

## TAAB Filmed/Coated Grids

### Formvar Support Films

Quantity	Copper Grid			
	100 mesh	200 mesh	300 mesh	400 mesh
25	F231/025	F218/025	F232/025	F233/025
50	F231/050	F218/050	F232/050	F233/050
100	F231/100	F218/100	F232/100	F233/100
Nickel Grid				
25	F231/N025	F218/N025	F232/N025	F233/N025
50	F231/N050	F218/N050	F232/N050	F233/N050
100	F231/N100	F218/N100	F232/N100	F233/N100
Gold Grid				
25	F231/G025	F218/G025	F232/G025	F233/G025
50	F231/G050	F218/G050	F232/G050	F233/G050

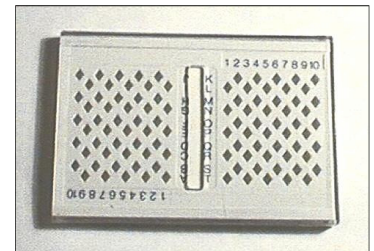
TAAB can offer high quality support films of formvar, formvar/carbon or pure carbon on a wide range of grid styles and makes depending on customer choice.

TAAB **carbon** films are limited to a maximum mesh size of 200 as our experience indicates that larger mesh sizes overstress the carbon and result in splits, tears or other problems either in manufacture, transit or the EM.

Plain **formvar** or **formvar/carbon** can be placed on most types of grid. Please ask for quotation if not listed.

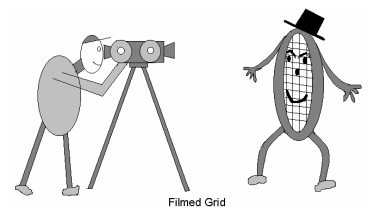
### Formvar/Carbon Support Films

Quantity	Copper Grid					
	100 mesh	100Hex	200 mesh	300 mesh	400 mesh	2 x 1mm
25	F200/025	F180/025	F077/025	F196/025	F098/025	F144/025
50	F200/050	F180/050	F077/050	F196/050	F098/050	F144/050
100	F200/100	F180/100	F077/100	F196/100	F098/100	F144/100
Nickel Grid						
25	F200/N025	F180/N025	F077/N025	F196/N025	F098/N025	F144/N025
50	F200/N050	F180/N050	F077/N050	F196/N050	F098/N050	F144/N050
100	F200/N100	F180/N100	F077/N100	F196/N100	F098/N100	F144/N100
Gold Grid						
25	F200/G025	F180/G025	F077/G025	F196/G025	F098/G025	F144/G025
50	F200/G050	F180/G050	F077/G050	F196/G050	F098/G050	F144/G050



### Carbon Support Films

Quantity	Copper Grid					
	100 mesh	100 Hex	200 mesh	300 mesh	400 mesh	2 x 1mm
1	-	-	C101/001	C267/001	C169/001	-
25	-	-	C101/025	C267/025	C169/025	-
50	-	-	C101/050	C267/050	C169/050	-
100	-	-	C101/100	C267/100	C169/100	-
Nickel Grid						
1	-	-	C101/N001	C267/N001	C169/N001	-
25	-	-	C101/N025	C267/N025	C169/N025	-
50	-	-	C101/N050	C267/N050	C169/N050	-
100	-	-	C101/N100	C267/N100	C169/N100	-
Gold Grid						
1	-	-	C101/G001	C267/G001	C169/G001	-
25	-	-	C101/G025	C267/G025	C169/G025	-
50	-	-	C101/G050	C267/G050	C169/G050	-

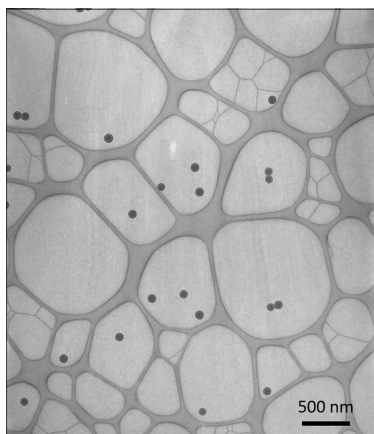


Standard carbon films are ~ 17-20nm thick but 30nm is available on request

For optically flat, mechanically and solvent resistant electron transparent specimen supports, see our Silicon Nitride Windows page 1.27

Also see Quantifoil or C-Flat Ultra Flat Carbon Grids

## Ultra-Thin Carbon Films for TEM



Our Ultra-Thin Carbon films on a Lacey Carbon (LC) support were developed to provide users with a high quality robust and uniform continuous film ideal for Cryo-TEM preparation and nanoparticle characterisation such as looking at Nanotubes, virus particles and other small particulate material. A thin layer of Carbon, estimated to be around **5nm thick**, is applied on top of a Lacey Carbon film, supported by a 300 or 400 mesh grid. These films are currently available on either Copper or Gold grids in packs of 25. Our Ultra-Thin Carbon films have been confirmed to be stable under TEM operational conditions of 100 and 120 kV for practical use.

**C269/C/UT** Ultra-Thin carbon film on LC on 300 mesh **Copper** grid pack of 25

**C269/G/UT** Ultra-Thin carbon film on LC on 300 mesh **Gold** grid pack of 25

**C270/C/UT** Ultra-Thin carbon film on LC on 400 mesh **Copper** grid pack of 25

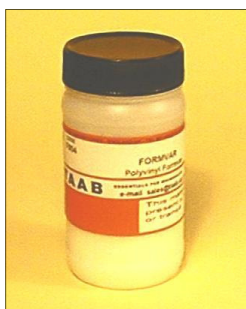
**C270/G/UT** Ultra-Thin carbon film on LC on 400 mesh **Gold** grid pack of 25

## Silicon Monoxide

Mounted on 400 mesh 3.05mm copper grids

For certain applications silicon monoxide offers an exceptionally clean film and being carbon free, is valuable in some microanalysis investigations

**S531** Silicon monoxide film on 400 mesh cu grid 50



## Film Making Materials

### POWDERS

**F004** Formvar 100g

**F005** Formvar 25g

An alternative support film material to Formvar is Butvar B98 as reported by Handley and Olsen, Ultramicrotomy 4,479 (1979). Exhibits good mechanical and high electron beam stability.

**B026** Butvar B98 100g

**C282** Collodion 25g

### SOLUTIONS

**F145/025** Formvar in chloroform 0.25% 100ml

**F145/050** Formvar in chloroform 0.50% 100ml

**F145/100** Formvar in chloroform 1% 100ml

**F145/HAZ** Formvar in chloroform\*\*\*\* 4 x 25ml

**F244/025** Formvar in ethylene dichloride 0.25% 100ml

**F244/050** Formvar in ethylene dichloride 0.50% 100ml

**F244/100** Formvar in ethylene dichloride 1% 100ml

**F244/HAZ** Formvar in ethylene dichloride\*\*\*\* 4 x 25ml

**C171/025** Collodion in amyl acetate 0.25% 100ml

**C171/050** Collodion in amyl acetate 0.50% 100ml

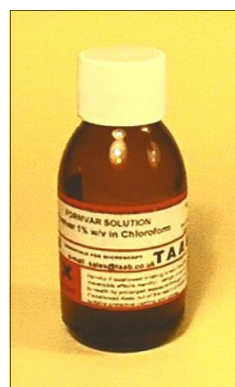
**C171/100** Collodion in amyl acetate 1% 100ml

**C171/200** Collodion in amyl acetate 2% 100ml

**C171/HAZ** Collodion in amyl acetate \*\*\*\* 4 x 25ml

Other strengths of solution can be made to order, please enquire.

\*\*\*\* Any of the above solutions can be packed in 25ml bottles 4 to a pack to avoid its classification as a hazardous chemical for shipping purposes. Please quote the relevant catalogue number and specify when ordering the strength of solution required.

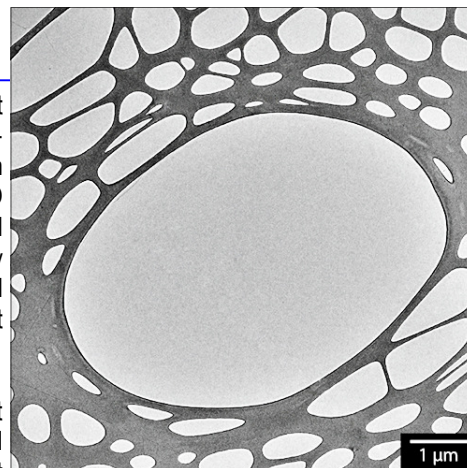


## Graphene and Graphene Oxide Coated Grids

There are currently two Graphene substrates available - **CVD Graphene** (chemical vapour deposition) and **Graphene Oxide (GO)**. Graphene oxide films are typically laid down on lacey carbon films in suspension form with micrometer sized flakes with a less controlled thickness and evenness of coverage over the grid. CVD Graphene oxide films on the other hand are produced by oxidizing CVD Graphene films at relatively low temperatures in oxygen (typically 200°C or less). These are continuous films and typically have well characterized hydrophilic properties which is important for wetting the surface of the Graphene oxide film. This property aids in the dispersion of nano particles for example but is also important for cellular biology and protein chemistry applications. **GO films are considerably less costly than CVD Graphene.**

### Graphene Oxide (GO) Support Films

Graphene oxide (GO) provides a support film up to 50% thinner than the equivalent carbon support but has a higher mechanical strength, electrical and thermal conductivity. TAAB Graphene Oxide support films are almost transparent in the electron beam and are available on holey and lacey carbon and Quantifoil® supports. These new GO films are hydrophilic and ideally suited to imaging of small nanoparticles, nanowires and suspensions. Their low atomic number and thin-layer thickness result in significantly lower background contrast than conventional supports. GO support films are also ideal for Cryo TEM studies. The vitreous ice layer can be significantly thinner on GO support films providing higher contrast and hence higher resolution for structural determination.



Graphene offers some unique advantages for studying interactions and processes at the atomic level. As the first readily available two-dimensional material, it is a model system for transmission electron microscopy studies; being almost electron transparent it enables other species to be resolved on its surface with atomic resolution. It is also a well-defined surface, allowing surface science techniques to be integrated with high resolution transmission electron microscopy and scanning probe microscopy.

**G203/10** GO film on **lacey carbon** on 300 mesh square Cu grid (10) **G203/25** GO film on **lacey carbon** on 300 mesh square Cu grid (25)  
**G203/50** GO film on **lacey carbon** on 300 mesh square Cu grid (50)

**G217/10** GO film on **holey carbon** on 300 mesh square Cu grid (10) **G217/25** GO film on **holey carbon** on 300 square Hex Cu grid (25)  
**G2127/50** GO film on **holey carbon** on 300 mesh square Cu grid (50)

**G204/10** GO film on **Quantifoil R 2/4** on 300 mesh Cu (10)  
**G204/50** GO film on **Quantifoil R 2/4** on 300 mesh Cu (50)

**G204/25** GO film on **Quantifoil R 2/4** on 300 mesh Cu (25)

**G219/10** GO film on **Quantifoil R 2/4** on 200 mesh Cu (10)  
**G219/50** GO film on **Quantifoil R 2/4** on 200 mesh Cu (50)

**G219/25** GO film on **Quantifoil R 2/4** on 200 mesh Cu (25)

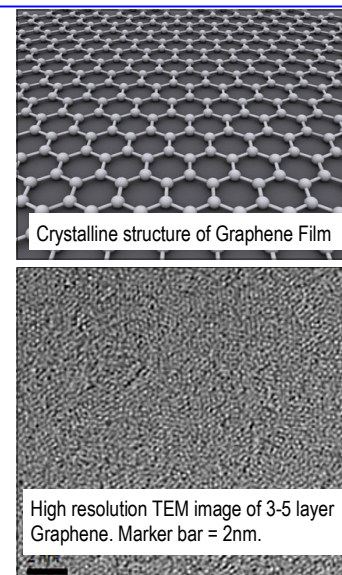
**G220/10** GO film on **Quantifoil R 1.2/1.3** on 400 mesh Cu (10)  
**G220/50** GO film on **Quantifoil R 1.2/1.3** on 400 mesh Cu (50)

**G220/25** GO film on **Quantifoil R 1.2/1.3** on 400 mesh Cu (25)  
*Available on other supports to special order*

### Graphene TEM Support Films

Our Graphene TEM support films are supported by a lacey carbon film on a 300 mesh copper grid. The single, continuous Graphene sheet covers the entire 300 mesh area of the TEM grid. This creates a usable area of around 75% of the TEM grid, leaving plenty of space for specimens or experiments. The Graphene films are available with either 1, 2, 3-5 or 6-8 layers of Graphene. The 2 layer Graphene is ideally suited for high resolution TEM imaging, imaging of nanoparticles and imaging of weak contrast materials. Graphene exhibits excellent conductivity and very high transparency for electrons. The more robust 3-5 and 6-8 layer Graphene are offered for use as an experimental platform for Graphene research. It can be used for nano scale experiments or Graphene applications research with subsequent high resolution imaging.

The Graphene used for these Graphene TEM support films is grown on copper foil using a CVD process. The Graphene is then released by dissolving the copper foil and transferred onto the lacey carbon/300mesh grid by using a proprietary transfer technique.

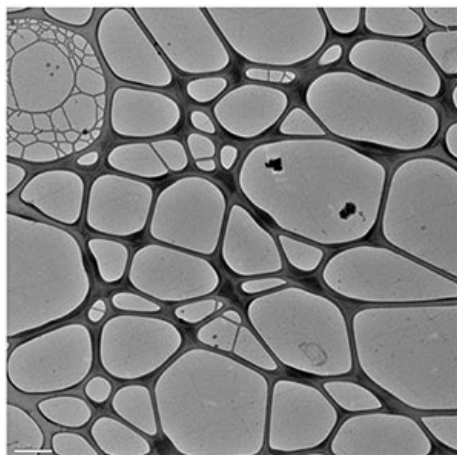


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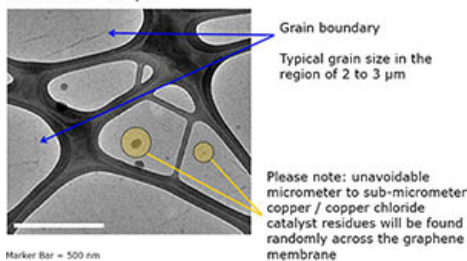


## Graphene Films on Grids

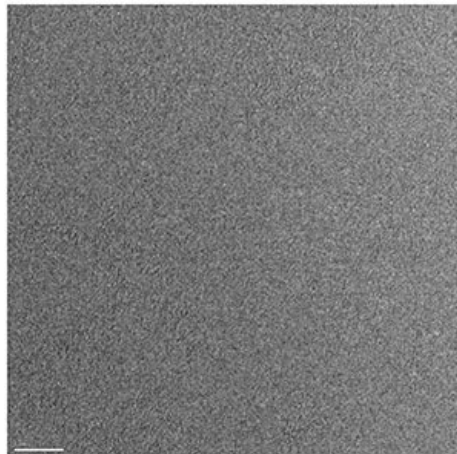
### Graphene specifications



Marker Bar = 0.5 μm



Marker Bar = 500 nm



5 nm Marker Bar

HR-TEM image

Thickness for the single layer of Graphene is normally approx. 0.35nm. Transparency of the single layer of Graphene is approx. 96.4%.

Thickness for the 2 layers of Graphene is normally approx. 0.7nm. Transparency of the 2 layers of Graphene is approx. 92.7%.

Thickness for the 3-5 layers of Graphene is between 1.0 - 1.7nm. Transparency of 3-5 layers of Graphene is in the range of 90.4 - 85.8%.

Thickness for the 6-8 layers of Graphene is between 2.1 - 2.8nm. Transparency of 6-8 layers of Graphene is in the range of 83.2 - 78.5%.

The Graphene has an in-plane modulus of 0.9TPa (compared with 1.0 TPa for Graphene produced by the scotch tape method).

**Films on lacey carbon 300 mesh copper grids.** Available in packs of 5 or 10 in grid box.

### Single Layer Graphene Support Films

**G205/5** Single layer Graphene on 300 mesh lacey carbon pack of 5

**G205/10** Single layer Graphene on 300 mesh lacey carbon pack of 10

### 2 Layer Graphene Support Films

**G206/5** Two layer Graphene on 300 mesh lacey carbon pack of 5

**G206/10** Two layer Graphene on 300 mesh lacey carbon pack of 10

### 3 to 5 Layer Graphene Support Films

**G207/5** 3-5 layer Graphene on 300 mesh lacey carbon pack of 5

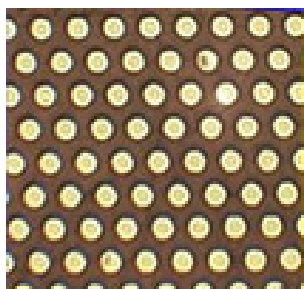
**G207/10** 3-5 layer Graphene on 300 mesh lacey carbon pack of 10

### 6 to 8 Layer Graphene Support Films

**G208/5** 6-8 layer Graphene on 300 mesh lacey carbon pack of 5

**G208/10** 6-8 layer Graphene on 300 mesh lacey carbon pack of 10

**Films on 2000 mesh supports** These are a 2000 mesh Cu grids supported by a 2 x 1mm slotted Cu grid. This combination delivers a rigid base but with a total thickness less than 50μm. The usable area is a slot 2 x 1mm with a transmission of 41%. The holes in the 2000 mesh Cu grids are circular with a diameter of 6.5μm leaving unsupported graphene over these circular openings.



### Single Layer Graphene TEM Support Films

**G346/5** Single layer graphene on 200 mesh copper grid pack of 5

**G346/10** Single layer graphene on 200 mesh copper grid pack of 10

### 2 Layer Graphene TEM Support Films

**G347/5** 2 layer graphene on 200 mesh copper grid pack of 5

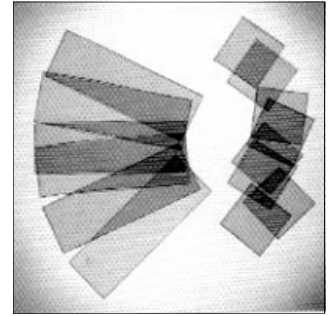
**G347/10** 2 layer graphene on 200 mesh copper grid pack of 10

## Mica Sheets

High grade mica for making freshly cleaved surfaces for such EM applications as carbon filming and particle spraying. Also suitable for high resolution AFM studies, growing cells and thin film coating research.

Available in the following sizes as stock items, other sizes can be supplied please enquire.

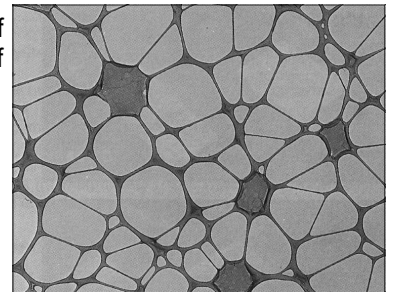
<b>M054</b>	Mica 3" x 1" x 0.006" thick (75 x 25 x 0.15mm)	20 sheets
<b>M055</b>	Mica 1" x 1" x 0.006" thick (25 x 25 x 0.15mm)	20 sheets
<b>M459</b>	Mica 11 x 11 x 0.15mm thick	20 sheets
<b>M460</b>	Mica 100 x 20 x 0.15mm thick	20 sheets
<b>M461</b>	Mica 150 x 150 0.15mm thick	3 sheets
<b>M462</b>	Mica 9.9mm dia x 0.1mm thick	pack of 10
<b>M463</b>	Mica 20 x 20mm thick ultra clean	10 sheets



## Lacey Carbon Films

These are carbon films with large holes, which make them particularly suitable for the support of acicular crystals. Much of the crystal is unsupported and therefore subject to a minimum of incoherent scattering from the film.

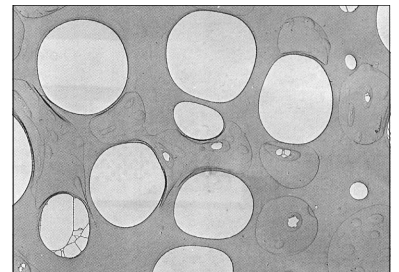
<b>C269/C</b>	Lacey carbon film 300 mesh, 3.05mm, Cu	50
<b>C269/N</b>	Lacey carbon film 300 mesh, 3.05mm, Ni	50
<b>C270/C</b>	Lacey carbon film 400 mesh, 3.05mm, Cu	50
<b>C270/N</b>	Lacey carbon film 400 mesh, 3.05mm, Ni	50
<b>C270/G</b>	Lacey carbon film 400 mesh, 3.05mm.Au	50



## Holey Carbon Films

These are similar to lacey carbon films with smaller holes.

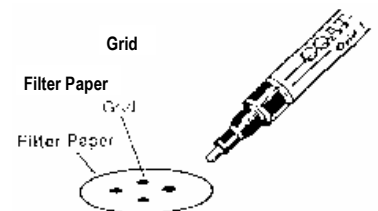
<b>C062/C</b>	Holey carbon film 300 mesh, 3.05mm, Cu	50
<b>C062/N</b>	Holey carbon film 300 mesh, 3.05mm, Ni	50
<b>C062/G</b>	Holey carbon film 300 mesh, 3.05mm.Au	50
<b>C274/C</b>	Holey carbon film 400 mesh, 3.05mm, Cu	50
<b>C274/N</b>	Holey carbon film 400 mesh, 3.05mm, Ni	50
<b>C274/G</b>	Holey carbon film 400 mesh, 3.05mm.Au	50



## Grid Coating Pen

The Grid Coating pen improves the adherence of tissue sections onto the grids. With a touch of the pen to the grid, a thin layer of coating is applied to the grid. Drying takes place in 1-2 minutes at room temperature. After it has dried the grid is ready for section mounting. The pen can also be used in pretreating grids prior to mounting support films such as formvar and carbon. This minimises dislodging, widening or breaking of the support film.

<b>P293</b>	Grid Coating Pen	1
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## Grid Coating Stand

A stand designed with 49 recessed holes suitable for 3.05mm diameter grids. A groove is carefully machined to the correct depth which allows safe and easy access for tweezer manipulation of the grids.

Standing on 3 integral feet it is easily placed in a low glass dish to allow thin collodion or formvar films to be lowered onto the grids by siphoning off the water. The coated grids can then be transferred to the coating unit.

<b>G122</b>	Grid coating stand, thin film	1
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