

Prepare TEM and SEM samples of pre-specified micron-sized regions



The PELCO® Tripod Polisher™ 590 was designed by researchers at the IBM East Fishkill Laboratory\* to accurately prepare TEM and SEM samples of pre-specified, micron-sized regions. For TEM samples, this technique has been used successfully to limit ion milling times to less than 15 minutes and, in some cases, has eliminated the need for ion milling.

Although this technique was designed for preparing semiconductor cross-sections, it has been used to prepare both plan-view and cross-section samples from such diverse materials as ceramics, composites, metals, and geological samples.

**OPERATION - STANDARD TECHNIQUE**

The PELCO® Tripod Polisher™ 590 can be used to prepare a sample for both SEM and TEM cross-sectional analysis. To accomplish this, the sample is mounted on the face of a special SEM stud which is clamped into the slotted L-bracket of the PELCO® Tripod Polisher™ 590. Initial grinding is done on a 15µm metal bonded diamond disc. Further lapping and polishing continues with a succession of diamond films ranging in size from 30µm to 0.5µm. The final polish is done with a colloidal silica suspension. As lapping progresses, the two rear micrometers are used to adjust the plane of polish. With periodic examinations in an inverted microscope, the plane of polish is adjusted until it is parallel to the plane of interest. At this point the SEM stud may be moved to an ion mill for a quick milling to remove fine scratches, polishing debris and to give the surface topography prior to SEM analysis. The SEM stud can be mounted directly in the SEM for analysis. When analysis is complete, a TEM sample of

the same area is made. The sample is removed from the SEM stud and attached to a single aperture TEM grid. The slotted L-bracket is removed and the TEM grid is attached to the round sample mount which is affixed to the center of the polisher. The sample is now mechanically thinned using Diamond Lapping Film. During this process the sample is periodically examined in an inverted microscope and the micrometers are adjusted to maintain the correct plane of polish. The sample is FINAL polished to 1µm or less and then ion milled for up to 15 minutes.

**OPERATION - WEDGE TECHNIQUE**

The preferential thinning and surface topography that occur in briefly ion milled samples makes the study of interfaces between dissimilar materials difficult. These problems can be reduced by completely eliminating the ion milling step and mechanically polishing the sample to electron transparency by employing the wedge technique. With this technique the SEM stud is replaced, in the slotted L-bracket, with a Pyrex® insert. The sample is mounted on the face of this insert. After the plane of interest is obtained, the sample is removed and mounted on the bottom of the Pyrex® insert. The two rear micrometers are adjusted and the micrometer nearest the sample is retracted to produce a wedge shape as material is removed from the sample. The sample, with the features of interest at the apex of the wedge, is thinned from the back side until the edge of interest is ~1µm thick. The sample is then polished on a final polishing cloth such as our MultiTex Cloth (product number 816-12) with a colloidal silica suspension until thickness fringes are visible (below a few thousand angstroms). The sample is then removed from the Pyrex® insert and attached to a single aperture TEM grid for analysis.

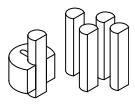
- Precise cross-sectioning at the TEM level
- Repeatable and rapid production of TEM samples
- Reduces ion milling time to minutes as opposed to hours
- Produces large thin areas over the entire specimen

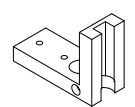
59100	PELCO® Tripod Polisher™ 590TEM	precision sample thinning for TEM	.....	each
59200	PELCO® Tripod Polisher™ 590SEM	precision sample preparation for SEM	.....	each
59300	PELCO® Tripod Polisher™ 590TS	configured for SEM & TEM sample preparation	.....	each

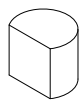
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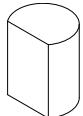
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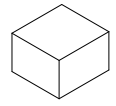
**INCLUDED ACCESSORIES:**

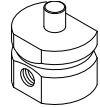
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**Wedge Polishing Mount**  
Includes one 59311 Wedge Polishing Clamp and five 59309 Pyrex® Wedge Polishing Rods  
59306 included with TEM / TS kits..... each
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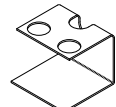
**Slotted L-bracket**  
Used with 59311 Wedge Polishing Clamp and 59313 SEM Stub  
59307 included with TEM / SEM / TS kits..... each
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
**Pyrex® Wedge Polishing Stub**  
Used with 59311 Wedge Polishing Clamp  
59308 included with TEM / TS kits..... each
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**Pyrex® Insert Large**  
Used with 59307 Slotted L-Bracket  
59310 included with TEM / TS kits..... each
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**Heater Block**  
Used with 59307 Slotted L-Bracket  
59312 included with TEM / TS kits..... each
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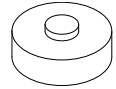
**SEM Stub**  
Used with 59307 Slotted L-Bracket  
59313 included with SEM / TS kits..... each
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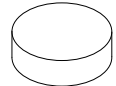
**Glass Leveling Slide**  
59314 included with TEM / SEM / TS kits..... each
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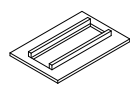
**Microscope Stand**  
59315 included with TEM / SEM / TS kits..... each
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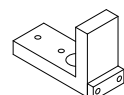
**Delrin® Foot for Micrometer Assembly**  
59316 included with TEM / SEM / TS kits..... each


**OPTIONAL ACCESSORIES:**


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**Parallel Polishing Mount with Pyrex® Insert**  
Used with basic tripod base  
59301 ..... each
- 

**Parallel Polishing Mount 1.25" dia. Stainless Steel**  
Used with basic tripod base  
59302 ..... each
- 

**Planarizing Tool**  
For feet resurfacing  
59303 ..... each
- 

**X-Section L-bracket Assembly**  
59304 ..... each
- 

**Pyrex® Wedge Polishing Rod**  
Used with 59311 Wedge Polishing Clamp  
59309 ..... each
- 

**Wedge Polishing Clamp**  
Used with 59307 Slotted L-Bracket  
59311 ..... each

**OPTIONAL STARTER KIT 59350 INCLUDES:**

814-457	30µm Diamond Film, 8", PB .....	1	1GC450	Slotted TEM grids, pkg/100.....	1
814-456	5µm Diamond Film, 8", PB .....	1	17395	Sample Cleaner, 4 oz.....	1
814-454	6µm Diamond Film, 8", PB .....	1	80915	Cotton Swabs, pkg/50.....	1
814-452	1µm Diamond Film, 8", PB .....	1	14005	Petri Dish .....	1
814-451	0.5µm Diamond Film, 8", PB .....	1	14012	Filter Paper.....	1
816-12	MultiTex Cloth, 8", PSA, pkg/10.....	1	5398	Tweezer Set .....	1
59317	Glass plate, 8" x 0.25" .....	1	80932	3M™ Scotch™ Pad .....	1
815-120	0.05µm Colloidal Silica, 16oz.....	1	81450	Squeegee .....	1
892-40	Mounting Wax, 135, 350 grams .....	1			

\* J. Benedict, R. Anderson, S. Klepeis, M. Chaker, in Specimen Preparation for Transmission Electron Microscopy of Materials-II, ed. Anderson, R., Mater. Res. Soc. Proc. 199, Pittsburgh, PA USA p. 189 (1990).