NANOWORLD® SPM AND AFM PROBES
Nanotechnology is our field. Precision is our tradition.

POINTPROBE®
- most widely used and best known SPM and AFM probe world-wide
- silicon SPM and AFM probe for very high resolution imaging
- alignment grooves on back side of support chip
- tip radius typically < 8 nm, guaranteed <12 nm
- available with different tip shapes

ULTRA-SHORT CANTILEVERS
- ultra-short cantilevers designed for High-Speed AFM
- 3 types with very high resonance frequencies (1.2 MHz - 5 MHz) and high force constants for dynamic mode applications in air
- 3 types with high resonance frequencies and low force constants (0.15 N/m - 0.6 N/m) mainly for applications in liquid
- wear resistant High Density Carbon/Diamond Like Carbon (HDC/DLC) tip
- tip radius typically < 10 nm

PYREX-NITRIDE
- silicon nitride cantilevers and tips
- designed for various imaging applications in contact mode or dynamic mode
- oxide sharpened pyramidal tips
- tip radius typically < 10 nm
- available either with triangular or rectangular cantilevers
- also available as tipless version

ARROW™
- optimized positioning through maximized tip visibility
- three sided tip defined by real crystal planes
- special tip shape leads to very symmetric scans
- tip at the very end of the cantilever
- tip radius typically < 10 nm, guaranteed < 15 nm
- also available as high speed version with a resonance frequency of up to 2 MHz
**POINTPROBE®**  
**SILICON AFM PROBES**  
Most widely used and best-known high quality  
SPM and AFM probe world-wide

**Pointprobe® Tip (Standard)**  
The standard Pointprobe® tip is shaped like a polygon based pyramid.  
Its macroscopic halfcone angle is 20° to 25° viewed along the cantilever axis,  
25° to 30° when looking from the side and virtually zero at the very tip end.  
The Pointprobe® tip is 10 - 15 µm high and shows a tip radius of typically smaller  
than 8 nm (smaller than 12 nm guaranteed).

**General**  
• SPM and AFM probes for very high resolution imaging  
• fits to all well-known commercial SPMs and AFMs  
• cantilever and tip are supported by a single crystal silicon support chip  
• monolithic design of support chip, cantilever and tip

**Material Features**  
• highly doped, single crystal silicon (resistivity 0.01 - 0.025 Ohm•cm)  
• no intrinsic stress and absolutely straight cantilevers  
• chemically inert silicon for application in fluids or electrochemical cells

**Cantilever**  
• rectangular cantilever with trapezoidal cross section  
• wide detector side for easy laser beam adjustment (see sketch on left)  
• small width at the tip side reduces damping

**Support Chip**  
• cantilever is integrated into a silicon support chip  
• dimensions of the support chip are very reproducible (3.4 mm x 1.6 mm x 0.3 mm)  
• alignment grooves on the back side of the silicon support chip in conjunction with  
the alignment chip ensure replacement of the probes without major readjustment  
of the laser beam

**Package Sizes**  
• packages of 10, 20 or 50 AFM probes  
• full wafer of 380 AFM probes (up to 388 AFM probes depending on the product)

**SuperSharpSilicon™ Tip (SSS)**  
For enhanced resolution of microroughness and nanostructures we have developed  
an advanced tip manufacturing process leading to a further improvement of the tip  
sharpness with tip radii as small as 2 nm.  
With these AFM tips we have pushed back the frontiers of technology.

**Tip Features**  
The tip height is 10 -15 µm and the typical radius of a SuperSharpSilicon™ tip  
is about 2 nm. We guarantee a tip radius of smaller than 5 nm (guaranteed yield: 80%).  
The half cone angle is smaller than 10° at the last 200 nm of the tip.

---

**Pointprobe® Tip**  
A trapezoidal cross section of the  
cantilever and therefore 30% wider  
(e.g. NCH) cantilever detector  
side result in easier and faster laser  
adjustment. Additionally, because  
there is simply more space to place  
and reflect the laser beam, a higher  
SUM signal is reached.

**SuperSharpSilicon™ Tip (SSS)**  
A trapezoidal cross section of the  
cantilever and therefore 30% wider  
(e.g. NCH) cantilever detector  
side result in easier and faster laser  
adjustment. Additionally, because  
there is simply more space to place  
and reflect the laser beam, a higher  
SUM signal is reached.
High Aspect Ratio Tip (AR5/AR5T)
For measurements on samples with sidewall angles approaching 90°, e.g. deep trench measurements or other semiconductor applications, we offer two different types of High Aspect Ratio Tips showing near vertical sidewalls. These tips have an overall height of 10 - 15 µm which allows measurements on highly corrugated samples. At the last few micrometers the tips show a high aspect ratio portion that is symmetric when viewed from the side as well as along the cantilever axis. The tip radius is typically 10 nm (smaller than 15 nm guaranteed).

Tip Features
The high aspect ratio portion of the AR5/AR5T tip is larger than 2 µm and shows an aspect ratio of typically 7:1 (minimum aspect ratio of 5:1 guaranteed). Consequently, the half cone angle of the high aspect ratio portion is typically smaller than 5°. In order to get symmetrical images when scanning deep trenches, it is necessary that the tip is perpendicular to the sample. Therefore, in order to compensate the most common tilt angle of 13° used in commercial AFMs, the high aspect ratio portion of the AR5T is tilted 13° with respect to the central axis of the tip.

Diamond Coated Tip (DT), Conductive Diamond Coated Tip (CDT)
For SPM and AFM applications that require hard contact between probe and sample we recommend our Diamond Coated Tip (DT). Some typical applications are friction force measurements, measurement of the elastic properties of samples, as well as wear measurements or nanostructuring. The Conductive Diamond Coated Tip (CDT) additionally offers a conductive, non passivated coating.

Tip and Coating Features
True polycrystalline diamond coating on the tip side of the cantilever with the unsurpassed hardness of diamond.
The tip height is 10 - 15 µm and the thickness of the diamond layer is approximately 100 nm. The macroscopic tip radius is in the range of 100 - 200 nm, but the tip often exhibits a nanoroughness in the 10 nm regime. In case of the CDT the conductivity is in the range of 0.003 - 0.005 Ohm•cm.

AVAILABLE COATINGS

**Aluminum Reflex Coating**
- 30 nm thick aluminum reflex coating on the detector side of the cantilever
- enhances reflectance of the laser beam by a factor of 2.5
- prevents light from interfering within the cantilever

**Hard Magnetic/Soft Magnetic Coating**
- hard magnetic coating: cobalt alloy coating on the tip side of the cantilever
- soft magnetic coating: soft magnetic coating on the tip side (coercivity of app. 0.75 Oe, remanence magnetization of app. 225 emu/cm³)
- permanent magnetization of the tip

**Diamond Coating**
- 100 nm thick polycrystalline diamond coating on the tip side of the cantilever
- unsurpassed hardness of the tip
- resistance <10 kOhm for CDT

**PtIr5 Coating**
- 25 nm thick platinum iridium5 coating on both sides of the probe
- stress compensated and wear resistant
- detector side coating enhances the reflectance of the laser beam by a factor of 2
- allows electrical measurements

**Gold Coating (on request)**
- 70 nm thick gold reflex coating on the detector side of the cantilever
- 70 nm thick gold coating on both sides of the probe
ARROW™
SILICON AFM PROBES
Optimized positioning through maximized tip visibility

General
- SPM and AFM probes for high resolution imaging
- fit to all well-known commercial SPMs and AFMs
- cantilever and tip are supported by a single crystal silicon support chip
- monolithic design of support chip, cantilever and tip

Material Features
- highly doped, single crystal silicon (resistivity 0.01 - 0.025 Ohm•cm)
- no intrinsic stress and absolutely straight cantilevers
- chemically inert silicon for application in fluids or electrochemical cells

Cantilever
- rectangular cantilever with triangular free end
- easy positioning of tip on the area of interest due to the Arrow™ shape
- consistent distance between tip and cantilever end
- trapezoidal cross section with wide detector side for easy laser adjustment

Support Chip
- dimensions of the support chip are very reproducible (3.4 mm x 1.6 mm x 0.3 mm)
- etched corners of the support chip avoid contact between the support chip and the sample

Tip
- tip height 10 - 15 µm and radius of curvature typically < 10 nm (< 15 nm guaranteed)
- macroscopic half-cone angles
  - are 30° to 35° seen along the cantilever axis
  - are 20° to 25° seen from the side

Package Sizes
- packages of 10, 20 or 50 AFM probes
- full wafer of at least 380 AFM probes

AVAILABLE COATINGS

Reflex Coating
- 30 nm thick aluminum reflex coating on the detector side of the cantilever
- enhances reflectance of the laser beam by a factor of 2.5
- prevents light from interfering within the cantilever

PtIr5 Coating
- 25 nm thick platinum iridium5 coating on both sides of the probe
- stress compensated and wear resistant
- detector side coating enhances the reflectance of the laser beam by a factor of 2
- allows electrical measurements

- Other coatings for standard SPM ans AFM probes available on request
NanoWorld Arrow™ UHF probes have a cantilever capable of resonating with a frequency of up to 2 MHz. These probes combine outstanding sensitivity with fast scanning ability. As for all probes of the Arrow™ series, the Arrow™ UHF probes are made from monolithic silicon which is highly doped to dissipate static charge. It is chemically inert and offers a high mechanical Q-factor for high sensitivity.

The Arrow™ UHF probes feature a 35 µm long triangular cantilever and a tetrahedral tip with a height of 3 µm and a radius of curvature smaller than 10 nm. The unique Arrow™ shape allows easy positioning of the tip on the area of interest.

The reflex coating (aluminum or gold) on the detector side of the cantilever enhances the reflectance of the laser beam by a factor of 2.5 and prevents light from interfering within the cantilever.

**Arrow™ TL (Tipless Cantilevers for Special Applications)**

The Arrow™ TL SPM and AFM probes have tipless cantilevers and are available with either 1 cantilever or with cantilever arrays consisting of 2 or 8 rectangular cantilevers with a triangular free end.

All types of the Arrow™ TL series are optionally available with a gold coating on the sample facing side of the cantilever.

**Cantilever Data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resonance Frequency</td>
<td>6 kHz</td>
</tr>
<tr>
<td>Force Constant</td>
<td>0.03 N/m</td>
</tr>
<tr>
<td>Length</td>
<td>500 µm</td>
</tr>
<tr>
<td>Width (rectangular part)</td>
<td>100 µm</td>
</tr>
<tr>
<td>Thickness</td>
<td>1.0 µm</td>
</tr>
<tr>
<td>Pitch (in case of TL2 and TL8)</td>
<td>250 µm</td>
</tr>
</tbody>
</table>

**Arrow™ TL1**

Tipless cantilever, single cantilever beam on silicon support chip

**Arrow™ TL2**

Tipless cantilever array, two cantilever beams on a single silicon support chip

**Arrow™ TL8**

Tipless cantilever array, eight cantilever beams on a single silicon support chip
ULTRA-SHORT CANTILEVERS (USC) for High-Speed AFM

General
NanoWorld Ultra-Short Cantilevers (USC) for High-Speed AFM (HS-AFM) combine very small cantilevers made of a quartz-like material which are designed for resonating at frequencies of up to 5 MHz and a very sharp and wear resistant High Density Carbon/Diamond Like Carbon (HDC/DLC) tip.

• especially designed for high speed scanning applications
• cannot be used in all commercial SPMs and AFMs due to the small dimensions of the cantilevers (see next page)
• cantilever and tip are supported by a single crystal silicon support chip
• no intrinsic stress and absolutely straight cantilevers

Cantilever
• rectangular cantilever with rounded corners at the freestanding end
• cantilever made of quartz-like material

Support Chip
• dimensions of the support chip are very reproducible (3.4 mm x 1.6 mm x 0.3 mm)
• etched and lowered corners of the support chip avoid contact between the support chip and the sample
• alignment grooves on the back side of the silicon support chip in conjunction with the alignment chip ensure replacement of the probes without major readjustment of the laser beam

Tip
• nanotools® High Density Carbon/Diamond Like Carbon (HDC/DLC) tip
• tip height typically 2.5 µm and radius of curvature typically < 10 nm
• tip aspect ratio typically 5:1 and tilt compensation of 8°

Package Size
• package of 10 AFM probes

AVAILABLE COATINGS

Gold Reflex Coating
• 20/30 nm thick gold reflex coating on both sides of the probe
• enhances reflectance of the laser beam
• tip remains uncoated
In order to cover a wide range of possible applications using High-Speed AFM, six different types of Ultra-Short Cantilevers (USC) have been developed: three types with very high resonance frequencies (1.2 MHz – 5 MHz) and high force constants mainly for dynamic mode applications in air and three types with high resonance frequencies and low force constants (0.15 N/m - 0.6 N/m) mainly for applications in liquid.

**USC mainly for dynamic mode applications in air**
- resonance frequency of 1.2 MHz and higher
- stiffness of 3.0 N/m and higher
- mainly designed for applications in non-contact mode in air but can also be used for other applications

<table>
<thead>
<tr>
<th>Type</th>
<th>USC-F5-k30</th>
<th>USC-F2-k3</th>
<th>USC-F1.2-k7.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resonance Frequency</td>
<td>5.0 MHz</td>
<td>2.0 MHz</td>
<td>1.2 MHz</td>
</tr>
<tr>
<td>Force Constant</td>
<td>30 N/m</td>
<td>3.0 N/m</td>
<td>7.3 N/m</td>
</tr>
<tr>
<td>Cantilever length</td>
<td>10 µm</td>
<td>10 µm</td>
<td>20 µm</td>
</tr>
<tr>
<td>Cantilever width</td>
<td>5 µm</td>
<td>5 µm</td>
<td>10 µm</td>
</tr>
<tr>
<td>Thickness</td>
<td>0.68 µm</td>
<td>0.28 µm</td>
<td>0.67 µm</td>
</tr>
</tbody>
</table>

**USC mainly for applications in liquid**
- resonance frequency of 1.5 MHz and lower
- stiffness of 0.6 N/m and lower
- mainly designed for applications in liquid but can also be used for applications in air (depending on the application)

<table>
<thead>
<tr>
<th>Type</th>
<th>USC-F1.5-k0.6</th>
<th>USC-F1.2-k0.15</th>
<th>USC-F0.3-k0.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resonance Frequency</td>
<td>1.5 MHz</td>
<td>1.2 MHz</td>
<td>0.3 MHz</td>
</tr>
<tr>
<td>Force Constant</td>
<td>0.6 N/m</td>
<td>0.15 N/m</td>
<td>0.3 N/m</td>
</tr>
<tr>
<td>Cantilever length</td>
<td>7 µm</td>
<td>7 µm</td>
<td>20 µm</td>
</tr>
<tr>
<td>Cantilever width</td>
<td>3 µm</td>
<td>2 µm</td>
<td>10 µm</td>
</tr>
<tr>
<td>Cantilever thickness</td>
<td>0.10 µm</td>
<td>0.08 µm</td>
<td>0.19 µm</td>
</tr>
</tbody>
</table>

* Values in air

For more information on ongoing developments of AFM probes for High-Speed AFM and for application examples please have a look at: www.highspeedscanning.com

**System limitations:** due to their small cantilever sizes and their very high resonance frequencies USC probes currently cannot be used in all commercially available SPMs and AFMs. Only AFMs with a sufficiently small laser spot and electronics that are capable of dealing with high resonance frequencies of up to 5 MHz are able to work with the USC probes. If in doubt whether these probes can be used in your AFM please check back with us or with your AFM manufacturer.
**Pyrex-Nitride AFM Probes**

Leading edge in sharpness and durability

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**General**
- SPM and AFM probes for a wide range of applications in contact mode or dynamic mode
- fit to all well-known commercial SPMs and AFMs
- silicon nitride cantilevers and tips
- cantilevers are supported by a support chip made of pyrex-glass
- delivered as separated single support chips for easy handling

**Material Features**
- low-stress silicon nitride for lowest cantilever bending
- excellent hardness for wear resistance and extended lifetime

**Cantilevers**
- multi-lever versions with either rectangular cantilevers or triangular cantilevers
- single lever version with one triangular cantilever (compatible with PeakForce Tapping™ and ScanAsyst® mode)
- reflective gold coating on the detector side of the cantilevers
- stress compensated with bending below 2°

**Support Chip**
- support chip made of pyrex-glass (3.4 mm x 1.6 mm x 0.5 mm)
- easy handling due to single support chips

**Tips**
- oxide sharpened pyramidal tips
- tip height 3.5 µm and radius of curvature typically < 10 nm
- macroscopic half cone angles 35°

**Package Sizes**
- packages of 20 or 50 AFM probes

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**AVAILABLE COATINGS**

**Gold Coating**
- 70 nm thick gold reflex coating on the detector side of the cantilevers enhances reflectance of the laser beam
- optional 35 nm thick gold coating on the tip side (front side) of the cantilevers
**PYREX-NITRIDE-AFM-PROBES**

Triangular Cantilevers (PNP-TR)
Diving Board Shaped Cantilevers (PNP-DB)
Single Triangular Cantilever (PNPTRS)

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### Triangular Cantilevers (PNP-TR)

- triangular shaped cantilevers
- multi-lever design
- gold reflex coating on the detector side of the cantilevers
- available with gold coating on both sides of the probe

<table>
<thead>
<tr>
<th>Cantilever #</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shape</td>
<td>Triangular</td>
<td>Triangular</td>
</tr>
<tr>
<td>Resonance Frequency</td>
<td>67 kHz</td>
<td>17 kHz</td>
</tr>
<tr>
<td>Force Constant</td>
<td>0.32 N/m</td>
<td>0.08 N/m</td>
</tr>
<tr>
<td>Length</td>
<td>100 µm</td>
<td>200 µm</td>
</tr>
<tr>
<td>Width</td>
<td>2 x 13.5 µm</td>
<td>2 x 28 µm</td>
</tr>
<tr>
<td>Thickness</td>
<td>600 nm</td>
<td>600 nm</td>
</tr>
</tbody>
</table>

---

### Diving Board Cantilevers (PNP-DB)

- rectangular diving board shaped cantilevers
- multi-lever design
- gold reflex coating on the detector side of the cantilevers

<table>
<thead>
<tr>
<th>Cantilever #</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shape</td>
<td>Rectangular</td>
<td>Rectangular</td>
</tr>
<tr>
<td>Resonance Frequency</td>
<td>67 kHz</td>
<td>17 kHz</td>
</tr>
<tr>
<td>Force Constant</td>
<td>0.48 N/m</td>
<td>0.06 N/m</td>
</tr>
<tr>
<td>Length</td>
<td>100 µm</td>
<td>200 µm</td>
</tr>
<tr>
<td>Width</td>
<td>40 µm</td>
<td>40 µm</td>
</tr>
<tr>
<td>Thickness</td>
<td>600 nm</td>
<td>600 nm</td>
</tr>
</tbody>
</table>

---

### Single Triangular Cantilever (PNP-TRS)

- single triangular shaped cantilever
- one cantilever per chip
- gold reflex coating on the detector side of the cantilever
- designed for PeakForce Tapping™ and ScanAsyst® Mode*

<table>
<thead>
<tr>
<th>Cantilever #</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shape</td>
<td>Triangular</td>
</tr>
<tr>
<td>Resonance Frequency</td>
<td>67 kHz</td>
</tr>
<tr>
<td>Force Constant</td>
<td>0.32 N/m</td>
</tr>
<tr>
<td>Length</td>
<td>100 µm</td>
</tr>
<tr>
<td>Width</td>
<td>2 x 13.5 µm</td>
</tr>
<tr>
<td>Thickness</td>
<td>600 nm</td>
</tr>
</tbody>
</table>

---

**PNP Tipless (PNP-TR-TL)**

- triangular Pyrex-Nitride probes are also available in a tipless version
- gold reflex coating on the detector side of the cantilevers
- available with gold coating on both sides of the probe

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*PeakForce Tapping™ and ScanAsyst® are registered trademarks of Bruker Corp.*
<table>
<thead>
<tr>
<th>Application</th>
<th>Type</th>
<th>Coating Tip/Front Side</th>
<th>Coating Detector Side</th>
<th>Tip Shape</th>
<th>Resonance Frequency</th>
<th>Force Constant</th>
<th>Cantilever Length x Width x Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Mode</td>
<td>Arrow CONT</td>
<td>-</td>
<td>-</td>
<td>Arrow™</td>
<td>14 kHz</td>
<td>0.2 N/m</td>
<td>450 x 45 x 2 µm</td>
</tr>
<tr>
<td></td>
<td>CONT</td>
<td>-</td>
<td>-</td>
<td>Pointprobe®</td>
<td>13 kHz</td>
<td>0.2 N/m</td>
<td>450 x 50 x 2 µm</td>
</tr>
<tr>
<td></td>
<td>Arrow CONTR</td>
<td>-</td>
<td>Reflex (Al)</td>
<td>Arrow™</td>
<td>14 kHz</td>
<td>0.2 N/m</td>
<td>450 x 45 x 2 µm</td>
</tr>
<tr>
<td></td>
<td>CONTR</td>
<td>-</td>
<td>-</td>
<td>Pointprobe®</td>
<td>13 kHz</td>
<td>0.2 N/m</td>
<td>450 x 50 x 2 µm</td>
</tr>
<tr>
<td></td>
<td>ZEILR</td>
<td>-</td>
<td>-</td>
<td></td>
<td>27 kHz</td>
<td>1.6 N/m</td>
<td>450 x 55 x 4 µm</td>
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<tr>
<td></td>
<td>Arrow CONTPt</td>
<td>Ptlr5</td>
<td>Ptlr5</td>
<td>Arrow™</td>
<td>14 kHz</td>
<td>0.2 N/m</td>
<td>450 x 45 x 2 µm</td>
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<tr>
<td></td>
<td>CONTPt</td>
<td>-</td>
<td>-</td>
<td>Pointprobe®</td>
<td>13 kHz</td>
<td>0.2 N/m</td>
<td>450 x 50 x 2 µm</td>
</tr>
<tr>
<td>Contact Mode (short cantilever)</td>
<td>CONTSC</td>
<td>-</td>
<td>-</td>
<td>Pointprobe®</td>
<td>25 kHz</td>
<td>0.2 N/m</td>
<td>225 x 48 x 1 µm</td>
</tr>
<tr>
<td></td>
<td>CONSCR</td>
<td>-</td>
<td>Reflex (Al)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact Mode or Tapping Mode</td>
<td>PNP-TR</td>
<td>Cantilever 1</td>
<td>-</td>
<td>Reflex (Cr/Au)</td>
<td>67 kHz</td>
<td>0.32 N/m</td>
<td>100 x 13.5 x 0.5 µm</td>
</tr>
<tr>
<td></td>
<td>PNP-TR-Au</td>
<td>Cantilever 1 Cr/Au</td>
<td>Cantilever 2 Cr/Au</td>
<td>Pyramidal silicon nitride</td>
<td>17 kHz</td>
<td>0.08 N/m</td>
<td>200 x 28 x 0.5 µm</td>
</tr>
<tr>
<td></td>
<td>PNP-DB</td>
<td>Cantilever 1</td>
<td>-</td>
<td>Reflex (Cr/Au)</td>
<td>67 kHz</td>
<td>0.32 N/m</td>
<td>100 x 13.5 x 0.5 µm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cantilever 2</td>
<td></td>
<td></td>
<td>17 kHz</td>
<td>0.08 N/m</td>
<td>200 x 28 x 0.5 µm</td>
</tr>
<tr>
<td>Non-Contact / Tapping Mode</td>
<td>Arrow NC</td>
<td>-</td>
<td>-</td>
<td>Arrow™</td>
<td>285 kHz</td>
<td>42 N/m</td>
<td>160 x 45 x 4.6 µm</td>
</tr>
<tr>
<td></td>
<td>NCH</td>
<td>-</td>
<td>-</td>
<td>Pointprobe®</td>
<td>330 kHz</td>
<td></td>
<td>125 x 30 x 4 µm</td>
</tr>
<tr>
<td></td>
<td>Arrow NCR</td>
<td>-</td>
<td>Reflex (Al)</td>
<td>Arrow™</td>
<td>285 kHz</td>
<td></td>
<td>160 x 45 x 4.6 µm</td>
</tr>
<tr>
<td></td>
<td>NCHR</td>
<td>-</td>
<td>-</td>
<td>Pointprobe®</td>
<td>330 kHz</td>
<td></td>
<td>125 x 30 x 4 µm</td>
</tr>
<tr>
<td></td>
<td>Arrow NCPr</td>
<td>Ptlr5</td>
<td>Ptlr5</td>
<td>Arrow™</td>
<td>285 kHz</td>
<td></td>
<td>160 x 45 x 4.6 µm</td>
</tr>
<tr>
<td></td>
<td>NCPr</td>
<td>-</td>
<td>-</td>
<td>Pointprobe®</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SSS-NCH</td>
<td>-</td>
<td>-</td>
<td>SuperSharpSilicon™</td>
<td>330 kHz</td>
<td></td>
<td>125 x 30 x 4 µm</td>
</tr>
<tr>
<td></td>
<td>ARS-NCHR</td>
<td>-</td>
<td>Reflex (Al)</td>
<td>High Aspect Ratio (5:1)</td>
<td>330 kHz</td>
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<td>AR10-NCHR</td>
<td>-</td>
<td>Reflex (Al)</td>
<td>High Aspect Ratio (10:1)</td>
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<td>80 N/m</td>
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<td>DT-NCHR</td>
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<td>Diamond</td>
<td>400 kHz</td>
<td>80 N/m</td>
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<tr>
<td>Non-Contact/Soft-Tapping Mode</td>
<td>NCST</td>
<td>-</td>
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<td>7.4 N/m</td>
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<td></td>
<td>NCSTR</td>
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<td>Reflex (Al)</td>
<td>Pointprobe®</td>
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<tr>
<td>Non-Contact / Tapping Mode</td>
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<td>190 kHz</td>
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<td></td>
<td>NCLPr</td>
<td>Ptlr5</td>
<td>Ptlr5</td>
<td>SuperSharpSilicon™</td>
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<tr>
<td></td>
<td>SSS-NCL</td>
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<td>SuperSharpSilicon™</td>
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<td>ARS-NCLPr</td>
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<td>Reflex (Al)</td>
<td>High Aspect Ratio (5:1)</td>
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<tr>
<td></td>
<td>DT-NCLPr</td>
<td>Diamond</td>
<td>Reflex (Al)</td>
<td>Diamond</td>
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<tr>
<td>Non-Contact / Tapping Mode</td>
<td>SEIHR</td>
<td>-</td>
<td>Reflex (Al)</td>
<td>Pointprobe®</td>
<td>130 kHz</td>
<td>15 N/m</td>
<td>225 x 33 x 5 µm</td>
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<tr>
<td>(Seiko Non-Contact Mode)</td>
<td>SSS-SEIH</td>
<td>-</td>
<td>-</td>
<td>SuperSharpSilicon™</td>
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# Quick Selection Table

<table>
<thead>
<tr>
<th>Application</th>
<th>Type</th>
<th>Coating Tip/Front Side</th>
<th>Coating Detector Side</th>
<th>Tip Shape</th>
<th>Resonance Frequency</th>
<th>Force Constant</th>
<th>Cantilever Length x Width x Thickness</th>
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<tbody>
<tr>
<td><strong>Contact Mode</strong></td>
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<tr>
<td>USC-F1.5-k0.6</td>
<td>Au</td>
<td>Reflex (Au)</td>
<td>Electron Beam Deposited (EBD) spike</td>
<td>1.5 MHz</td>
<td>0.6 N/m</td>
<td>7 x 3 x 0.10 µm</td>
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<tr>
<td>USC-F1.2-k0.15</td>
<td>Au (tip remains uncoated)</td>
<td>Reflex (Au)</td>
<td>Electron Beam Deposited (EBD) spike</td>
<td>1.2 MHz</td>
<td>0.15 N/m</td>
<td>7 x 2 x 0.08 µm</td>
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<tr>
<td>USC-F0.3-k0.3</td>
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<td>Reflex (Au)</td>
<td>Electron Beam Deposited (EBD) spike</td>
<td>0.3 MHz</td>
<td>0.3 N/m</td>
<td>20 x 10 x 0.19 µm</td>
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<td><strong>Non-Contact / Tapping Mode</strong></td>
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<tr>
<td>USC-F5-k30</td>
<td>Au</td>
<td>Reflex (Au)</td>
<td>Electron Beam Deposited (EBD) spike</td>
<td>5.0 MHz</td>
<td>30 N/m</td>
<td>20 x 5 x 0.68 µm</td>
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<tr>
<td>USC-F2-k3</td>
<td>Au (tip remains uncoated)</td>
<td>Reflex (Au)</td>
<td>Electron Beam Deposited (EBD) spike</td>
<td>2.0 MHz</td>
<td>3.0 N/m</td>
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<td>USC-F1.2-k7</td>
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<td>Reflex (Au)</td>
<td>Electron Beam Deposited (EBD) spike</td>
<td>1.2 MHz</td>
<td>7.3 N/m</td>
<td>20 x 10 x 0.67 µm</td>
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<tr>
<td>Arrow UHF</td>
<td>Reflex (Al)</td>
<td>Arrow™</td>
<td>up to 2.0 MHz</td>
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<td></td>
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<td>Reflex (Au)</td>
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<td><strong>PeakForce TappingTM / ScanAsyst® Mode</strong></td>
<td>PNP-TRS</td>
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<td>Reflex (Al)</td>
<td>Pyramidal silicon nitride</td>
<td>67 kHz</td>
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<td><strong>Force Modulation Mode</strong></td>
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<td>Arrow FM</td>
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<td>-</td>
<td>Arrow™</td>
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<tr>
<td>FM</td>
<td>-</td>
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<td>Pointprobe®</td>
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<td></td>
<td>225 x 28 x 3 µm</td>
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<tr>
<td>Arrow FMR</td>
<td>-</td>
<td>Reflex (Al)</td>
<td>Arrow™</td>
<td>75 kHz</td>
<td>2.8 N/m</td>
<td>240 x 35 x 3 µm</td>
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<tr>
<td>FMR</td>
<td>-</td>
<td>-</td>
<td>Pointprobe®</td>
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<td>225 x 28 x 3 µm</td>
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<tr>
<td>DT-FMR</td>
<td>Diamond</td>
<td>Reflex (Al)</td>
<td>Diamond</td>
<td>105 kHz</td>
<td>6.2 N/m</td>
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<td>CDT-FMR</td>
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<tr>
<td><strong>Electrostatic Force Microscopy</strong></td>
<td>Arrow EFM</td>
<td>PtIr5</td>
<td>Arrow™</td>
<td>75 kHz</td>
<td>2.8 N/m</td>
<td>240 x 35 x 3 µm</td>
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<tr>
<td>EFM</td>
<td>PtIr5</td>
<td>PtIr5</td>
<td>Pointprobe®</td>
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<td>225 x 28 x 3 µm</td>
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<tr>
<td><strong>Magnetic Force Microscopy</strong></td>
<td>MFMR</td>
<td>Hard magnetic</td>
<td>Reflex (Al)</td>
<td>75 kHz</td>
<td>2.8 N/m</td>
<td>225 x 28 x 3 µm</td>
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<tr>
<td>S-MFMR</td>
<td>Soft magnetic</td>
<td>Reflex (Al)</td>
<td>Pointprobe®</td>
<td>75 kHz</td>
<td>2.8 N/m</td>
<td>225 x 28 x 3 µm</td>
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<tr>
<td><strong>Special Applications</strong></td>
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<tr>
<td>Arrow TL1</td>
<td>1 cantilever</td>
<td>-</td>
<td>-</td>
<td>Tipless silicon</td>
<td>6 kHz</td>
<td>0.03 N/m</td>
<td>500 x 100 x 1 µm</td>
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<td>Arrow TL1-Au</td>
<td>1 cantilever</td>
<td>Ti/Au</td>
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<td>Arrow TL2</td>
<td>Array of 2 cantilevers</td>
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<tr>
<td>Arrow TL2-Au</td>
<td>Array of 2 cantilevers</td>
<td>Ti/Au</td>
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<td>Arrow TL8</td>
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<td>Array of 8 cantilevers</td>
<td>Ti/Au</td>
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<tr>
<td>PNP-TR-TL</td>
<td>triangular cantilevers</td>
<td>Cantilever 1</td>
<td>Reflex (Au)</td>
<td>67 kHz</td>
<td>0.32 N/m</td>
<td>100 x 13.5 x 0.6 µm</td>
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<tr>
<td>PNP-TR-TL-Au</td>
<td>triangular cantilevers</td>
<td>Cantilever 2</td>
<td>Reflex (Au)</td>
<td>67 kHz</td>
<td>0.32 N/m</td>
<td>100 x 13.5 x 0.6 µm</td>
<td></td>
</tr>
</tbody>
</table>

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About NanoWorld

Nanotechnology is our field. Precision is our tradition.

Innovation is our key instrument. That’s why we are located in Switzerland, one of the most powerful and innovative areas in Europe.

Using our knowledge as well as our high precision SPM and AFM probes, our clients achieve the best results with Scanning Probe Microscopy (SPM) and with Atomic Force Microscopy (AFM).

The wide selection of tip shapes, spring constants, resonance frequencies and coatings translates to the most appropriate probe for your research as well as industrial applications.

The Pointprobe® Silicon AFM probes are the most widely used and best known AFM probes world-wide and have become the standard probes in many laboratories. The AFM probes of the Pointprobe® series are available in many different cantilever versions and tip shapes.

The AFM probes of the Arrow™ series feature a unique tip shape that allows easy positioning of the tip on the area of interest. The Arrow™ UHF version is designed for high speed scanning with a resonance frequency of up to 2 MHz.

With the Ultra-Short Cantilevers series NanoWorld now offers a whole range of AFM probes for High-Speed AFM. They are designed to resonate at frequencies of up to 5 MHz and feature a very wear resistant tip made of High Density Carbon/Diamond Like Carbon (HDC/DLC). Three different versions mainly for applications in air and three different versions mainly for applications in liquid are currently available.

The PNP Silicon Nitride AFM probes are available as versions with multiple triangular cantilevers, a version with a single triangular cantilever as well as a version with multiple rectangular cantilevers. They feature a pyramidal silicon nitride tip with a radius of curvature smaller than 10 nm. Tipless triangular silicon nitride cantilevers with either gold coating on the detector side or on both sides of the cantilevers are also available.