AFM/STM ACCESSORIES & SUPPLIES
AFM/STM Specimen Preparation, Specimen Storage, Calibration and Consumables

AFM/STM Specimen Discs
PELCO® AFM/STM Diskpenser & Disc Carriers
PELCO® AFM/STM Workstation & Disc Grippers
AFM/STM Disc Storage Boxes
AFM Mounts & Disc Media
Disc Punches
Silicon Chips & PELCO® Si₃N₄ Discs
AFM Calibration Standards
AFM Probes

TED PELLA, INC.
Microscopy Products for Science and Industry
www.tedpella.com sales@tedpella.com 800.237.3526
AFM/MICA DISCS
Highest quality grade V1 mica, 0.21mm (.0085”) thick. Interleaved, in packages of 10.
Available in four diameters:
10mm (0.39”); 12mm (0.47”)
15mm (0.59”); 20mm (0.79”)

AFM DISC CARRIERS & DISC PICKUP TOOL
An inexpensive way to store 10, 12, 15 and 20mm discs in a dust-free environment. Discs are placed face down into a stepped cavity where the specimen is protected. The cavity allows for a maximum specimen height of 3.2mm (1/8”). They are retrieved by using the convenient PELCO® AFM Disc Pickup Tool, comprised of a plastic handle, stainless steel shaft and a magnetic pad on the tip. Fingers need not touch the disc. Sliding cover.

AFM DISKPENSER
A practical way to store and dispense AFM discs. The plastic tubes in which the discs are packaged may be inserted into the PELCO® Diskpenser. With a turn of the cylinder one disc is dispensed, ready to be picked up with the PELCO® Disc Gripper as shown to the right. The PELCO® Diskpenser will dispense either 10, 12 or 15mm Discs.

AFM/STM METAL SPECIMEN DISCS
High quality magnetic stainless steel (alloy 430) discs for Atomic Force Microscopy are offered, with smooth edges and consistently flat surfaces. The AFM/STM discs are 22 gauge which is .0299” (0.76mm) with a range of .0269 to .0329” (0.68 to 0.84mm) thickness. Available in 6, 10, 12, 15 and 20mm diameter, supplied in packs of 50 in a clear tube which will fit into the PELCO® AFM/STM Diskpenser (see below).

AFM/STM SUPPLIES & ACCESSORIES
AFM/STM Specimen Discs; Disc Carriers; Disc Pickup Tool; Mica Discs; Glass Coverslips

PELCO® AFM METAL SPECIMEN DISCS
High quality metal magnetic stainless steel (alloy 430) discs for Atomic Force Microscopy coated with 1 micron of gold. The discs are supplied in PELCO® AFM Disc Carriers. They are available in 10, 12 and 15mm diameter.

PELCO® GOLD COATED AFM METAL SPECIMEN DISCS
Advanced Nanotechnology Specimen Support

AFM MICA DISCS
Highest quality grade V1 mica, 0.21mm (.0085”) thick. Interleaved, in packages of 10.
Available in four diameters:
10mm (0.39”); 12mm (0.47”)
15mm (0.59”); 20mm (0.79”)

ROUND GLASS COVERSLEPS
10mm, thickness #1.5 (0.16 to 0.19mm) sold in package of 100.
12mm, thickness #1 (0.13 to 0.17mm) approx. 173 per 1/4 oz.
15mm, thickness #1 (0.13 to 0.17mm) approx. 111 per 1/4 oz.
**PELCO® ATOMIC FORCE MICROSCOPY WORKSTATION**

Turned from solid aluminum, this workstation features an adjustable internal magnet to securely hold a metal AFM Specimen Disc in place. A tray around the circumference of the central disc holder may be used to catch residue or hold additional discs.

15010  PELCO® AFM Workstation .................................................. each
16220  PELCO® AFM Disc Pickup Tool (previous page) ............ each

---

**PELCO® AFM DISC GRIPPERS**

Specially designed rubber coated tips for picking up AFM discs from a flat surface. Transfer Atomic Force Microscopy Discs from Diskpenser to PELCO® AFM Workstation to Microscope and to PELCO® AFM Disc Carrier or AFM Disc Storage Box with ease.

1671  PELCO® 10mm AFM Disc Grippers .............................. each
1668  PELCO® 12mm AFM Disc Grippers ............................. each
1669  PELCO® 15mm AFM Disc Grippers ............................. each
1672  PELCO® 20mm AFM Disc Grippers .............................. each

---

**PELCO® SILICON NITRIDE COATED 3MM DISCS**

These 3mm blank silicon discs have a 50nm ultra low stress silicon nitride layer (Si$_3$N$_4$) on both sides and can be used as specimen discs for AFM applications which need a Si$_3$N$_4$ background. Provide smooth background: Surface roughness has RMS (Rg) of 0.65 ±0.06nm which gives a mean roughness (RA) of 0.45 ±0.02nm

Film Thickness: 50nm ultra low stress Si$_3$N$_4$ on both sides
Disc Thickness: 200µm silicon support
Disc Diameter: 3mm
Surface Roughness: The RMS (Rq) is 0.65 ±0.06nm which gives a mean roughness (Ra) of 0.45 ±0.02nm
Packaging: The PELCO® Silicon Aperture Frames are packaged under cleanroom conditions in the PELCO® #160 TEM Grid Storage box. Each box holds 10 discs.

21555-10  PELCO® Silicon Nitride 3mm Discs ......................... pkg/10

---

**PELCO® CROSS SECTION AFM MOUNTS & AFM SAMPLE HOLDERS**

A convenient way to clamp and position cross sectional samples for AFM imaging. These holders are all made from high quality magnetic stainless steel (alloy 430) so they can be easily attached to the magnetic sample holder of the AFM system. Small 12mm diameter will make the cross section holders compatible with most AFM systems on the market.

16213-6  90° AFM Sample Mount. Use (conductive) adhesive to mount specimen........................................each
16213-10  90° AFM Sample Mount with Spring Clip to conveniently mount thin cross section sample................................................each
16213-4  Set Screw Vise to mount AFM samples up to 4mm thickness. Allen key for set screw included......................each
16213-1  Dual Set Screw Vise to mount samples up to 1mm thickness. Allen key for set screws included..............each

---

**PELCO® X-TREME AFM/STM DISC STORAGE BOX**

Very strong and rugged clear polycarbonate box to store stainless steel AFM discs with 6, 10, 12, 15 or 20mm diameter. The PELCO® X-TREME storage box is watertight, crushproof and dustproof. Strong hinges, locking clasps and O-ring seal makes this box suitable for transport, shipping and storage of the stainless steel AFM discs. Ideal for storing calibration and test samples. The box has a single pole magnetic layer in the base with a size of 47 x 86mm (1.85” x 3.4”). A marker pen can be used to write on the magnetic material. OD 112 x 77 x 36mm (4.4” x 3” x 1.4”), maximum specimen height is 21mm (0.81”).

Storage capacity: 5 ea of the Ø20mm AFM discs; 8 ea of the Ø15mm AFM discs; 10 ea of the Ø12mm AFM discs; 21 ea of the Ø6mm AFM discs.

16224  PELCO® X-TREME AFM Disc Storage Box ................. each

---

**PELCO® AFM DISC STORAGE BOXES**

These storage boxes have a single pole magnetic layer in the base of the box to store stainless AFM discs with 10, 12, 15 or 20mm diameter.

Large storage box holds up to 20 AFM discs. Inside measurements of the styrene box are 152 x 51 x 18mm (6” x 2” x 11/16”). Box has a clear lid and a black base.

Small storage box holds up to 4 discs. Inside measurements of the styrene box are 70 x 28 x 18mm (2.3/4” x 1-1/8” x 11/16”). Box has a clear lid and a black base.

16201  PELCO® Single AFM/STM Disc Storage Box, Small ......... pkg/5
16203  PELCO® AFM Disc Storage Box, small .................... each
16212  PELCO® AFM Disc Storage Box, large ..................... each
## PELCO® GOLD COATED MICROSCOPE SLIDES

High quality glass, standard microscope slides coated with 50nm of gold with a 5nm chromium adhesion layer between the glass slide surface and the gold coating. Can be used for a wide range of nanotechnology, biotechnology and AFM applications. Also suitable as an opaque microscopy support. Both Cr and Au are evaporated on the glass slide using a vacuum evaporation system. The gold surface is not atomically flat, but has bumps in the nm range. The gold slides are individually packed in a slide mailer. The gold slides are autoclavable.

**Glass Slide:** 75 x 25mm, 1mm thickness, soda lime glass  
**Chromium Adhesion Layer Thickness:** 5nm  
**Gold Layer Thickness:** 50nm (+/- 5nm)

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Quantity/Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>260156-G</td>
<td>Gold Coated 22 x 22mm Microscope Slide, 50nm Au</td>
<td>each</td>
</tr>
</tbody>
</table>

### Glass Coverslip Size:
- Ø16mm with thickness #1 or 22 x 22mm with thickness #2

**Glass Type:** Schott D263M borosilicate  
**Chromium Adhesion Layer Thickness:** 5nm  
**Gold Substrate Layer Thickness:** 50nm (+/- 5nm)

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Quantity/Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>260156-G</td>
<td>Gold Coated 22 x 22mm Glass Coverslips, 50nm Au</td>
<td>each</td>
</tr>
<tr>
<td>260374-G</td>
<td>Gold Coated Ø16mm Glass Coverslips, 50nm Au</td>
<td>each</td>
</tr>
</tbody>
</table>

## DISC PUNCHES

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Quantity/Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>54741</td>
<td>Disc Punch, 9.5mm Ø circle (3/8”)</td>
<td>each</td>
</tr>
<tr>
<td>54740</td>
<td>Disc Punch, 7.9mm Ø circle (5/16”)</td>
<td>each</td>
</tr>
<tr>
<td>54742</td>
<td>Disc Punch, 11mm Ø circle (3/16”)</td>
<td>each</td>
</tr>
<tr>
<td>54743</td>
<td>Disc Punch, 12.7mm Ø circle (1/2”)</td>
<td>each</td>
</tr>
</tbody>
</table>

Maximum thickness for punching: 0.067” (1.7mm)

### SILICON CHIP SPECIMEN SUPPORTS

Si-chips are opaque, of low electrical resistance and have surface properties equal to glass (including smoothness). They are chemically inert and make good substrates for growing or mounting cells. Si-chips are precleaned before packaging. Also ideal for imaging small particles due to low background signal.

**Availability:** 4” wafer is precut into 5 x 7mm, 5 x 5mm or 10 x 10mm chips that can be easily separated in the laboratory.

**Properties:**
- Orientation (111)  
- Resistance 1-30 Ohms  
- Type P (Boron) (1 primary flat)  
- No SiO2 top coating  
- Wafer thickness is 18-21 mil  
- Wafer is polished on one side  
- After dicing they are rinsed in DI water for cleaning

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Quantity/Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>16007</td>
<td>4” (10cm) dia., 5 x 7mm diced Silicon Wafer, 187 chips/wafer</td>
<td>each</td>
</tr>
<tr>
<td>16008</td>
<td>4” (10cm) dia., 5 x 5mm diced Silicon Wafer, 270 chips/wafer</td>
<td>each</td>
</tr>
<tr>
<td>16006</td>
<td>4” (10cm) dia., 10 x 10mm diced Silicon Wafer, 55 chips/wafer</td>
<td>each</td>
</tr>
</tbody>
</table>

## AFM CANTILEVER TWEEZERS - STAINLESS STEEL

Easily grasp AFM cantilevers / probes with these precise non-magnetic stainless steel, tweezers. 4-5/8” (117mm) long.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Quantity/Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>5599</td>
<td>AFM Cantilever Tweezers, NM-SS</td>
<td>each</td>
</tr>
</tbody>
</table>

## AFM CANTILEVER TWEEZERS - TITANIUM

Easily grasp AFM cantilevers / probes with these precise non-magnetic stainless steel, tweezers. 4-5/8” (117mm) long.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Quantity/Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>5596-TI</td>
<td>AFM Cantilever Tweezers, Titanium</td>
<td>each</td>
</tr>
</tbody>
</table>
When imaging a sample by AFM, it is imperative to know the condition of the AFM probe, since this determines the quality and correctness of the image. The TipChecker is an SPM sample for fast, convenient and efficient determination of the AFM tip condition. The clear differences between the tips becomes apparent even with a single scan line. The TipChecker offers a fast and easy way to compare and categorize different AFM tips with respect to tip apex, shape and sharpness. The TipChecker sample enables checking if the tip is still good, starts showing wear or is blunted or broken without the need for scanning an entire image or using SEM inspection. The Tip Checker sample works perfectly with Auto Tip Qualification and Tip Characterization software that is available on the market.

Figures showing a comparison between different AFM probe tips used to image the TipChecker sample. Scan is 1x1µm for all images, height is 100nm. Each image is shown with a representative cross-section scan.

The BudgetSensors TipChecker sample consists of an extremely wear-resistant thin film coating deposited on a silicon chip. The thin film coating shows a granular, sharply peaked nanostructure ideal for reversely imaging an AFM probe’s apex. The die size of the BudgetSensors TipChecker is 5x5mm and is completely coated with the thin film. It comes glued onto a 12mm diameter, stainless steel, magnetic disc, ready to be placed into your AFM set.

TC1 BudgetSensors TipChecker for AFM Probes………………each

This product is intended for checking the tip sharpness (not height calibration); AFM tips wear down and can get damaged resulting in blurry lines, especially at the nano scale.

A single layer of cobalt particles provide an excellent and stable substrate for AFM tip characterization and instrument operation. Image at top demonstrates height calibration at 1nm (red line profile) and 3nm (green line profile) on the standard to indicate a sharp tip. Can be used in water as long as there are no chemicals present which would react with the substrate or the Co particles.

The Co particles are flattened half spheres (droplets) with the radius typically larger than the height. There is a distribution of particle heights between 1 and 5nm.

Available on 5x5mm silicon wafer chips, unmounted or mounted, on 12mm stainless steel metal disc. Tip characterization down to angstrom resolution is easily attained. Ready-to-scan test specimen.

628 PELCO® AFM Tip and Resolution Test Specimen, Unmounted…………………………………………………………each
628-AMF PELCO® AFM Tip and Resolution Test Specimen, Mount AFM ……………………………………………………each
HS-SERIES AFM CALIBRATION STANDARDS

Step heights of 20, 100 or 500nm.

The HS-series calibration standards offers an easy and reliable way to calibrate AFM systems. Primarily designed for accurate Z-axis calibration, the standards also offer X- and Y-axis calibration for bigger scanners in the 40-100µm range. The structure symmetry enables calibration in one step without the need to rotate and re-align the sample in between X- and Y-axis calibration.

The HS-series feature silicon dioxide structure arrays on a 5 x 5mm silicon chip. The fabrication process ensures excellent uniformity of the structures across the chip. There are three step heights available with nominal values of: 20nm, 100nm, and 500nm. The actual value will be supplied with the delivered calibration standard. Arrays of structures with different shape and pitch are integrated on the chip. The larger square of 1 x 1mm contains square pillars and holes with a 10µm pitch. The smaller center square of 500 x 500µm contains circular pillars and holes as well as lines in both X- and Y-direction with a 5µm pitch.

The silicon chips are available unmounted or mounted on a 12mm standard AFM disc using a high quality electrically conductive epoxy.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Details</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS-20MG</td>
<td>AFM Calibration Standard, step height 20nm, mounted</td>
<td>each</td>
</tr>
<tr>
<td>HS-20MG-UM</td>
<td>AFM Calibration Standard, step height 20nm, unmounted</td>
<td>each</td>
</tr>
<tr>
<td>HS-100MG</td>
<td>AFM Calibration Standard, step height 100nm, mounted</td>
<td>each</td>
</tr>
<tr>
<td>HS-100MG-UM</td>
<td>AFM Calibration Standard, step height 100nm, unmounted</td>
<td>each</td>
</tr>
<tr>
<td>HS-500MG</td>
<td>AFM Calibration Standard, step height 500nm, mounted</td>
<td>each</td>
</tr>
<tr>
<td>HS-500MG-UM</td>
<td>AFM Calibration Standard, step height 500nm, unmounted</td>
<td>each</td>
</tr>
</tbody>
</table>

CS AFM XYZ CALIBRATION STANDARD

The CS-20NG represents an advanced XYZ calibration grid that enables reliable calibration of AFM systems down to the nanometer level. The XYZ calibration standard features silicon dioxide structures on a 5 x 5mm silicon chip. The calibration area is in the middle of the chip and can be easily located by the optical system of the AFM. The structure step height is in the range of 20nm. The actual height value will be supplied with the delivered calibration standard. CS-20NG has three different x-y array sizes, all with the same 20nm height. The large 1 x 1mm square contains square pillars and holes with a 10µm pitch.

The middle square contains circular pillars, holes and lines with a 5µm pitch. The small central area contains circular holes with a 500nm pitch. The CS-20NG is suitable for both lateral and vertical AFM scanner calibration. The structure symmetry enables calibration in one step without the need to rotate the sample between X- and Y-calibration.

Vertical accuracy is 2% of the actual value which corresponds to ±0.4nm. The lateral pitch accuracy for the 5µm and 10µm patterns is 0.1µm. For the 500nm pitch region, the lateral accuracy is 10nm.

The XYZ calibration standard is mounted on a 12mm, standard AFM disc using a high quality electrically conductive epoxy resin.

CS-20NG AFM XYZ Calibration Standard, mounted on a 12mm AFM disc ..........................................................each

AFM GOLD CALIBRATION KIT

Characterized colloidal gold particles for:

- Characterization of scanning tip geometry
- Reliable calibration of the vertical scale of piezoelectric response
- Characterizing vertical dimensions of coadsorbed biomolecules

Three sizes of colloidal gold particles are available in a convenient kit form. The kit contains 8 numbered 15mm AFM discs with mica attached for calibration and tip characterization. Remaining colloidal gold can be used for coadsorption with biomolecules or other samples.

**16200 and 16205 Kits Contain:**

- PELCO® 15mm AFM Disc Carrier
- Gold Colloid, 15nm Range, 500µl
- Gold Colloid, 30nm Range, 500µl
- Poly-L-Lysine, 0.1%, 500µl
- AFM Disc Pickup Tool

Protocol & Reprint (see below)

**16200** PELCO® AFM Gold Standard Kit ................................each
**16205** PELCO® AFM Gold Standard Kit with 2 Additional .. Gold Sizes (10 and 20nm Range) ......................each

HIGH MAGNIFICATION, HIGH RESOLUTION REFERENCE & CALIBRATION STANDARDS
Holographic Grating for AFM, SEM, Auger and FIB

Precision, holographic patterns, provide accurate calibration and feature high stability and usability. Moderate ridge heights are convenient for AFM. Specimens provide good contrast for secondary and backscatter imaging with SEM. They enable accurate calibration for high resolution, nanometer-scale measurements. Available with 70, 145 and 292nm pitch.

145nm Pitch Reference Standard for Very High Resolution Calibration
Precision holographic pattern for accurate calibration for high resolution, nanometer scale measurements.

**Period:** 145nm pitch nominal, one dimensional array. Accuracy is +/- 1nm. Calibration certificate will give the actual pitch of the standard.

**Surface Structure:** Aluminum lines on glass, 4 x 6mm dimensions. Line height (about 100nm) and line width (about 75nm) are not calibrated.

**Usability:** The calibrated pattern covers the entire standard. There is sufficient usable area to make tens of thousands of measurements without reusing any areas contaminated or altered by previous scans.

**AFM:** Use in contact, tapping and other modes with image sizes from 250nm to 10μm. Available unmounted or mounted on a 12mm steel AFM disc.

**Certification:** Comes with a non-traceable manufacturer’s certificate stating average pitch, based on batch measurements.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>642-1AFM</td>
<td>145nm Very High Resolution AFM Reference Standard on 12mm steel disc.</td>
<td>each</td>
</tr>
<tr>
<td>642-1</td>
<td>145nm Very High Resolution AFM Reference Standard, Unmounted.</td>
<td>each</td>
</tr>
</tbody>
</table>

292nm Pitch High Magnification, High Resolution Calibration Standard
Precision holographic grating standard with high contrast and excellent edge definition.

**Period:** 292nm pitch nominal, one dimensional array. Accuracy is +/- 1%. Calibration certificate will give the actual pitch of the standard.

**Surface Structure:** Titanium lines on Silicon, 4 x 3mm dimensions. Line height (about 30nm) and line width (130nm) are not calibrated.

**Usability:** The calibrated pattern covers the entire chip. There is sufficient usable area to make tens of thousands of measurements without reusing any areas contaminated or altered by previous scans.

**AFM:** Use in contact, tapping and other modes with image sizes from 500nm to 20μm. Mounted on a 12mm steel AFM disc.

**Certification:** There is a version with a non-traceable manufacturer’s certificate stating average pitch, based on batch measurements.

There is also the traceable, certified version measured in comparison with a standard calibrated at PTB (Physikalisch-Technischen Bundesanstalt in Braunschweig, Germany, is the German counterpart of NIST). The standard is NIST traceable by virtue of the mutual recognition agreement by NIST and PTB.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>643-1AFM</td>
<td>292nm High Resolution AFM Reference Standard on 12mm steel disc, Certified.</td>
<td>each</td>
</tr>
<tr>
<td>643-1</td>
<td>292nm High Resolution AFM Reference Standard, Unmounted, Certified.</td>
<td>each</td>
</tr>
<tr>
<td>643-11AFM</td>
<td>292nm High Resolution AFM Reference Standard on 12mm steel disc, Certified, Traceable.</td>
<td>each</td>
</tr>
<tr>
<td>643-11</td>
<td>292nm High Resolution AFM Reference Standard, Unmounted, Certified, Traceable.</td>
<td>each</td>
</tr>
</tbody>
</table>
2D HOLOGRAPHIC ARRAY STANDARDS

Precision, holographic pattern providing accurate calibration in the horizontal plane for very high resolution, nanometer-scale measurements with 144nm and 300nm pitch.

144nm Very High Resolution 2D Calibration Standard

Period: 144nm pitch, two-dimensional array. Accurate to ±1nm. Refer to calibration certificate for actual pitch.

Surface: Aluminum bumps on Silicon, 4 x 3mm die. Bump height (about 90nm) and width (about 75nm) are not calibrated.

Usability: The calibrated pattern covers the entire chip. There is sufficient usable area to make tens of thousands of measurements without reusing any areas altered or contaminated by previous scans.

AFM: Use in contact, intermittent contact (TappingMode™) and other modes with image sizes from 250nm to 10mm. Available unmounted or mounted on 12mm steel discs.

SEM: This specimen works well at all accelerating voltages. Normally supplied unmounted. Can be mounted on a stub of your choice.

Model 2D: This Calibration Reference specimen comes with a non-traceable, manufacturer’s certificate. This states the average period, based on batch measurements.

Model 2DUTC: This Traceable, Certified Standard is a select grade. Each standard is individually measured in comparison with a similar specimen calibrated at PTB. (PTB, Physikalisch-Technischen Bundesanstalt, is the German counterpart of NIST.) The uncertainty of single pitch values is typically ±1.4nm (95% confidence interval). Multi-pitch measurements provide the usual square-root of N improvement in precision.

AFM, STM, SPM CALIBRATION SPECIMENS

A complete selection of useful, precise, practical calibration and test specimens for scanning probe microscopy (SPM, AFM and STM) applications. Included are calibration specimens for Z-axis, X- or Y-axis, X/Y/Z direction, linearity and tip sharpness parameters.

Block Test Gratings for Z-axis

Selection of 3 block type test gratings with different step heights intended for Z-axis calibration of scanning probe microscopes and linearity measurements.

Structure: Si Wafer with SiO2 layer for grating
Pattern Type: 1-Dimensional (in Z-axis direction)
Step Heights: 20±1nm for TGZ-20; 115±2nm for TGZ-100; 550±3nm for TGZ-500
Period: 3 ±0.01µm
Chip Size: 5 x 5 x 0.5mm
Effective Area: Central square of 3 x 3mm

Triangular Test Grating for X- or Y-axis

The TGT-1500 test grating is intended for SPM calibration in X- or Y-axis, determination of lateral and vertical scanner nonlinearity, detection of angular distortion and tip characterization, 3µm pitch.

Structure: Si wafer with grating in top surface
Pattern Type: 1-D array of triangular steps with precise linear and angular dimensions
Edge Angle: Aprox. 70 degrees
**AFM SUPPLIES & ACCESSORIES**

**AFM Calibration Specimens**

---

**Test Grating for Tip Sharpness**

The TGTZ-400 test grating is intended for 3-D visualization of the scanning tip, determination of tip sharpness parameters, tip degradation and contamination control.

**Structure:** Si wafer with grating in top surface

**Pattern Type:** Array of sharp tips

**Tip Angle:** About 50 degrees

**Tip Radius:** ≤10nm

**Tip Height:** 0.3 - 0.7µm

**Period:** 3 ±0.01µm

**Diagonal Period:** 2.12µm

**Chip Size:** 5 x 5 x 0.5mm

**Effective Area:** Central square of 2 x 2mm

---

**Test Grating for Lateral Calibration**

The TG3D-3000/600 test grating with its 3-Dimensional array is intended for lateral calibration of SPM scanners, detection of lateral nonlinearity, hysteresis, creep, cross-coupling effects and for determination of the tip aspect ratio.

**Structure:** Si wafer with grating in top surface

**Pattern Type:** Chessboard like array of square pillars with sharp undercut edges

**Height:** 0.3 - 0.6µm

**Top Square Size:** 1.2 x 1.2µm

**Edge Radius:** ≤10nm

**Period:** 3 ±0.05µm

**Chip Size:** 5 x 5 x 0.5mm

**Effective Area:** Central square of 3 x 3mm

---

**Si-STEP Calibration Sample**

6H-SiC (0001) based calibration sample which is designed to perform easy calibrations of an AFM scanner vertical movements in several nanometers interval. The simplicity of calibration process is provided by the nearly uniform distribution of half-monolayer high steps (either 0.75 or 1.5nm) on the sample surface demonstrating both chemical and mechanical stability. The step height corresponds to the half of the lattice constant of the 6H-SiC crystal in the (0001) direction.

**Structure:** Si with steps

**Single Step Height:** 0.75nm / 1.5nm

**Average Inter-step Distance:** 0.15-0.4µm / 0.2-0.5µm

**Mis-orientation of Surface:** ~0.2° / ~0.3°

**Average Inter-step Roughness:** 0.09nm

**Chip Size:** 5 x 5 x 0.3mm

---

**Test Grating for X-, Y- and Z-direction**

The TG3D-3000/20 test grating with its truly 3-Dimensional structure is intended for simultaneous calibration in X-, Y-, and Z-direction, lateral calibration of SPM scanners and detection of any lateral nonlinearity, hysteresis, creep and cross-coupling effects.

**Structure:** Si wafer with SiO₂ layer for grating

**Height:** 20 ±1.5nm

**Square Size:** 1.5 ±0.15µm

**Period:** 3 ±0.05µm

**Chip Size:** 5 x 5 x 0.5mm

**Effective Area:** Central square of 3 x 3mm

---

Note: The precision on the height is based on the measurement of 5 gratings (randomly selected from a batch of 300 gratings) by an SPM calibrated by a PTB certified TGZ-20 grating. The basic step height can vary from the specified one within 10% (example: step height can be 22 ±1.5nm).
The right choice of AFM probes is extremely important for the quality of your AFM work. The BudgetSensors AFM probes are an excellent choice for today’s high demands in nanotech research. Designed by specialists in AFM, they combine the latest technology of AFM tip/cantilever manufacturing with a realistic pricing. Made of monolithic silicon, they fit into most commercially available AFM’s (DI Nanoscope, PSI, JEOL, NT-MDT, Asylum, VEECO, WiTec, etc) and outperform all other silicon AFM probes on the market when it comes to value, sharpness, symmetry and consistency. The BudgetSensors AFM probes are specifically designed for different AFM modes and are available with a variety of coatings to give the highest resolution needed for cutting edge nanoscale imaging.

If there are any doubts regarding compatibility of your AFM system with the BudgetSensors AFM probes, please contact us at sales@tedpella.com.

**Silicon AFM probes products:**
- Tap300 series for tapping mode
- Tap150G series for soft tapping mode
- Tap190G series with longer cantilever for tapping mode
- Multi75 series for force modulation mode
- Contact series for contact mode and pulse force mode
- Magnetic AFM Probe, an excellent choice for MFM applications
- New! All-In-One series with four cantilevers

Some AFM systems, such as NanoScale, require alignment grooves on the back side of the AFM holder chip for correct holding and calibration of each AFM probe. All products with alignment grooves have “-G” in their product number. Available AFM Probes with alignment grooves are: Tap150-G; Tap190-G; Multi75Al-G; Multi75E-G; Multi75M-G; ContAl-G and Electri-G.

**Please Note:** The presence of the alignment Grooves does not affect the AFM probe in systems that do not require this feature. AFM probes with grooves have the same specifications and pricing as the equivalent probes without alignment grooves.

Order a combination of whatever probes you want. BudgetComboBox on the web page gives you the freedom to choose freely your personalized box with AFM probes out of any available BudgetSensors AFM Probe models you need.

NEW! Budget Sensors TipChecker, an SPM sample for fast, convenient and efficient determination of the AFM tip condition.

AFM probes are all available with some or all of the following high quality coatings (depending on series):
- Al Aluminium coating of the cantilever for enhanced reflectivity
- Electri Chromium/Platinum electrically conductive coating for Electric Modes
- GD Partial gold coating of the cantilever for enhanced reflectivity for special applications such as in liquids
- GB Overall gold coating of the cantilever where the probe acts as an electrode
- M Magnetic Coating
- DLC Diamond-like-Coating on tip side of cantilever

**Technical information and dimensions for the BudgetSensor AFM holder, cantilever and tip:**

![AFM Holder Chip](image1)

![AFM Cantilever](image2)

![AFM Tip](image3)

The AFM Holder Chip fits most commercial AFM’s as it has industry standard size. It is compatible with DI Nanoscope, PSI, JEOL, NT-MDT, Asylum, VEECO, WiTec and other commercial AFM’s.

The AFM Cantilever is micromachined monolithic Silicon, comprising excellent uniformity. It provides high quality imaging for all standard AFM’s.

The AFM Tip is a micromachined monolithic Silicon probe, exhibiting excellent uniformity and a sharp tip radius. The consistent tip radius of less than 10nm gives good resolution and reproducibility. The probes (except the Silicon Nitride tip) feature an “on scan angle” symmetric tip to provide a more symmetric representation of features over 200nm.