent, chemical and moisture resistance. It has a long pot life and is fast curing at relatively low temperatures. It will withstand 200 °C for 1000 hours. It contains no solvents or thinners, so therefore it will not outgas. H20E is ideal for electronic applications.

**G3040** EPO-TEK H20E epoxy. 28 g *Irritant*

Also available in a single component frozen syringe.

### EPO-TEK EE129-4

EPO-TEK EE129-4 is a room temperature curing, silver filled epoxy designed for making a conductive connection in SEM sample mounts, circuit assembly, semiconductor and LCD applications.

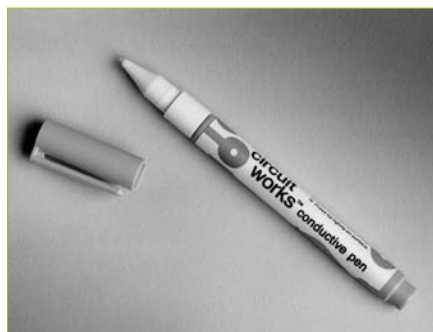
**G3041** EPO-TEK EE129-4 epoxy. 28 g *Irritant*

### EPO-TEK 353ND

EPO-TEK 353ND is a two component, high temperature epoxy originally designed for semiconductor, fibre optic and medical applications. It is especially suited for the bonding together of samples, in particular wafers, prior to ultrasonic disc cutting for the subsequent production of TEM cross-sections.

**G3042** EPO-TEK 353ND epoxy. 4 g *Irritant*

### Conductive silver pens



Silver pen suitable for affixing samples to SEM stubs, making instant conductive traces. The specially formulated silver-bearing thermoplastic polymer dries very quickly at room temperature. The valved pen tip allows a smooth flow with normal writing pressure, and is spring loaded to prevent clogging. Each pen contains approximately 30 metres of trace.

Available with standard or fine tip.

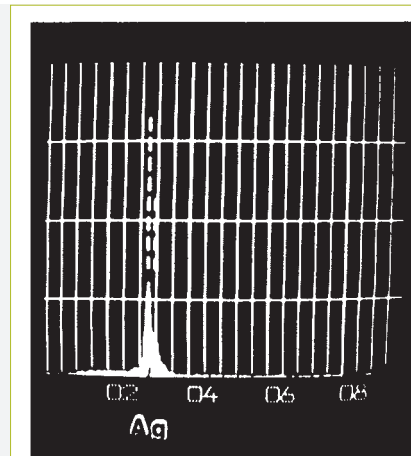
**G3342** Conductive silver pen, standard tip

**G3342F** Conductive silver pen, fine tip

## Silver adhesive sheet double coated

This electrically conductive adhesive sheet is suitable for cutting to SEM sample sizes. Dimensions: 50 x 120 mm, 0.16 mm thick.

**G3792** Silver conductive sheets. Pack of 5



## Conductive gold DAG

A suspension of finely divided gold particles, useful for analytical work where silver is not suitable. It is supplied in paste form (78 % gold), with a needle applicator.

**G3535** Conductive gold paste. 2 g *Highly flammable, irritant*

**G3791** Diluent for G3535. 25 ml *Flammable*



## Colloidal graphite (Aquadag)

This is a preparation of fine, pure colloidal graphite in water. It may be painted on to surfaces to provide continuous, adherent, dry films of graphite or used to form conducting paths.

**G303** Colloidal graphite. 500 g



## DAG 580 dry film lubricant

DAG 580 is a graphite lubricant which forms a thin, dry film. It has very low friction properties, and is ideal for use as a substitute for oil or grease on lightly loaded bearing surfaces, as it does not attract dust particles. It is electrically conductive, and is effective up to temperatures of 500 °C.

**G3656** DAG 580 dry film lubricant. 1 kg *Highly flammable, harmful*

### Graphit '33' spray



Dry film graphite spray lubricant containing finely divided graphite. The volatile carrier allows the sprayed layer to dry quickly on almost any substrate. The binding resin is stable up to 100 °C.

**G3689** Graphit '33'. 200 ml *Extremely flammable, irritant*

### Electrodag® 502



Electrodag 502 consists of specially processed carbon particles in a fluoroelastomer resin system. It cures at room temperature and, once cured, exhibits both high and low temperature flexibility, remaining flexible from -40 °C to over 260 °C. Supplied ready for use if applied by brush. Dip and spray methods may require dilution with a solvent (methyl ethyl ketone).

**G3734** Electrodag 502. 30 g *Highly flammable, irritant*

### Conducting carbon cement (Leit-C)



This is a suspension of very fine conducting carbon particles in a volatile carrier, suitable for forming conducting bonds between specimens and stubs.

**G3300** Conducting carbon cement (Leit-C). 30 g *Highly flammable, irritant*

**G3300A** Thinners for Leit-C. 30 ml *Highly flammable, irritant*

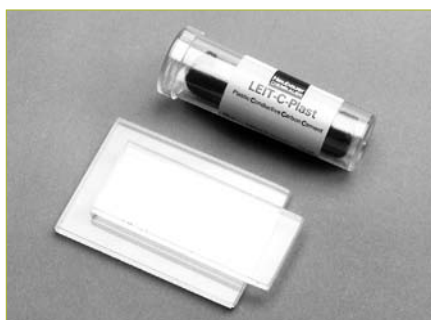
### Conductive graphite paint

Conductive graphite paint with isopropanol base. Average flake size 1 µm. Service temperature up to 200 °C.

**G3418** Conductive graphite, isopropanol base. 30 g *Highly flammable, irritant*

**G3418A** Diluent for G3418 *Highly flammable, irritant*

### Leit-C plast



A plasticine like material with low outgassing properties, suitable for use in the vacuum of an SEM. It is conductive, and therefore does not require additional coating. Small rolls can be used as conductive markers on a specimen surface.

**G3302** Leit-C plast. 15 g

**G3302A** Leit-C plast refills. 2 x 15 g

## Carbon adhesive discs

Carbon based, electrically conductive, double sided adhesive discs, also known as Leit tabs. They can be pressed onto a specimen stub and leave a conductive carbon adhesive when the backing material is removed. Ideal for examining uncoated small specimens in the SEM, and for microanalysis.

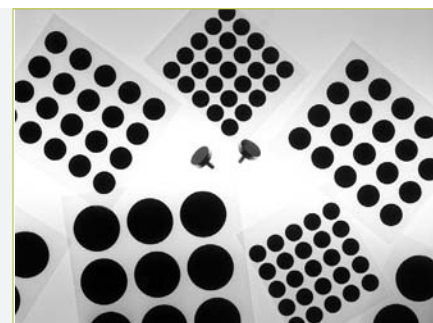
May contain trace impurities of Si, Fe, Mg and Na.

- G3357N** Adhesive carbon discs, 9 mm dia. Pack of 100
- G3347N** Adhesive carbon discs, 12 mm dia. Pack of 100
- G3348N** Adhesive carbon discs, 25 mm dia. Pack of 54

Also available in sheet form.

- G3356** Adhesive carbon sheets, 65 x 20 mm. Pack of 5

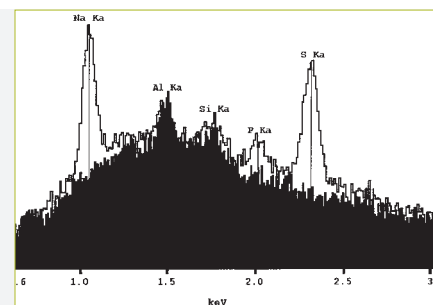
Other sheet sizes are available on request.



## Spectrotabs

Spectrotabs have a much lower level of impurities than standard carbon (Leit) tabs, avoiding anomalous results during X-ray analysis of small particles and powders, while still providing a quick and convenient means of attaching SEM specimens to stubs.

- G3358** Spectrotabs, 12 mm dia. Pack of 120



## Conductive carbon discs

Conductive carbon adhesive tabs with a thin film of strong adhesive, approximately 12.5 mm diameter. Over 99 % transparent to EDS, with very small amounts of nickel (0.6 %) and copper (<0.3 %). For small samples, tabs can be cut to the desired size before removing the tab from the backing sheet.

- G3111** Conductive carbon discs. Roll of 250



## Carbon conductive adhesive tapes

Electrically conductive, non-porous carbon tapes suitable for SEM or EDX applications. The double sided adhesive permits quick mounting of samples without using liquid or colloidal adhesives. Useful for securing samples for examination in an uncoated state. A range of widths is available for use with various specimen stub sizes.

- G3939** Carbon tape, 8 mm x 20 m
- G3939A** Carbon tape, 12 mm x 20 m
- G3939B** Carbon tape, 20 mm x 20 m
- G3939C** Carbon tape, 50 mm x 20 m



### Carbon adhesive sheet double coated

Electrically conductive adhesive sheets suitable for SEM/EDS applications. Can be cut to size as required. Dimensions: 50 x 120 mm, 0.16 mm thick.

**G3794** Carbon conductive sheets. Pack of 10

### Double sided sticky tapes



As well as being convenient for general use in the laboratory this double sided adhesive tape can be used for attaching specimens to stubs when convenience overrides any requirements for a clean vacuum.

**G263** Double sided tape, 12 mm x 55 m

**G264** Double sided tape, 38 mm x 55 m

#### Heavy duty double sided sticky tape

This general purpose double sided adhesive tape has a thicker base than **G263/G264** and is available in two widths.

**G3914** Heavy duty, double sided adhesive tape, 12 mm x 33 m

**G3915** Heavy duty, double sided adhesive tape, 25 mm x 33 m

### Metallised tapes with adhesive backing



**G265E** Aluminium tape, 6 mm x 55 m

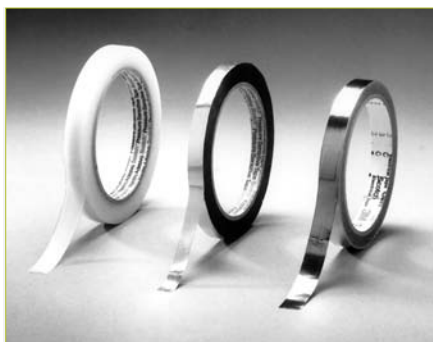
**G265** Aluminium tape, 12 mm x 55 m

**G265A** Aluminium tape, 25 mm x 55 m

**G253A** Copper tape, 6.4 mm x 16 m

**G253** Copper tape, 12.5 mm x 16 m

### Conductive metal tapes



Copper tape, 12 mm wide, with an electrically conductive adhesive.

**G3940** Conductive copper tape, 12 mm x 50 m

#### Double sided copper conductive tape

Copper tape with pressure sensitive, conductive acrylic adhesive. Allows specimens to be attached directly to the top surface of the tape.

**G3397** Copper conductive tape, double sided, 12.7 mm x 16.4 m

## Copper spray

Highly conductive, copper based spray suitable for shielding against electromagnetic interference, as well as to protect against electrostatic discharge.

**G3721** Copper spray *Extremely flammable, irritant*



## Conductive adhesive transfer tape

This is a highly conductive, pressure sensitive double sided adhesive tape filled with conductive nickel fibres for good adhesion and electrical performance. It conducts electricity through the thickness (Z axis) and also in the plane of the adhesive (X, Y planes). This tape was originally designed for EMI/RF shield applications but it is equally suited to mounting samples onto SEM stubs or directly on to SEM holders due to its conductivity and bonding strength. Available in two thicknesses: Type 9712 is 0.005" (0.127 mm), and Type 9713 is 0.003" (0.0762 mm).

- G3716-6** Conductive tape, Type 9712, 6 mm x 33 m
- G3716-12** Conductive tape, Type 9712, 12 mm x 33 m
- G3717-6** Conductive tape, Type 9713, 6 mm x 33 m
- G3717-12** Conductive tape, Type 9713, 12 mm x 33 m

Type 9719 is a conductive, pressure sensitive tape with a silicon adhesive suitable for applications where high temperature performance (up to 204 °C) is required.

- G3718-6** Conductive tape, Type 9719, 6 mm x 33 m
- G3718-12** Conductive tape, Type 9719, 12 mm x 33 m

## Kapton® plastic film tape

Kapton is a polyimide tape with a silicone adhesive backing which adheres well to difficult surfaces. Designed for high temperature applications, it can be used in harsh environments, in temperatures ranging from -75 to +260 °C. Due to its low outgassing properties it is suitable for use in ultra high vacuum applications. It is suitable for a diverse range of other applications, including as a positioning tape for cryo applications. Film thickness: 0.03 mm.

- G3713-12** 5413 polyimide film tape, 12 mm x 33 m
- G3713-19** 5413 polyimide film tape, 19 mm x 33 m
- G3713-25** 5413 polyimide film tape, 25 mm x 33 m

## Polyimide film tape

This is a 0.03 mm thick polyimide film with silicone backing adhesive. It is a tape suitable for use in high temperature applications, up to 180 °C.

- G3714-12** 92 polyimide film tape, 12 mm x 33 m
- G3714-19** 92 polyimide film tape, 19 mm x 33 m
- G3714-25** 92 polyimide film tape, 25 mm x 33 m

### W wax



This wax, apart from its use in making semi-permanent vacuum seals, is recommended for mounting specimens on SEM stubs. It has the advantage of a very smooth surface and a low atomic number. It can be softened by heating to allow removal of the specimen. It is unsuitable for some samples undergoing X-ray analysis.

**B7275** W wax. 500 g

**B7276** W wax. 100 g

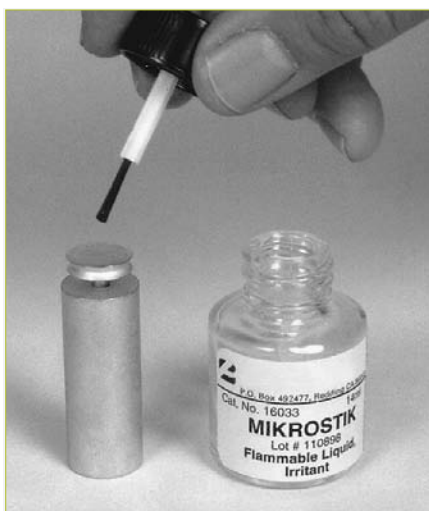
### Tempfix



A temperature sensitive adhesive which may be applied to a heated stub to yield a sticky surface for holding specimens. It dries to a very smooth surface with little inherent structure. It is also useful in microanalytical applications, as it gives a low X-ray background.

**G3305** Tempfix. 15 g

### Mikrostik™ non-conductive adhesive



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.

**G3793** Mikrostik. 14 ml *Highly flammable, irritant*

### Glue pen for mounting SEM samples



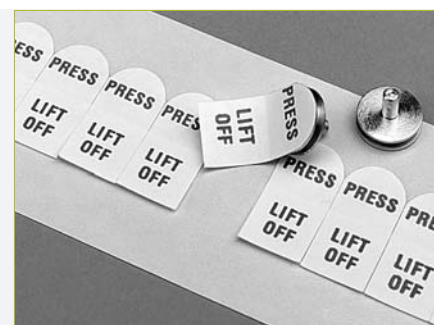
Fibre tip pen dispensing an all purpose glue, useful for mounting particulate samples on SEM stubs. It can be used for permanent or temporary bonds. The main components are an acrylic emulsion and water. It is acid and xylene free. The glue is blue when wet and clear when dry.

**G3112** Glue pen. 10 g

## Sticky tabs

Sticky tabs may be affixed to 12.5 mm specimen stubs, leaving a layer of adhesive when the backing is removed. Suitable for affixing small specimens. The adhesive is easily removed with isopropyl alcohol or acetone.

**G3109** Sticky tabs. Roll of 500



## SEMGLU

This high vacuum compatible SEM adhesive hardens under electron beam irradiation. Using relatively low imaging currents, the glue remains uncured. Polymerisation begins only when focussing the electron beam on a very small area of glue. Setting yields an excellent bond with adhesive forces comparable to those obtained with epoxy-based glues. It is excellent for securing FIB lamellae to grids. SEMGLU is supplied ready to use on a stub.

**SEMGLU** Kleindiek SEMGLU



## Epoxy Bond 110

Epoxy Bond 110 is a hard fast curing epoxy adhesive commonly used to bond glass coverslips to small or delicate samples, adhere multiple samples for TEM cross-sections, pre-coat samples prior to encapsulation and for other mounting applications. The two part epoxy cures bubblefree in five minutes at 150 °C. Epoxy Bond 110 turns red when set allowing curing by colour instead of time. Once cured, it is chemically resistant to etchants and will not outgas under vacuum.

**B7315** Epoxy Bond 110. 15 ml kit *Irritant*



## M-Bond™ 610 adhesive

M-Bond 610 is a non-conductive, two-component, solvent-thinned epoxy-phenolic adhesive for high performance applications. It is chemically resistant and provides a thin layer of glue which has good ion milling properties. It is an excellent adhesive for mounting samples for dimpling grinding and for bonding samples to produce high quality cross-sections for TEM or for FIB applications. It has also been found to be useful for bonding specimens to mounts for vibratome sectioning. M-Bond has an extremely wide operating temperature range. The complete kit contains four 14 g bottles of resin, four 11 g bottles of curing agent, four brush caps for dispensing mixed adhesives, four disposable mixing funnels and a sheet of instructions.

The single mix kit comprises one bottle of resin (14 g), one bottle of curing agent (11 g), one brush cap for dispensing mixed adhesive and a disposable mixing funnel.

**G3203** M-Bond 610. Single kit *Flammable, irritant*

**G3207** M-Bond 610. Complete kit *Flammable, irritant*



## Loctite® 460 sample bonding adhesive



Loctite 460 is a fast curing, low odour, low viscosity glue which can be used as an alternative to wax for mounting samples on glass for TEM/FIB thinning. Functional bond strength develops in a short time and is fully cured within 24 hours. Loctite 460 is soluble in acetone. This product also provides rapid bonding of a wide range of other materials, including metals, plastics and elastomers. It is particularly suited for bonding porous or absorbent materials such as wood, paper, leather and fabric.

**G3204** Loctite 460 adhesive. 20 g *Irritant*

## Crystalbond™ adhesives

Crystalbond adhesives allow temporary bonding of delicate crystals, metallurgical samples, glass components and ceramic substrates for dicing, slicing, drilling, grinding and polishing. They adhere readily to metals, glass and ceramics, and after machining can be washed away using suitable solvents.

**Crystalbond 509** provides excellent adhesion, and offers reduced clogging of diamond tools compared with waxes. It is transparent in thin cross-sections, and available in two standard colours: amber and clear. It is soluble in acetone or 509-S stripper, an odourless, nonflammable, biodegradable polar solvent.

**Crystalbond 555** and **555-HMP** are low melting point adhesives for moderate stress machining processes, dry plasma etching silicon wafers, de-panelling copper plated Teflon® boards, and dicing ceramic green tape. Transparent in thin cross-sections, and soluble in hot water.

**Crystalbond 590** is a high strength, resilient adhesive, ideal for use with miniature and tall parts. Soluble in isopropyl alcohol or 590-S stripper.

**Wafer-Mount™ 559** is a semi-rigid, solvent resistant plastic film with a pressure sensitive soluble adhesive layer.

**Wafer-Mount 562** is a thermoplastic film adhesive used for temporary bonding of delicate crystals, metallurgical specimens, glass components and ceramic substrates for dicing, slicing, drilling and polishing. It is especially suited to making TEM cross-sections. It can be easily washed away using various solvents such as 1,1,1-trichloroethylene or specially formulated Wafer-Mount 562-S stripper.

**Crystalbond 590-S stripper** is an environmentally safe, water-dispersible, powder concentrate prepared primarily for use with Crystalbond 590 and other mounting waxes. It can also be used for the removal of silicones, greases, oils, soils, finishing compounds and other contaminants. It is non-reactive with metals and non-flammable.

**Crystalbond 509-S** and **Wafer-Mount 562-S strippers** are high performance, environmentally safe chemical cleaning agents developed specifically for the removal of Crystalbond 509, Wafer-Mount 562, polymer coatings and inorganic particulates.

Cat. no.	Product ID	Flow point °C/°F	Viscosity CPS	Colour	Solvent
<b>B7297</b>	509	121/250	6000	Clear	509-S
<b>B7312</b>	509	121/250	6000	Amber	509-S
<b>B7298</b>	555	54/120	500	White	509-S
<b>B7313</b>	555-HMP	66/150	500	White	509-S
<b>B7314</b>	590	150/302	9000	Brown	590-S
<b>B7316</b>	559	-	-	Clear	Acetone
<b>B7317</b>	562	93/200	-	White	562-S/ 1,1,1-Trichloroethylene

**B7297** Crystalbond 509. 50 g  
**B7312** Crystalbond 509-1. 90 g  
**B7298** Crystalbond 555. 150 g  
**B7313** Crystalbond 555 HMP. 68 g  
**B7314** Crystalbond 590. 227 g

**B7316** Wafer-Mount 559, 10" x 10" sheet. Pack of 2  
**B7317** Wafer-Mount 562, 8" x 10" sheet. Pack of 10  
**B7322** Crystalbond stripper 509-S. 950 ml  
**B7323** Crystalbond stripper 590-S. 454 g  
**B7324** Crystalbond stripper 562-S. 450 g

## Specimen mounting wax

Thermoplastic wax ideal for fixing ceramics, glasses and semiconductor materials to specimen mounts for grinding, dimpling or ion beam thinning. Two versions are available, one melting at 80 °C and the other at 52 °C. The sample holder is heated to just above the wax melting point, and a small amount of wax is placed on the surface. The sample can then be positioned on the thin film of molten wax, and allowed to cool. The thin film of solidified wax is transparent and readily soluble in chloroform or warm acetone, facilitating sample removal.

**G3880** Transparent thermoplastic wax, 80 °C. 100 g

**G3881** Transparent thermoplastic wax, 52 °C. 100 g

## Bonding material

Lakeside cement L 70 C is a thermoplastic bonding material for mounting thin sections on sample holders. Applied at 120 - 140 °C, it becomes solid on cooling, and is soluble in either alcohol or acetone.

**G3887** Lakeside cement, 12 bars. Approx 250 g

## President SEM replication kit for high resolution SEM replicas

Two component, silicone based moulding material with excellent low viscosity forming properties, for high definition of fine structures. Polymerises in 5 to 7 minutes, and moulds can be removed from samples directly after polymerisation to obtain a negative mould. Applications include replication of biological materials to achieve a stable surface and the examination of processes like damage, wear or strain on large structures. Kit contains base (53 ml tube), catalyst (53 ml tube), six 30 ml mixing cups and six wooden stirring sticks.

**G3888** President SEM resolution replication kit



## Replicating compound

Two part, silicone rubber elastomer formulated to make permanent replicas of objects with a 1 µm resolution. The two component cartridges are used with an applicator fitted with a fine nozzled disposable mixer tube. Two types are available, a rapid curing version with a one minute working time, and a slower curing version with a seven minute working time. Both are ideal for non-destructive testing and for field use. Replicas can be sputter coated for examination in the SEM. Temperature range from -10 to +180 °C.

**G3556** Manual applicator

**G3557** Static mixer tubes. Pack of 10

**G3558** Replicating medium cartridge, fast curing (7 minute curing time). 50 ml

**G3559** Replicating medium cartridge, slow curing (30 minute curing time). 50 ml

For details of other replicating materials, please refer to section 15, pages 292 - 293.

### Anti-static spray



Aerosol spray which can be applied to non-conducting specimens, enabling them to be examined uncoated at low resolution in the SEM.

**G3301** Anti-static spray. 400 ml *Extremely flammable*

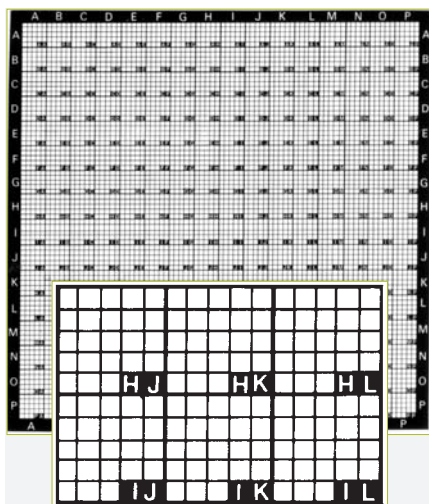
### Ink pen



Fine point writing pen which leaves a mark that can be read in the electron beam of the SEM. It can be used for marking or identifying an object under examination.

**G3344** Ink pen for SEM

### LM-SEM locator grids

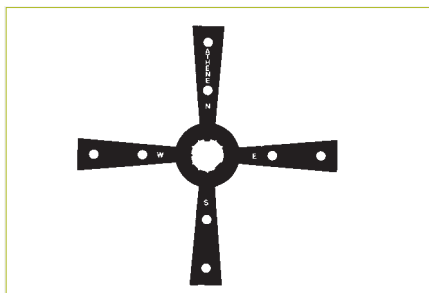


Large 65 x 65 mm locator grid with small squares of 0.72 mm. Delineation of 5 x 5 small squares gives unique area labelling, useful for comparing LM and SEM images. Available in copper or nickel.

**G2998C** LM-SEM grid, copper

**G2998N** LM-SEM grid, nickel

### Finder grids for SEM specimens



SEM specimens may be relatively large and the area selected for viewing rather small. We provide a range of large format grids that can easily be mounted onto SEM stubs.

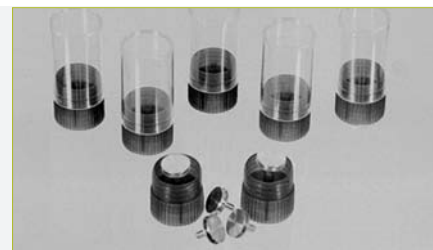
Markings on the grid bars help to define individual squares and to relocate features of interest previously identified. They are particularly useful for particle analysis.

For details of the complete range, please refer to section 1.

## Storage/transport tubes for SEM stubs

Tubes for storing and transporting SEM specimens, designed to hold the stub firmly in the base of the tube. Available for 12.5 mm diameter pin stubs, stubs with M4 thread (Hitachi), and pin stubs up to 38 mm in diameter.

- G3626** Storage tubes for 12.5 mm pin stubs. Pack of 10
- G3636** Storage tubes for pin stubs up to 38 mm dia. Pack of 10
- G3637** Storage tubes for stubs with M4 thread up to 38 mm dia. Pack of 10



## Storage box for SEM stub tubes

Strong cardboard box with an insert which holds 10 stub storage tubes (**G3626**). Useful for storage or posting purposes. Available with or without storage tubes.

Dimensions: 200 x 95 x 55 mm.

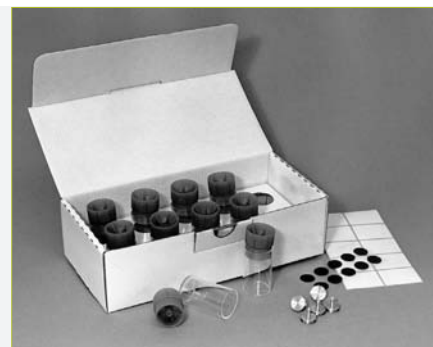
- G3114** Storage box with insert
- G3106** Storage box with insert and 10 storage tubes

Kits are also available comprising storage box, 10 storage tubes (**G3626**), 10 pin stubs (**G301**), 10 labels, and a choice of adhesive discs as listed below. These kits are particularly useful for collecting samples from remote locations for SEM examination.

- G3107** Storage kit with carbon tabs (G3347N)
- G3108** Storage kit with adhesive tabs (G3109)
- G3110** Storage kit with spectrotabs (G3358)

We can also supply pin stubs (**G301**) with pre-mounted carbon adhesive discs in storage tubes (**G3626**).

- G3115** Carbon disc on pin stub in storage tube. Pack of 100



## Storage boxes for stubs

Plastic storage boxes with inserts and hinged lid.

- G310C** Storage box for 8 larger type G305, G399, G399F or G400 stubs\*
- G310D** Storage box for 8 x 12.5 mm pin type stubs
- G311** Storage box for 4 x 12.5 mm pin type stubs



\*See pages 322 - 323.

### Lightweight stub storage boxes



Lightweight, stackable, plastic stub storage boxes. Boxes are transparent allowing the position of each stub to be marked. Three designs are available, holding twelve 12.5 mm diameter pin type, twelve 10 mm cylinder type or three re-entrant stubs.

Overall dimensions: 133 x 73 x 28 mm.

- G3103** Storage box for 12 x 12.5 mm pin type stubs
- G3104** Storage box for 12 x 10 mm cylinder stubs
- G3105** Storage box for 3 re-entrant stubs

### SEM-STOR paper box storage for pin mounts



Low cost storage boxes for SEM mounts, with insert which accepts 8 x 12.5 mm pin mounts. Packed flat.

Dimensions: 35 x 38 x 70 mm.

- G3113** SEM-STOR paper box. Pack of 100

### Agar stub storage boxes



Storage boxes for a wide range of stubs. Three designs are available for pin type stubs, 10/15 mm diameter stubs and 15 mm Hitachi stubs with an internal M4 thread. The pin type stub box accepts a range of pin diameters, so that the stubs do not fall out during transit, and can accept fourteen 12.5 mm diameter stubs (long or short), eight 25 mm diameter stubs or four 32 mm diameter stubs. The second type of box accepts twelve each of the 10 mm and 15 mm diameter stubs (JEOL and ISI/ABT/Topcon respectively) and is tolerant of either  $\frac{3}{8}$ " or 10 mm stubs.

The Hitachi stub box holds 14 stubs with M4 thread, 15 mm in diameter.

- G3100** Stub storage box for 14 pin type stubs
- G3101** Stub storage box for 12 x 10 mm and 15 mm dia cylinder stubs
- G3102** Stub storage box for 14 x 15 mm Hitachi stubs with M4 thread

### Wooden storage boxes



- G309** Wooden storage box for 128 12.5 mm pin type stubs

## Large capacity store for SEM stubs

For storage of a large number of SEM stubs. The cabinet holds 2240 of the 12.5 mm pin type stubs in indexed rows in 10 drawers. The front door seals to prevent moisture affecting the contents.

**G3320** Storage cabinet for SEM stubs



## Mini desiccator

75 mm desiccator suitable for holding 12 pin type mounts under partial vacuum. Its flat design permits easy stacking. It is also shatterproof, making it ideal for transporting specimens.

**G3688** Mini desiccator



## Scintillators and light pipes

Unlike conventional scintillators, YAG single crystal scintillators do not degrade with use, providing cost-effective, highly efficient SEM operation. YAG scintillators are also very efficient at fast scan rates. Quartz light pipes offer excellent light transmission characteristics, making them preferable for some applications.

### Plano P47 scintillator discs

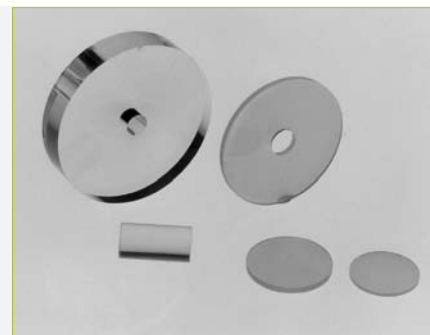
Scintillator discs coated with a very uniform layer of carefully selected P47 phosphor, highly recommended for routine use. They have a high signal output and a good working life. They should not normally be coated with aluminium, unless performing cathodoluminescence studies, as this reduces the efficiency by approximately 20 %. Discs are available for all principal types of microscope, with special sizes available on request.



See table on page 351.

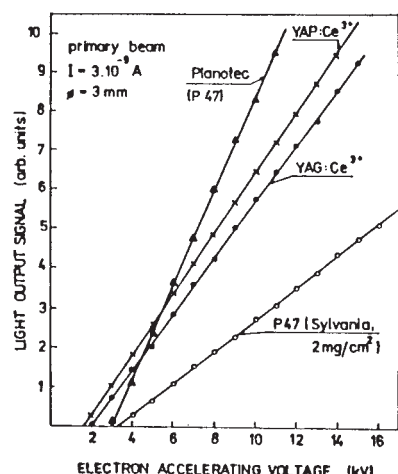
### YAG single crystal scintillator discs

YAG single crystal scintillators offer very fast response times of 50 to 60 ns and, unlike plastic or most phosphor scintillators, do not degrade when bombarded by electrons or ions. They are particularly suited to high current operations. Light emission peaks at about 560 nm, which means that S20 photo cathodes are most suitable for detecting the emission. The response is better than for the Plano P47 discs below 5 kV and at higher accelerating voltages, offering linear response where the performance of powder scintillators falls off. The crystal should be coated with 50 nm of aluminium before use. If the layer becomes damaged, it can be removed with sodium hydroxide without damaging the crystal. Crystals are mounted with the matt surface in contact with the light pipe to increase efficiency. Uncoated YAG scintillators may be baked at temperatures of up to 1000 °C. Discs are 1 mm in thickness, unless otherwise specified.



Sizes are listed in the table on page 351.

## YAP single crystal scintillator discs



YAP scintillators are more efficient in terms of light output than YAG crystals (see graph). They have a maximum emission peak at approximately 378 nm, closely corresponding with the maximum sensitivity of the S11 photo cathode commonly used in electron microscopes. In such microscopes there would be significant signal improvements over YAG crystals. Decay time of the YAP is also faster (40 ns compared with 80 ns), so overall performance is markedly superior to YAG crystals, while they share the same insensitivity to radiation damage.

See table below for available formats.

## Scintillator discs

All discs are 1 mm thick, unless otherwise specified.

Diameter	Instrument	Plano P47 Powder	YAG	YAP
6.0 mm	CT semiconductor mod	<b>B7666</b>	<b>B8300</b>	<b>B8320</b>
6.2 mm	Philips Quad Detector	<b>B7657</b>	<b>B8301</b>	<b>B8321</b>
7.7 mm	ISI/ABT/Topcon Mini SEM	<b>B7650</b>	<b>B8302</b>	<b>B8322</b>
8.8 x 2 mm	JEOL 25, 733, T, 800 and 6000 series	<b>B7662</b>	<b>B7680</b>	<b>B8323</b>
9.0 x 3 mm	ETEC	<b>B7661</b>	<b>B8303</b>	<b>B8324</b>
10.0 mm	Cambridge/LEO except S600, AMRAY 1200	<b>B7652</b>	<b>B7681</b>	<b>B8325</b>
12.0 mm	Cambridge S600	<b>B7653</b>	<b>B8304</b>	<b>B8326</b>
12.0 x 0.17 mm	Zeiss SEM	<b>B7665</b>	<b>B8305</b>	<b>B8327</b>
12.4 x 3.2 mm	Cameca	<b>B7667</b>	<b>B8306</b>	<b>B8328</b>
13.7 mm	ISI/ABT/Topcon, JEOL	<b>B7651</b>	<b>B7682</b>	<b>B8329</b>
16.4 x 0.17 mm	Zeiss Novascan Semco/Zeiss	<b>B7663</b>	<b>B8307</b>	<b>B8330</b>
18.0 mm	Camscan/Balscan	<b>B7655</b>	<b>B7683</b>	<b>B8331</b>
19.0 mm	JEOL U3 and JSM-2	<b>B7654</b>	<b>B8308</b>	<b>B8332</b>
19.0 x 7.3 mm	ARL SEMQ	<b>B7658</b>	<b>B8309</b>	<b>B8333</b>
19.8 mm	Hitachi, with metal ring	<b>B7656</b>	<b>B8310</b>	<b>B8334</b>
20.0 mm	JEOL 50A, 35 and 6000F series Leitz/AMRAY except 1200	<b>B7659</b>	<b>B7684</b>	<b>B8335</b>
20.0 x 2 mm	Philips/FEI	<b>B7668</b>	<b>B8311</b>	<b>B8336</b>

## Plastic light pipes with add-on scintillator disc

Plastic light pipes with Planotec P47 scintillator discs offer an economical choice for Cambridge/LEO/Zeiss SEMs. Replaceable 12 mm diameter discs are not coated. Should an aluminium coating be required, eg. for cathodoluminescent work, then a 20 % loss in efficiency can be expected.

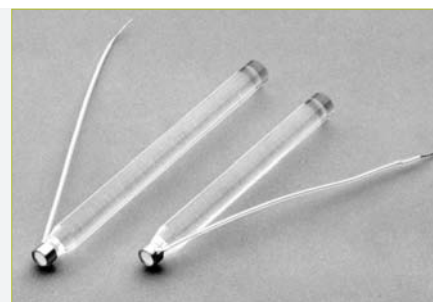
- B7669** Light pipe (angled) plus scintillator disc
- B7670** Light pipe 74 mm, 9.0 mm dia, plus scintillator disc
- B7671** Light pipe 89 mm, 9.0 mm dia, plus scintillator disc
- B7672** Light pipe 104 mm, 9.0 mm dia, plus scintillator disc



## Combined light pipe/scintillator disc for Cambridge/LEO

Combined light pipe/scintillator disc assemblies are available for Cambridge/LEO/Zeiss SEMs employing light pipes with a conical tip. Two standard lengths are stocked, 99 mm and 120 mm, although others can be made to special order. The high efficiency, long life Plano P47 scintillator disc is permanently bonded to the plastic light pipe. Each assembly is supplied complete with light pipe, scintillator disc and high voltage connector.

- B8275** Conical tip light pipe, 99 mm length
- B8276** Conical tip light pipe, 120 mm length



## PLANOTEC X-ray beam finder

5 x 5 mm silicon chip coated with P47 phosphor. When the X-ray beam touches the surface of the chip, the P47 starts to shine, allowing you to identify the position and the spot or line size of the beam.

- B7321** Planotec X-ray beam finder



## TEM specimen holders

An economical range of TEM holders, constructed from high vacuum compatible beryllium copper alloy to exacting dimensional tolerances and a high standard of finish. Grids are retained with an 'AEI type' circlip, which is easy to insert and remove using the supplied injector tool. Multi grid holders also feature touch sensitive specimen selection, making specimen choice much easier in the dark. All holders are supplied with a specimen loading stand, and cased in a mahogany box.

Please send for details.

## Fischione model 2000 series tomography specimen holders

The model 2000 TEM tomography holder series from Fischione brings TEM into the three dimensional world. This advanced series includes specimen holders that allow high tilt and extended field of view, and is available in single-, dual-, and on-axis versions that are compatible with even the narrowest pole piece geometries.

All Fischione advanced tomography holders come with a dedicated loading station for secure specimen handling, tools to assist in specimen clamping and a Fischione model 9010 vacuum storage container for storing the holder in a clean vacuum environment.



For further details, please refer to section 16.

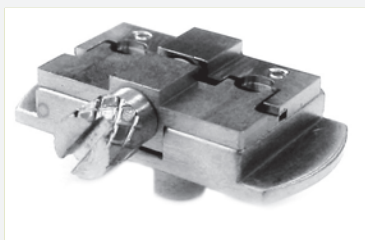
### TEM grid/sample holders

TEM grid holders with short posts of standard 3.2 mm diameter are available. The TEM grid/sample holder has workstations for two TEM grids and with either one or two sample pucks. The stainless steel holders are very slightly magnetic. Non-magnetic versions of each of these holders are also available.

The pivoting TEM grid holder has workstations for two TEM grids and allows manual adjustment of the grid holder plate to obtain the optimal milling incidence angle, even when at the FIB stage tilt limit. The TEM plate angle is manipulated *in situ*, using the tip of an empty AutoProbe™ 300 gripper shaft. The pivoting grid holder is non-magnetic.

The single sample holder accommodates a 3 mm TEM grid, and has raised edges that have been designed to protect samples from accidental damage. The single sample holder can be mounted on the sample holder base, which allows samples to be viewed under a stereomicroscope from two angles without focus adjustment.

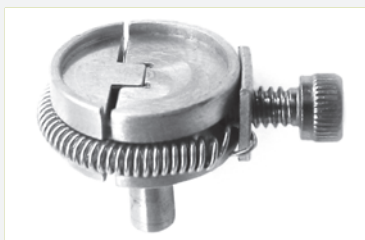
Short post TEM holders 3.2 mm dia x 4 mm length.



**J400** TEM grid holder, stainless steel

**J401** TEM grid holder, non-magnetic

Long post TEM holders 3.2 mm dia x 8.1 mm length.



**J404** Single sample holder

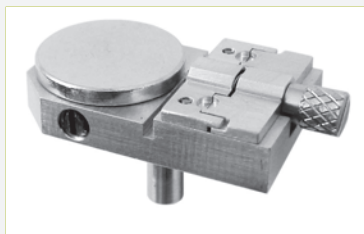


**J405** Sample holder base



**J407** TEM grid/sample holder,  
1 sample puck, stainless steel

**J406** TEM grid/sample holder,  
1 sample puck, non-magnetic



**J408** Pivoting TEM grid holder



**J402** TEM grid/sample holder,  
2 sample pucks, stainless steel

**J403** TEM grid/sample holder,  
2 sample pucks, non-magnetic

## Specimen circlip injector and circlips

This refurbished specimen circlip injector tool for positioning the grid retaining clip (tungsten or molybdenum wire type) in JEOL and Philips specimen holders can easily be damaged and may need to be replaced. It has a concave plunger tip to help minimise specimen damage during circlip injection.

**G3685** Specimen circlip injector

### Circlips

Tungsten wire, split spring circlips for retaining 3 mm specimens in TEM holders.

**G3644** Tungsten wire circlips. Pack of 25



## Viewing screens

We offer a viewing screen recoating service, using a range of phosphor powders to match the characteristics of the original screen.

Please contact us for further details.



## Film/plate desiccator

This simple, compact desiccator has a chamber designed to accommodate all types of film cassette, including Philips/FEI cassettes. Two chambers may be mounted on a T-piece if required, allowing cassettes to be used alternately. The system's pump features a non-return valve, enabling cassettes to be stored under vacuum when the pump is not running.

Chamber size (internal): 164 x 164 x 340 mm. Total weight (including pump): 30 kg.

**B7140** Film/plate desiccator with pump and 1 chamber, 220 - 240 V, 50/60 Hz

**B7141** Film/plate desiccator with pump and 1 chamber, 115 - 230 V, 60 Hz

**B7142** Additional chamber assembly (without pump)



## Safety step

A double height step on spring loaded castors, which rests securely on a broad base when stepped on. It is a convenient height for exchanging light sources on bench mounted enlargers, or for easy access to high cupboards.

**G3600** Safety step

