

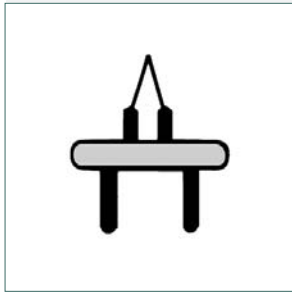
17 - Filaments and apertures

Agar filaments

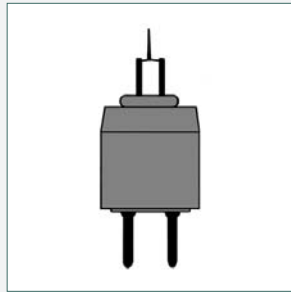
Agar filaments are made with specially designed jigs which ensure accuracy and reproducibility in production. High-ductility tungsten wire is used to minimise strain. All filaments are stress relieved by flashing in a vacuum at temperatures above the normal operating level, and are then checked for accuracy of centring.

Filament assemblies having alignment screws are subsequently adjusted using a light microscope to ensure that they are ready for immediate operation in the electron microscope.

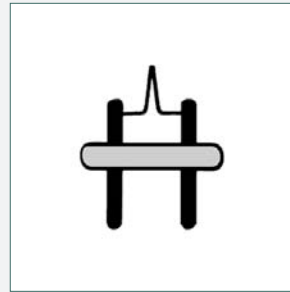
Agar filaments



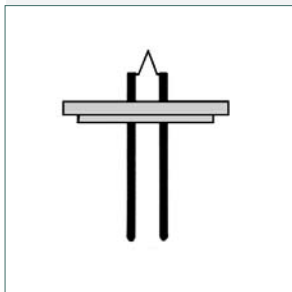
A050



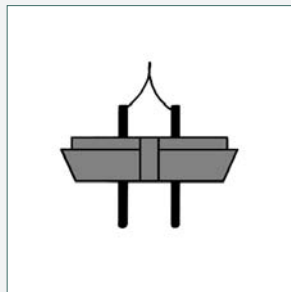
A052



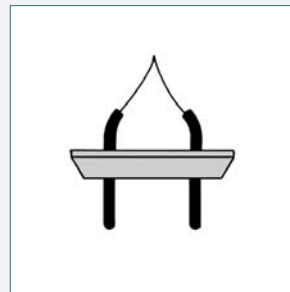
A054



A086



A092



A093B

- A054** Agar filaments for Cambridge/LEO/Zeiss and AEI. Box of 10
- A086** Agar filaments for FEI/Philips. Box of 10
- A092** Agar filaments for JEOL (K type). Box of 6
- A052** Agar filament for Cambridge, Camscan and Siemens, supplied as refurbished only
- A046** Agar filaments for Camscan series 3000. Box of 6
- A093B** Agar filaments for ISI/ABT/Topcon (bent two pin). Box of 10
- A050** Agar filaments for AEI. Box of 10
- A054A** Agar W/Rh filaments for Errington microfocus X-ray system. Box of 10

Other filaments

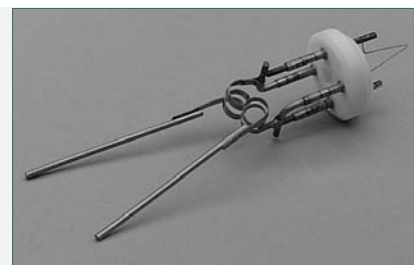
Filaments for other makes of electron microscopes are also available.

- A042** Filaments for Hitachi (H, S and X series). Box of 10
- A043** Filaments for Zeiss/LEO. Box of 10
- A045** Filaments for JEOL (GC type). Box of 10
- A047** Filaments for Tescan. Box of 10

Special filaments

In addition to the range of standard filaments, we also have the facilities for manufacturing special filaments to customers' requirements. These can be of a different wire thickness from those supplied as standard, using different wire materials (eg. tungsten/rhenium or thoriated tungsten) or of a completely novel design. Special coatings can also be applied to the filament to improve emission characteristics.

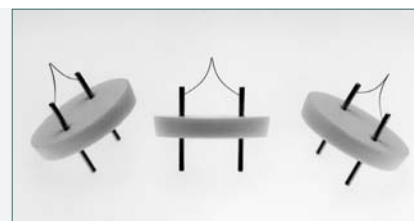
A repair service is also available for filaments used in other types of equipment. Further details available on request.



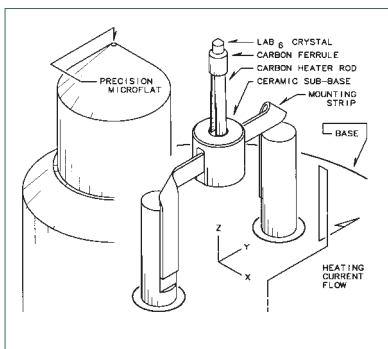
Filament repair service

We can accept most types of filaments for repair provided the bases are in good condition. If the insulators need replacement, these will be changed (if available) and charged additionally to the standard cost for replacing the filament. Repaired filaments are given the same exacting care as our new filaments; all filaments are pre-flashed in a vacuum to promote stability in operation, and those filaments on bases provided with adjustment screws are subsequently re-centred under a light microscope. The filaments sent for repair must be in a suitable transit box or tube so that the repaired filaments can be returned safely.

- A071** Refilamenting Agar FEI/Philips
- A061** Refilamenting JEOL (K type)
- A053** Refilamenting Siemens type
- A046R** Refilamenting Camscan series 3000
- A064** Refilamenting ISI/ABT/Topcon
- A065** Refilamenting Tescan
- A063Z** Refilamenting Zeiss/LEO
- A062** Refilamenting Hitachi (H, S and X Series)
- A070** Refilamenting Amray



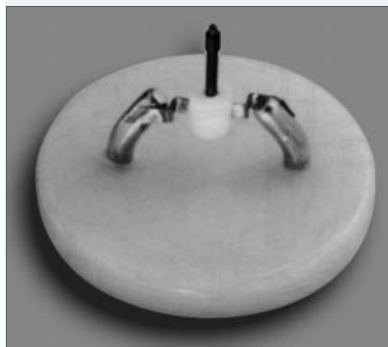
Lanthanum hexaboride filaments



Kimball Physics single crystal lanthanum hexaboride (LaB₆) cathodes are available for most makes of electron microscopes and other electron beam instruments where a suitable gun vacuum in the region of 10⁻⁷ Torr is attainable. The filament heater can then be driven by the normal power supply of the microscope.

Brightness above 1 x 10⁶ Amp/cm² steradian is achievable.

For SEM applications, the higher brightness provides better imaging resolution and improved efficiency for microanalysis. For TEM, the low energy spread of the LaB₆ filament is particularly advantageous for high resolution imaging. Alternatively, LaB₆ filaments may be used where a long filament life is important; lifetimes in excess of six months continuous operation are regularly achieved.



Operational guidelines for the use of LaB₆ cathodes are available.

ES423E series with 90° cone and 15 µm microflat

The ES423E style 90-15 cathode is the standard LaB₆ crystal filament, ground with a 90° cone, terminated with a truncation of 15 µm diameter. This is the standard style of filament recommended for long life, stability and uniformity.

ES423E series with 90° cone and 20 µm microflat

The ES423E style 90-20 series of LaB₆ filaments are designed to be used in scanning electron microscopes that normally operate with a high emission current in the range of 60 - 100 µA. The 90° cone is terminated with a 20 µm diameter microflat. A long lifetime of this filament can be achieved providing a good gun vacuum is maintained.

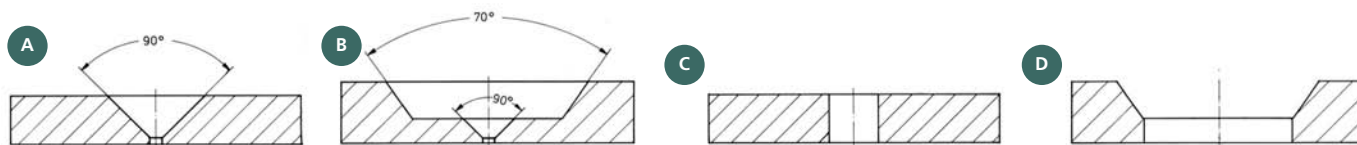
ES423E series with 60° cone and 6 µm microflat

The ES423E style 60-06 filament has the tip of an ES423E LaB₆ crystal ground with a 60° cone, terminated with a polished truncation of 6 µm diameter. This type of filament can provide a higher brightness than filaments with larger truncations. The main application of this style of filament is in high resolution TEM, where the total beam current is frequently restricted to minimise electron energy spread. With this filament, adequate axial brightness is attainable at very low emission currents. As a consequence of achieving the higher brightness, the effective lifetime of this filament is found to be slightly less than a conventional 90-15 style filament.

Microscope type	90° cone 15 µm microflat	90° cone 20 µm microflat	60° cone 6 µm microflat
AEI Base for Camscan, Cameca, Electroscan, Cambridge Instruments, LEO/Leica/Zeiss	A0692-9015	A0692-9020	A0692-6006
FEI/Philips (not XL30)	A0690-9015	A0690-9020	A0690-6006
FEI XL30	-	A0691-9020	-
JEOL K Base	A0693-9015	A0693-9020	A0693-6006
Zeiss (Please specify make and model)	A0694-9015	A0694-9020	A0694-6006
ISI/ABT/Topcon two pin	A0695-9015	A0695-9020	A0695-6006
Hitachi S	A0698-9015	A0698-9020	A0698-6006

Apertures

Aperture profiles



We have a wide range of high quality disc apertures for use in electron microscopes, and Focus Ion Beam, microprobe and X-ray systems. These apertures are manufactured to tight tolerances with precision drilled holes. They are usually made from a platinum/iridium alloy 95:5 % or molybdenum, although tantalum can be supplied for some applications. Platinum apertures can be made with hole sizes down to 5 µm diameter whereas the smallest size for molybdenum is 10 µm. We maintain a stock of all the regularly used aperture sizes with disc diameters and thicknesses to suit all current EM systems. We also have apertures for systems which are no longer manufactured but are still in use.

Please note: molybdenum forms an oxide layer when stored for long periods. We can therefore guarantee the material for no longer than 4 - 6 weeks.

The apertures can also be used for non-electron microscopy applications where precision small holes are required for light optics, gas and liquid flow purposes.

Non-standard sizes can be supplied to special order.

Tolerances

Disc diameter:	+0/-0.02 mm	Capillary length:	½ hole diameter for 10 - 200 µm <100 µm for larger holes
Thickness:	+0/-0.02 mm	Roundness of hole:	0.1 µm for holes 5 - 10 µm 1 µm for holes 11 - 200 µm 2 µm for holes over 200 µm
Hole size:	5 - 10 µm: ± 1 µm 11 - 70 µm: ± 2 µm 71 - 300 µm: ± 5 µm 301 - 1000 µm: ± 10 µm	Centring of hole:	0.02 mm for diameter up to 7 mm 0.03 mm for diameter 7 - 30 mm

Platinum/iridium *profile A*

1.85 mm dia, 0.1 mm thick

A0100P	5 µm hole dia
A0101P	10 µm hole dia
A0102P	20 µm hole dia
A0103P	25 µm hole dia
A0104P	30 µm hole dia
A0105P	40 µm hole dia
A0106P	50 µm hole dia
A0107P	60 µm hole dia
A0108P	70 µm hole dia
A0109P	100 µm hole dia
A0110P	150 µm hole dia
A0111P	200 µm hole dia
A0112P	250 µm hole dia
A0113P	300 µm hole dia
A0114P	400 µm hole dia
A0115P	500 µm hole dia
A0116P	600 µm hole dia
A0117P	750 µm hole dia
A0118P	1000 µm hole dia
A0119P	1250 µm hole dia

Molybdenum *profile A*

2 mm dia, 0.1 mm thick

AJ201M	10 µm hole dia
AJ202M	20 µm hole dia
AJ203M	25 µm hole dia
AJ204M	30 µm hole dia
AJ205M	40 µm hole dia
AJ206M	50 µm hole dia
AJ207M	60 µm hole dia
AJ208M	70 µm hole dia
AJ209M	100 µm hole dia
AJ210M	150 µm hole dia
AJ211M	200 µm hole dia
AJ212M	250 µm hole dia
AJ213M	300 µm hole dia
AJ214M	400 µm hole dia
AJ215M	500 µm hole dia
AJ216M	600 µm hole dia

profile C

AJ217M	750 µm hole dia
AJ218M	1000 µm hole dia
AJ219M	1250 µm hole dia

Platinum/iridium *profile A*

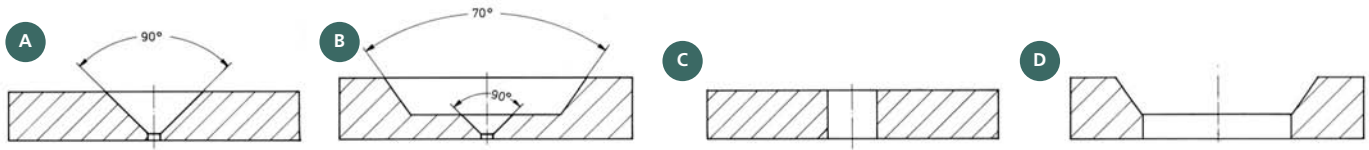
2 mm dia, 0.1 mm thick

AJ200P	5 µm hole dia
AJ201P	10 µm hole dia
AJ202P	20 µm hole dia
AJ203P	25 µm hole dia
AJ204P	30 µm hole dia
AJ205P	40 µm hole dia
AJ206P	50 µm hole dia
AJ207P	60 µm hole dia
AJ208P	70 µm hole dia
AJ209P	100 µm hole dia
AJ210P	150 µm hole dia
AJ211P	200 µm hole dia
AJ212P	250 µm hole dia
AJ213P	300 µm hole dia
AJ214P	400 µm hole dia
AJ215P	500 µm hole dia
AJ216P	600 µm hole dia
AJ217P	750 µm hole dia

profile C

AJ218P	1000 µm hole dia
AJ219P	1250 µm hole dia

Aperture profiles



Platinum/iridium

profile **B**

2 mm dia, 0.25 mm thick

A0220P	5 µm hole dia
A0231P	10 µm hole dia
A0222P	20 µm hole dia
A0233P	25 µm hole dia
A0234P	30 µm hole dia
A0225P	40 µm hole dia
A0226P	50 µm hole dia
A0227P	60 µm hole dia
A0228P	70 µm hole dia
A0229P	100 µm hole dia
A0230P	150 µm hole dia
A0221P	200 µm hole dia
A0232P	250 µm hole dia
A0223P	300 µm hole dia
A0224P	400 µm hole dia
A0235P	500 µm hole dia
A0236P	600 µm hole dia

profile **D**

A0237P	750 µm hole dia
A0238P	1000 µm hole dia
A0239P	1250 µm hole dia

Molybdenum

profile **B**

2 mm dia, 0.6 mm thick

A0201M	10 µm hole dia
A0202M	20 µm hole dia
A0203M	25 µm hole dia
A0204M	30 µm hole dia
A0205M	40 µm hole dia
A0206M	50 µm hole dia
A0207M	60 µm hole dia
A0208M	70 µm hole dia
A0209M	100 µm hole dia
A0210M	150 µm hole dia
A0211M	200 µm hole dia
A0212M	250 µm hole dia
A0213M	300 µm hole dia
A0214M	400 µm hole dia
A0215M	500 µm hole dia
A0216M	600 µm hole dia
A0217M	750 µm hole dia

profile **C**

A0218M	1000 µm hole dia
A0219M	1250 µm hole dia

Platinum/iridium

profile **B**

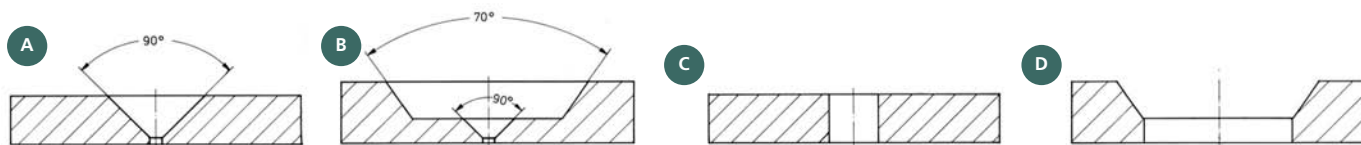
2 mm dia, 0.6 mm thick

A0200P	5 µm hole dia
A0201P	10 µm hole dia
A0202P	20 µm hole dia
A0203P	25 µm hole dia
A0204P	30 µm hole dia
A0205P	40 µm hole dia
A0206P	50 µm hole dia
A0207P	60 µm hole dia
A0208P	70 µm hole dia
A0209P	100 µm hole dia
A0210P	150 µm hole dia
A0211P	200 µm hole dia
A0212P	250 µm hole dia
A0213P	300 µm hole dia
A0214P	400 µm hole dia
A0215P	500 µm hole dia
A0216P	600 µm hole dia
A0217P	750 µm hole dia

profile **D**

A0218P	1000 µm hole dia
A0219P	1250 µm hole dia

Aperture profiles

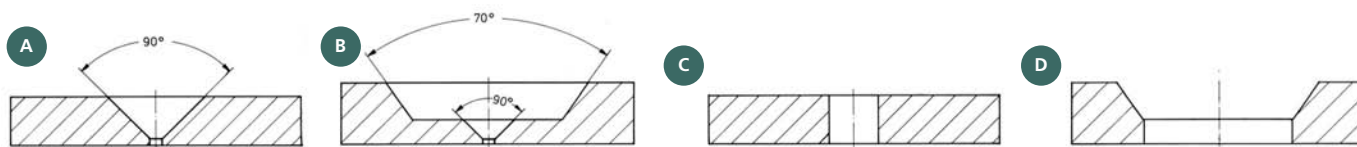


Platinum/iridium <i>profile A</i>	
3.00 mm dia, 0.1 mm thick	
AZ300P	5 µm hole dia
AZ301P	10 µm hole dia
AZ302P	20 µm hole dia
AZ303P	25 µm hole dia
AZ304P	30 µm hole dia
AZ305P	40 µm hole dia
AZ306P	50 µm hole dia
AZ307P	60 µm hole dia
AZ308P	70 µm hole dia
AZ309P	100 µm hole dia
AZ310P	150 µm hole dia
AZ311P	200 µm hole dia
AZ312P	250 µm hole dia
AZ313P	300 µm hole dia
AZ314P	400 µm hole dia
AZ315P	500 µm hole dia
AZ316P	600 µm hole dia
<i>profile C</i>	
AZ317P	750 µm hole dia
AZ318P	1000 µm hole dia
AZ319P	1250 µm hole dia

Molybdenum <i>profile B</i>	
3.00 mm dia, 0.25 mm thick	
AV301M	10 µm hole dia
AV302M	20 µm hole dia
AV303M	25 µm hole dia
AV304M	30 µm hole dia
AV305M	40 µm hole dia
AV306M	50 µm hole dia
AV307M	60 µm hole dia
AV308M	70 µm hole dia
AV309M	100 µm hole dia
AV310M	150 µm hole dia
AV311M	200 µm hole dia
AV312M	250 µm hole dia
AV313M	300 µm hole dia
AV314M	400 µm hole dia
AV315M	500 µm hole dia
AV316M	600 µm hole dia
AV317M	750 µm hole dia
<i>profile D</i>	
AV318M	1000 µm hole dia
AV319M	1250 µm hole dia

Molybdenum <i>profile B</i>	
3.04 mm dia, 0.25 mm thick	
A0301M	10 µm hole dia
A0302M	20 µm hole dia
A0303M	25 µm hole dia
A0304M	30 µm hole dia
A0305M	40 µm hole dia
A0306M	50 µm hole dia
A0307M	60 µm hole dia
A0308M	70 µm hole dia
A0309M	100 µm hole dia
A0310M	150 µm hole dia
A0311M	200 µm hole dia
A0312M	250 µm hole dia
A0313M	300 µm hole dia
A0314M	400 µm hole dia
A0315M	500 µm hole dia
A0316M	600 µm hole dia
A0317M	750 µm hole dia
<i>profile D</i>	
A0318M	1000 µm hole dia
A0319M	1250 µm hole dia

Aperture profiles



Platinum/iridium

profile **B**

3.04 mm dia, 0.25 mm thick

A0300P	5 µm hole dia
A0301P	10 µm hole dia
A0302P	20 µm hole dia
A0303P	25 µm hole dia
A0304P	30 µm hole dia
A0305P	40 µm hole dia
A0306P	50 µm hole dia
A0307P	60 µm hole dia
A0308P	70 µm hole dia
A0309P	100 µm hole dia
A0310P	150 µm hole dia
A0311P	200 µm hole dia
A0312P	250 µm hole dia
A0313P	300 µm hole dia
A0314P	400 µm hole dia
A0315P	500 µm hole dia
A0316P	600 µm hole dia
A0317P	750 µm hole dia
A0318P	1000 µm hole dia
A0319P	1250 µm hole dia

Molybdenum

profile **A**

4 mm dia, 0.2 mm thick

A0401M	10 µm hole dia
A0402M	20 µm hole dia
A0403M	25 µm hole dia
A0404M	30 µm hole dia
A0405M	40 µm hole dia
A0406M	50 µm hole dia
A0407M	60 µm hole dia
A0408M	70 µm hole dia
A0409M	100 µm hole dia
A0410M	150 µm hole dia
A0411M	200 µm hole dia
A0412M	250 µm hole dia
A0413M	300 µm hole dia
A0414M	400 µm hole dia
A0415M	500 µm hole dia
A0416M	600 µm hole dia
A0417M	750 µm hole dia
A0418M	1000 µm hole dia
A0419M	1250 µm hole dia

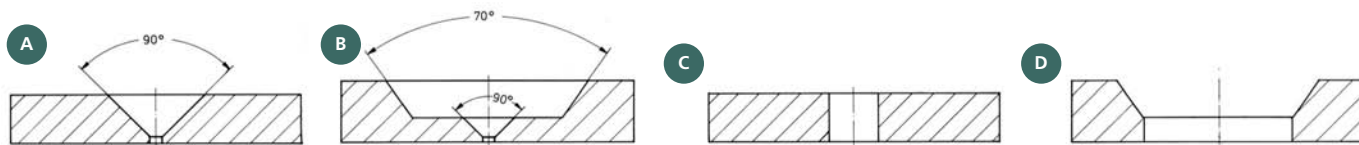
Platinum/iridium

profile **A**

4 mm dia, 0.2 mm thick

A0400P	5 µm hole dia
A0401P	10 µm hole dia
A0402P	20 µm hole dia
A0403P	25 µm hole dia
A0404P	30 µm hole dia
A0405P	40 µm hole dia
A0406P	50 µm hole dia
A0407P	60 µm hole dia
A0408P	70 µm hole dia
A0409P	100 µm hole dia
A0410P	150 µm hole dia
A0411P	200 µm hole dia
A0412P	250 µm hole dia
A0413P	300 µm hole dia
A0414P	400 µm hole dia
A0415P	500 µm hole dia
A0416P	600 µm hole dia
A0417P	750 µm hole dia
A0418P	1000 µm hole dia
A0419P	1250 µm hole dia

Aperture profiles



Platinum/iridium <i>profile B</i>	
4 mm dia, 0.6 mm thick	
A0420P	5 µm hole dia
A0421P	10 µm hole dia
A0422P	20 µm hole dia
A0423P	25 µm hole dia
A0424P	30 µm hole dia
A0429P	100 µm hole dia
A0430P	150 µm hole dia
A0431P	200 µm hole dia
A0432P	250 µm hole dia
A0433P	300 µm hole dia
A0434P	400 µm hole dia
<i>profile D</i>	
A0438P	1000 µm hole dia

Molybdenum <i>profile A</i>	
6.35 mm dia, 0.125 mm thick	
A0601M	10 µm hole dia
A0606M	50 µm hole dia
A0607M	60 µm hole dia
A0608M	70 µm hole dia
A0609M	100 µm hole dia
A0610M	150 µm hole dia
A0611M	200 µm hole dia
A0613M	300 µm hole dia
A0615M	500 µm hole dia
A0618M	1000 µm hole dia

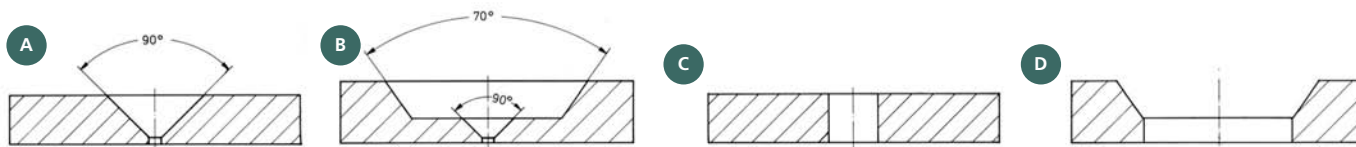
Platinum <i>profile A</i>	
6.35 mm dia, 0.125 mm thick	
A0601P	10 µm hole dia
A0606P	50 µm hole dia
A0607P	60 µm hole dia
A0608P	70 µm hole dia
A0609P	100 µm hole dia
A0610P	150 µm hole dia
A0611P	200 µm hole dia
A0613P	300 µm hole dia
<i>profile C</i>	
A0618P	1000 µm hole dia

Molybdenum <i>profile A</i>	
10 mm dia, 0.1 mm thick	
A0902M	20 µm hole dia
A0906M	50 µm hole dia
A0908M	70 µm hole dia
A0909M	100 µm hole dia
A0910M	150 µm hole dia
A0911M	200 µm hole dia
A0913M	300 µm hole dia
A0914M	400 µm hole dia
A0916M	600 µm hole dia
<i>profile C</i>	
A0918M	1000 µm hole dia
A0920M	1500 µm hole dia

Platinum/iridium <i>profile A</i>	
10 mm dia, 0.1 mm thick	
A0902P	20 µm hole dia
A0904P	30 µm hole dia
A0906P	50 µm hole dia
A0908P	70 µm hole dia
A0907P	80 µm hole dia
A0909P	100 µm hole dia
A0910P	150 µm hole dia
A0911P	200 µm hole dia
A0913P	300 µm hole dia
A0914P	400 µm hole dia
A0916P	600 µm hole dia
<i>profile C</i>	
A0918P	1000 µm hole dia

Platinum/iridium <i>profile A</i>	
10 mm dia, 0.6 mm thick	
A09606P	50 µm hole dia
A09609P	100 µm hole dia
A09611P	200 µm hole dia
A09614P	400 µm hole dia
A09616P	600 µm hole dia
A09618P	1000 µm hole dia

Apertures profiles



Platinum/iridium

profile **A**

12 mm dia, 0.1 mm thick

A1202P	20 µm hole dia
A1203P	25 µm hole dia
A1204P	30 µm hole dia
A1205P	40 µm hole dia
A1206P	50 µm hole dia
A1207P	60 µm hole dia
A1208P	70 µm hole dia
A1209P	100 µm hole dia
A1210P	150 µm hole dia
A1211P	200 µm hole dia
A1212P	250 µm hole dia
A1213P	300 µm hole dia
A1214P	400 µm hole dia

Platinum/iridium

profile **C**

12 mm dia, 0.1 mm thick

A1217P	700 µm hole dia
A1218P	1000 µm hole dia
A1219P	1200 µm hole dia

Platinum/iridium

profile **A**

19.99 mm dia, 0.25 mm thick

A1220P	1000 µm hole dia
A1221P	1200 µm hole dia
A1222P	1500 µm hole dia
A1223P	2000 µm hole dia

Molybdenum

profile **C**

19.99 mm dia, 0.25 mm thick

A1220M	1000 µm hole dia
A1221M	1200 µm hole dia
A1222M	1500 µm hole dia
A1223M	2000 µm hole dia

Tantalum

profile **C**

19.99 mm dia, 0.25 mm thick

A1220T	1000 µm hole dia
A1221T	1200 µm hole dia
A1222T	1500 µm hole dia
A1223T	2000 µm hole dia

Spray apertures

Used in Cambridge/LEO/Zeiss and Camscan scanning electron microscopes.
Aperture diameter 12.68 mm, thickness 0.25 mm.

For Cambridge/LEO/Zeiss except S180.
Aperture diameter 10.485 mm, thickness 0.25 mm.

Molybdenum

profile **A**

12.68 mm dia, 0.25 mm thick

A1005M	Hole dia 50 µm
A1075M	Hole dia 75 µm
A1010M	Hole dia 100 µm
A1125M	Hole dia 125 µm
A1015M	Hole dia 150 µm
A1020M	Hole dia 200 µm
A1030M	Hole dia 300 µm

Molybdenum

profile **C**

12.68 mm dia, 0.25 mm thick

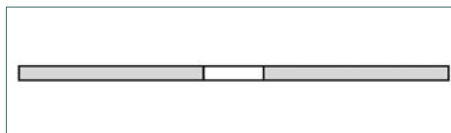
A1050M	Hole dia 500 µm
A1080M	Hole dia 800 µm
A1100M	Hole dia 1000 µm
A1500M	Hole dia 1500 µm
A1200M	Hole dia 2000 µm

Molybdenum

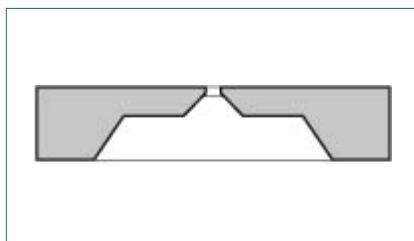
profile **C**

10.485 mm dia, 0.25 mm thick

A1051M	Hole dia 500 µm
A1101M	Hole dia 1000 µm
A1201M	Hole dia 2000 µm



Tantalum apertures



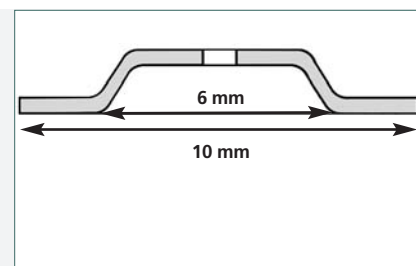
Tantalum final apertures are for SEM use where X-ray analysis of biological material is being undertaken. The platinum and molybdenum apertures normally used can give rise to X-ray lines, which interfere with elemental analysis of biological materials.

A0209T	Tantalum aperture 2 mm dia, 0.6 mm thick, 100 µm hole dia
A0211T	Tantalum aperture 2 mm dia, 0.6 mm thick, 200 µm hole dia
A0214T	Tantalum aperture 2 mm dia, 0.6 mm thick, 400 µm hole dia

Wehnelt apertures

Replaceable apertures for the Wehnelt cylinder can be supplied to fit some microscopes. A hole size smaller than normal gives improved characteristics for most electron guns. Used in Philips/FEI, Leitz and Amray. Aperture diameter 10 mm.

- A0117T** Tantalum, Wehnelt aperture, hole dia 750 μm
- A0115T** Tantalum, Wehnelt aperture, hole dia 500 μm
- A0113T** Tantalum, Wehnelt aperture, hole dia 300 μm
- A0111T** Tantalum, Wehnelt aperture, hole dia 200 μm



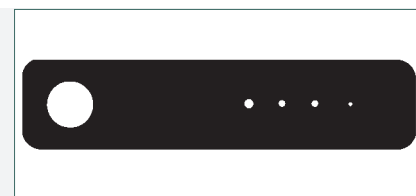
Multi-hole strip apertures

Three-hole and four-hole strip apertures are commonly used in Hitachi, ISI/ABT/Topcon and JEOL instruments.

Standard and non-standard hole configurations can be supplied for most instruments. Aperture strips with holes larger than 20 μm are normally manufactured from molybdenum. Strips with smaller holes are supplied in platinum/iridium alloy.

- A097** Hitachi multi-hole aperture strip
- A098** ISI/ABT/Topcon multi-hole aperture strip
- A099** JEOL multi-hole aperture strip

Due to the large variety of aperture strips in use, it is essential that the make and model of instrument, the size and number of holes and the overall dimensions are all specified at the time of order.



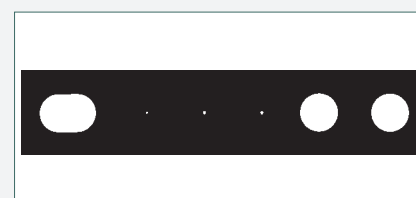
Electroformed aperture strips

Aperture strips with hole dimensions of less than 10 μm are extremely difficult to produce by conventional mechanical methods. By using lithography techniques, holes as small as 5 μm are possible. Such strips are made of copper and can be coated with a thin layer of gold or platinum.

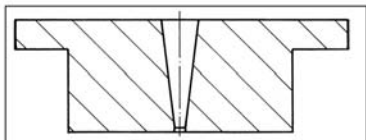
Experience shows that these apertures have a long lifetime in the electron microscope. Listed below are some patterns available from stock.

Other designs are available to fit Hitachi, ISI/ABT/Topcon and FEI/Philips instruments. Alternatively, multi-hole strips can be made to a particular specification. Please ask for details.

- A080G** Gilded aperture strip, 5, 10, 20, 55 μm , JEOL 100/200
- A089G** Gilded aperture strip, 5, 10, 40 μm , JEOL 1200EX, 2000EX/FX
- A0801** Gilded aperture strip, 5, 30, 40, 60 μm , JEOL 2010
- A0802** Gilded aperture strip, 30, 30, 50, 50 μm , JEOL 3000SFF
- A0803** Gilded aperture strip, 5, 20, 50, 100 μm , JEOL 2010



Top hat screening apertures



Holes up to 300 µm countersunk 14°
Holes over 300 µm countersunk 90°

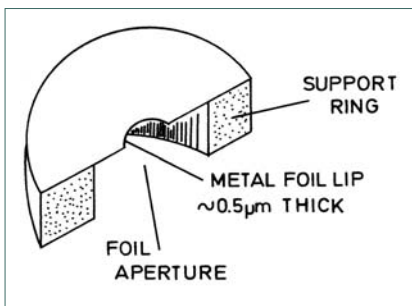
X-rays generated in the illumination system penetrate through the edge of conventional condenser apertures, causing an excess X-ray background (hole count) which prevents measurement of small quantities of characteristic X-radiation from the specimen. These special thick platinum apertures are found to reduce the X-ray background significantly.

- A0349** Top hat aperture, 3 mm dia, 20 µm hole
- A0350** Top hat aperture, 3 mm dia, 30 µm hole
- A0351** Top hat aperture, 3 mm dia, 50 µm hole
- A0352** Top hat aperture, 3 mm dia, 70 µm hole
- A0353** Top hat aperture, 3 mm dia, 100 µm hole
- A0354** Top hat aperture, 3 mm dia, 150 µm hole
- A0355** Top hat aperture, 3 mm dia, 200 µm hole
- A0356** Top hat aperture, 3 mm dia, 300 µm hole
- A0357** Top hat aperture, 3 mm dia, 500 µm hole
- A0358** Top hat aperture, 3 mm dia, 750 µm hole
- A0359** Top hat aperture, 3 mm dia, 1000 µm hole

Thin film apertures

Thin film apertures are frequently used in the objective lenses of high resolution and electron beam lithography instruments. These apertures have the advantage that they heat up in the beam and are effectively self cleaning. This minimises astigmatism caused by a build up of carbon contamination. The small amount of contamination which deposits after lengthy operation may be removed by heating the aperture strongly for a short time with the focused electron beam. The benefits of using this type of aperture are particularly apparent when operating at low accelerating voltages or with small probe sizes.

Thin film apertures should not be used in the condenser lens as they may melt. They are, of course, more fragile to handle and can be irreparably damaged by abrasion or by a sudden rush of air in the vacuum system. Normal tolerance on hole diameter is $\pm 10\%$. Close tolerance holes $\pm 1\ \mu\text{m}$ from the nominal size can be supplied at additional cost. Agar apertures are made to exceptionally high standards and are only accepted after examination in the TEM to check the perfection of the edge of the hole, its roundness and absence of pin holes in the vicinity.



Cat. no.	2 mm dia, 0.25 mm thick Hole size	Cat. no.	3.04 mm dia, 0.25 mm thick Hole size
A07210	10 µm	A07310	10 µm
A07215	15 µm	A07315	15 µm
A07220	20 µm	A07320	20 µm
A07225	25 µm	A07325	25 µm
A07230	30 µm	A07330	30 µm
A07240	40 µm	A07340	40 µm
A07250	50 µm	A07350	50 µm
A07260	60 µm	A07360	60 µm
A07270	70 µm	A07370	70 µm
A07201	100 µm	A07375	75 µm
A07202	200 µm	A07380	80 µm
		A07390	90 µm
		A07301	100 µm
		A07302	200 µm

Specialist apertures

In addition to our standard range of apertures, we can now offer large diameter apertures and apertures with square holes, slots/rectangles and triangles, for applications other than electron microscopy.

Apertures with large diameters

Platinum

30 mm dia, 0.6 mm thick

AG3003P	30 µm hole dia
AG3005P	50 µm hole dia
AG3010P	100 µm hole dia
AG3050P	500 µm hole dia
AG3100P	1000 µm hole dia

Molybdenum

30 mm dia, 0.6 mm thick

AG3003M	30 µm hole dia
AG3005M	50 µm hole dia
AG3010M	100 µm hole dia
AG3050M	500 µm hole dia
AG3100M	1000 µm hole dia

Molybdenum

30 mm dia, 0.25 mm thick

AG32003M	30 µm hole dia
AG32005M	50 µm hole dia
AG32010M	100 µm hole dia
AG32050M	500 µm hole dia
AG32100M	1000 µm hole dia

Apertures with square holes

Platinum

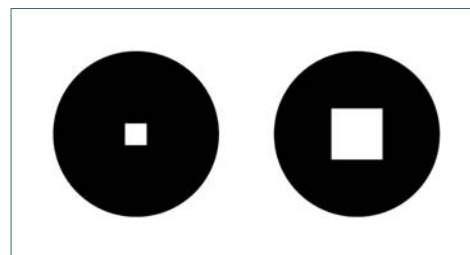
3.04 mm dia, 0.25 mm thick

AS3004P	40 µm hole edge length
AS3005P	50 µm hole edge length
AS3010P	100 µm hole edge length
AS3050P	500 µm hole edge length
AS3060P	600 µm hole edge length

Platinum

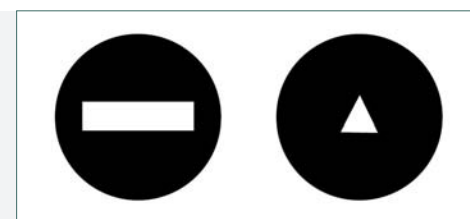
2 mm dia, 0.6 mm thick

AS2004P	40 µm hole edge length
AS2005P	50 µm hole edge length
AS2010P	100 µm hole edge length
AS2050P	500 µm hole edge length
AS2060P	600 µm hole edge length



Apertures with rectangles and triangles

Please specify your requirements.



Apertures with <5 µm holes

If you require apertures with hole sizes of <5 µm, we may be able to supply them. Please let us know your exact requirements.

Stainless steel discs

These stainless steel discs have etched holes and are mainly used for gas flow control, pressure testing and filtering of particles. Outer diameter approximately 9.53 mm, thickness approximately 25 µm.

A095-76	Stainless steel disc, hole dia, 76 µm ± 13 µm. Pack of 10
A095-50	Stainless steel disc, hole dia, 50 µm ± 13 µm. Pack of 10
A095-635	Stainless steel disc, hole dia, 635 µm ± 13 µm. Pack of 10

