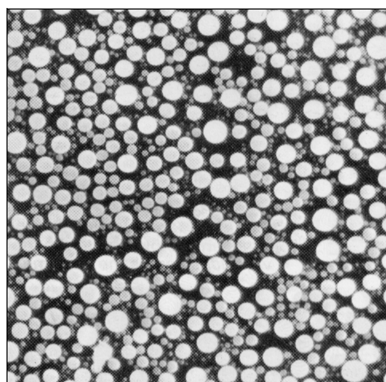
EM Calibration Standards

Resolution and Grey Level Test Specimens

SEM resolution is tested by a range of criteria including counteracting astigmatism, resolving gaps and measuring the number of grey levels in the image. This is to ensure that the resolution has not been distorted by using the contrast to maximise the visibility of edges. High resolution images should ideally show fine detail together with a lack of noise evidenced by a good range of grey levels.

Specimens are available for for checking medium, high and ultra high resolution including FE sources.

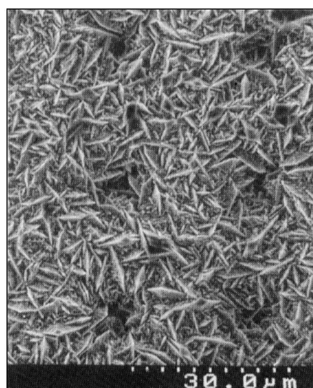
Medium Resolution - Tin on Carbon



An alternative specimen for medium resolution evaluation and for day to day visual checking of instrument performance. This specimen consists of a dispersion of tin spheres within the size range 10-40nm on a carbon substrate. It is ideal for astigmatism correction and is recommended for use in SEM's employed in the semiconductor industry where the usual gold on carbon sample cannot be used due to the risk of gold 'poisoning'.

S605 Medium resolution tin on carbon specimen on 12.5mm (½") pin stub
S605/J Medium resolution tin on carbon specimen on JEOL stub
S605/I Medium resolution tin on carbon specimen on ISI stub
S605/H Medium resolution tin on carbon specimen on Hitachi stub
Available on other stubs to order - please ask

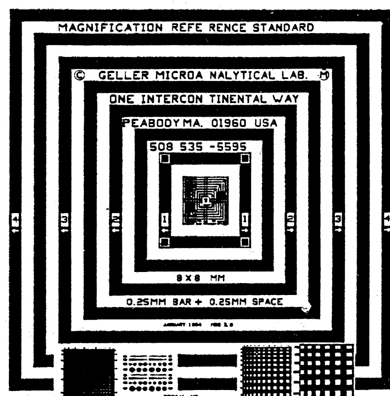
Prickly Gold for Astigmatism Correction



Pelco™ Prickly Gold mounted on a 1000 mesh grid gives clear, sharp, high contrast images that are easy to stigmate. The presence of astigmatism is determined and corrected using this specimen.

S606 Prickly gold on 12.5mm (½") pin stub
S606/J Prickly gold on JEOL stub
S606/I Prickly gold on ISI stub
S606/H Prickly gold on Hitachi stub
Available on other stubs to order - please ask
Also available unmounted

Magnification Reference Standard for LM, SEM, AFM etc



Transmitted Optical Image

This Geller reference standard is suitable for light microscopy (transmitted and incident light), scanning electron microscopy, scanning tunnelling and atomic force microscopy. It has patterns for calibration of particle size analysis systems and video spacial resolution determination.
The geometric design of the standard contains groups of concentric squares spanning several orders of magnitude with line widths and spaces of 250µm and 25µm and a fine pitch of 2µm. Measurements in the X-Y plane can be certified to NPL & NIST standards. The overall size is approximately 9 x 9 x 2.3mm. A 3mm version is available for use in TEMs in the SED and BED modes (uncertified).
Pattern accuracy is within ±o.1µm and the appropriate graphics are included on the standard for identification purposes. Suitable for use in the magnification range x10 to x50,000 the standard can also be used for checking image distortion and measuring tilt angles by observing 'foreshortening' of the image. The anti-reflective chromium pattern is coated on an optically transparent, electrically conductive thin film over fused silica. Further coating for SEM applications is not required. The use of a special holder is strongly recommended. The universal holder enables the standard to be used in the SEM, optical microscopes and other instruments. It can also be supplied mounted on a metal slide for optical use only (transmitted and incident light). Further details available.

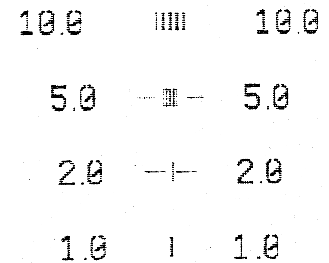
S607 Geller reference standard uncertified
S607/C Certified standard (NPL & NIST traceable)
S607/XYZ Certified standard X, Y & Z (NIST)
S607/XYZ/N Standard non certified 3mm Ø

Please add suffix "S" for universal holder and "O" for optical microscope holder

Phone: +44 (0) 118 981 7775 Fax: +44 (0) 118 981 7881 E-mail: sales@taab.co.uk

Critical Dimension (CD) Test Specimen

This specimen is of particular interest to microscopists and test engineers using high performance SEMs for critical measurement of semi-conductor line width dimensions.
The 4.8 x 4.5mm silicon standard has a series of chess patterns around its edges with a side length of 480µm. These can be used for optimising imaging parameters and distortion checking.
The central area of the standard contains a series of four line patterns each clearly identified with its pitch size. Each pattern is made up form 5 bars and spaces of equal width. Pitches for the individual patterns range in size from 1.0µm - 10µm. Each standard is identified by a unique serial number.
Three forms are available - non certified, certified with the manufacturers certificate or certified by the **G**erman **P**hysikalisch **T**echinische **B**undersanstalt. For certified standards each pitch is measured and a mean value calculated from a series of five measurements. Measured were made on a dedicated CD measuring system fitted to a FEG SEM at an accelerating voltage of 700eV. The specimen can be unmounted or mounted on any standard SEM stub - please specify.

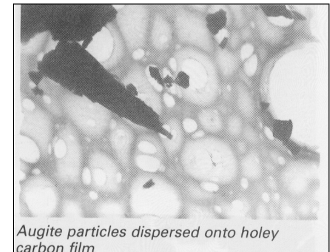


S608 CD calibration specimen non certified **S608/MC** CD calibration spec. (manufacturers cert.)
S608/GPTB CD calibration specimen certified by GPTB

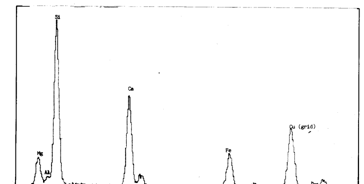
Standards for X-ray Microanalysis

X-ray Reference Standards for T E M

These standards are supplied as fine powders dispersed onto holey carbon films on 400 mesh 3mm Ø copper grids and are selected from a range of certified material and synthetic compounds. The universal set contains 25 compound standards and the rare earth set 14 compounds.


Augite particles dispersed onto holey carbon film

S609 Universal TEM X-ray standard set
S610 Rare earth TEM X-ray standard set


X-ray energy spectrum for Augite

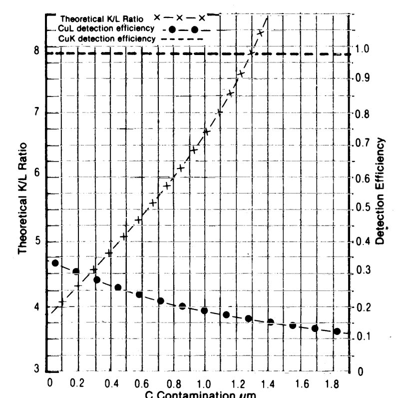
Boron Carbide Standard

A dispersion of small boron carbide particles on a 3mm carbon coated grid which provides a low atomic number analysis standard for determining the energy resolution of wave-length dispersive X-ray spectrometers

S611 Boron carbide on 3mm grid each

Copper Foil on Aluminium Grid

A specimen used to determine detector efficiency.
This is a dual purpose specimen which generates two well separated K-lines to check the calibration of the X-ray detector. The aluminium generates a low energy line at 1.49keV and the copper K-alpha peak occurs at 8.04keV. The copper film has a very uniform thickness of about 60nm and carbon coated on both sides. The ratio of the Cu K/Cu L X-ray intensities is measured for assessing detector efficiency. Although detector efficiency is assumed to be constant any contaminant on the beryllium window can be detrimental to performance.



S612 Calibrating copper foil for X-ray detectors on 3mm grid each

Phone: +44 (0) 118 981 7775 Fax: +44 (0) 118 981 7881 E-mail: sales@taab.co.uk