나노툴즈 탄소나노탐침

실리콘 캔틸레버 위에 나노크기의 탄소탐침을 가공한 제품

높은 종횡비 탄소나노탐침 높은 종횡비 측정에 필요한 탁월한 내구성과 신뢰성를 가진 탐침	M1_ArrowNC_13 M1_NCH_13 M1_ESD_NCH_13 MC90-70_ArrowNCR_3 MC60_ArrowNCR_3 MSS_NCHR_13 MSS_NCHR_3 MSS_FMR_13 MSS_FMR_3 CNT300_ArrowNCR_3 EBD2-100_NCH_13 EBD2-100_NCH_3 EBD2-100_NCHR_3
고분해능 탄소나노탐침 매우 예리한 모양의 특수한 Tapping Mode AFM 측정을 위한 탐침	SSE_NCHR_13
범용 탄소나노탐침 고속 원자현미경 측정, 생물학과 나노결각 적용에 적합한 탐침	biotool_PNP_TR_10 B1, B2, B50, B100, B150

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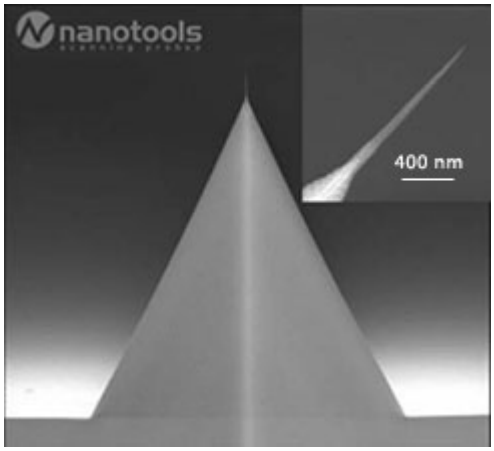
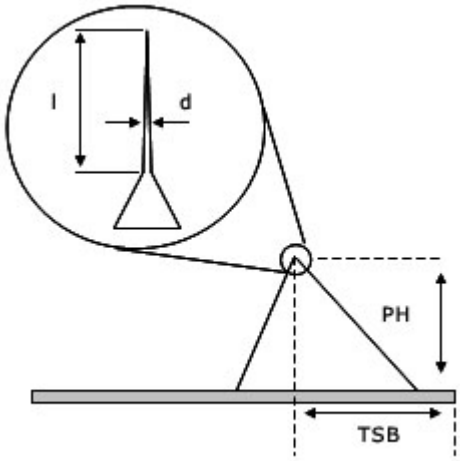
M1_ArrowNC_13



The nanotools® M1_ArrowNC_13 tip is designed for non-contact / high frequency mode, in particular for automated AFM systems for in-line process control as well as general purpose AFM. Excellent lifetime and reliability for high aspect ratio applications are key features.

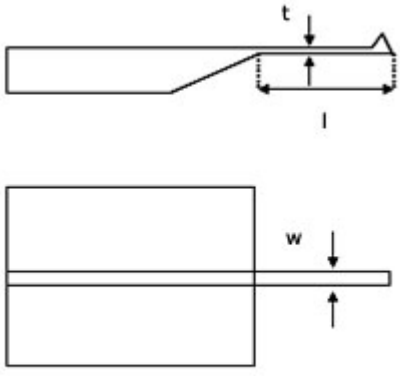
Tip Spec

	nominal	**range**
Shape	conical	
Tip length (l)	800 nm	+/- 200 nm
Tip radius (r)	< 5 nm	+/- 10 nm
Tip diameter (d) measured at 600nm	70 nm	+/- 10 nm
Tilt compensation	13 deg	+/- 1 deg
Pyramid height (PH)	15 um	10–15 um
Tip set back (TSB)	5.2 um	4- 5.5 um



Cantilever Spec

	nominal	**range**
Type	Arrow NC	
Shape	beam	
Force constant	42 N/m	27–80 N/m
Resolution frequency	285 kHz	240-380 kHz
length (i)	160 nm	150-170 nm
Width (w)	45 um	32.5–52.5 um
Thickness (t)	4 um	3–5 um



Coating

Tip side : none
Back side : none

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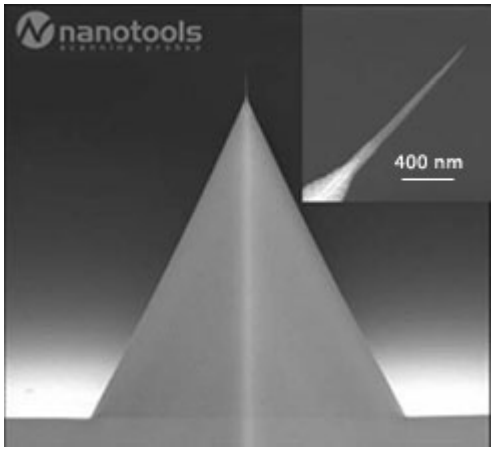
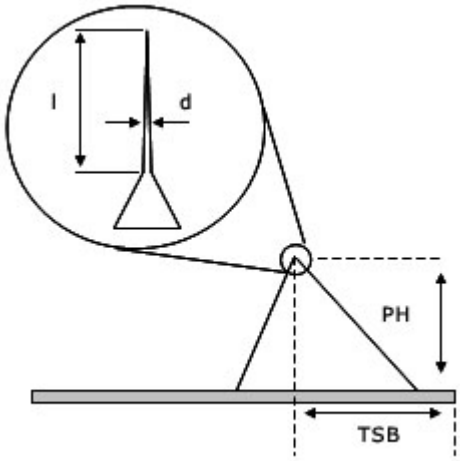
M1_NCH_13



The nanotools® M1_NCH_13 tip is designed for non-contact / high frequency mode, in particular for automated AFM systems for in-line process control as well as general purpose AFM. Excellent lifetime and reliability for high aspect ratio applications are key features.

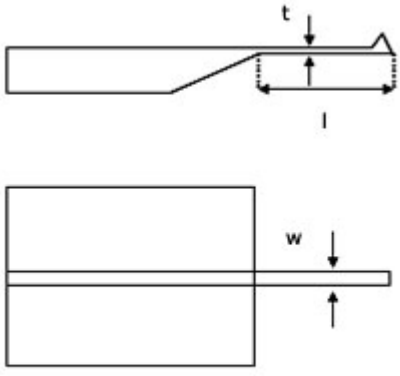
Tip Spec

	nominal	**range**
Shape	conical	
Tip length (l)	800 nm	+/- 200 nm
Tip radius (r)	< 5 nm	+/- 10 nm
Tip diameter (d) measured at 600nm	70 nm	+/- 10 nm
Tilt compensation	13 deg	+/- 1 deg
Pyramid height (PH)	15 um	10–15 um
Tip set back (TSB)	15 um	5- 25 um



Cantilever Spec

	nominal	**range**
Type	TESP/NCH	
Shape	beam	
Force constant	42 N/m	27–75 N/m
Resolution frequency	320 kHz	270-350 kHz
length (i)	125 nm	115-135 nm
Width (w)	30 um	22–38 um
Thickness (t)	4 um	3–5 um



Coating

Tip side : none
Back side : none

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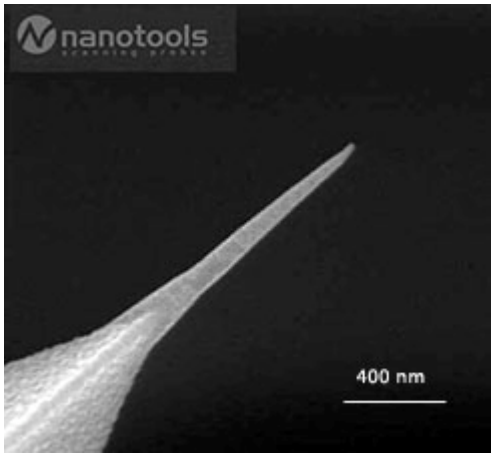
M1_ESD_NCH_13

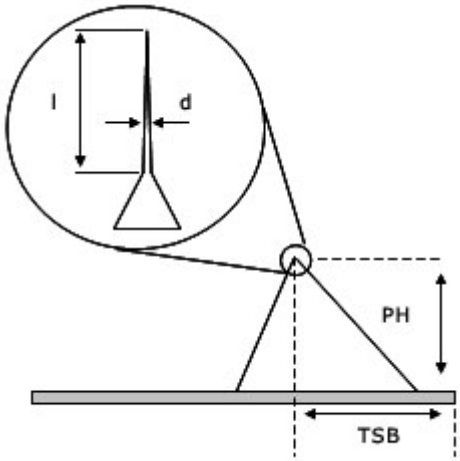


The nanotools® M1-ESD_NCH_13 probes are designed for non-contact/ high frequency mode, in particular for automated AFM systems for in-line process control as well as general purpose AFM. Its special anti-ESD coating delivers metallic conductivity of the probe without weakening its mechanical strength. For most applications the conductivity of the standard probe (either EBD or highly doped silicon) is sufficient to dissipate static charge - an electric discharge would immediately destroy the tip. However, some applications such as scanning ceramics or photomasks require an even higher level of ESD precautions. Therefore the nanotools® M1-ESD_NCH_13 is the choice.

Key features are excellent lifetime and reliability for high aspect ratio applications, where charging of the sample is an issue.

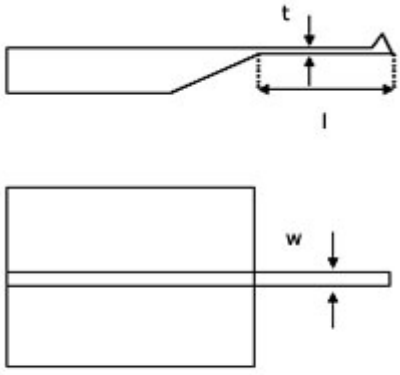
Tip Spec

	nominal	**range**
Shape	conical	
Tip length (l)	800 nm	+/- 200 nm
Tip radius (r)	< 5 nm	+/- 10 nm
Tip diameter (d) measured at 600nm	70 nm	+/- 10 nm
Tilt compensation	13 deg	+/- 1 deg
Pyramid height (PH)	15 um	10–15 um
Tip set back (TSB)	15 um	5- 25 um



Cantilever Spec

	nominal	**Range**
Type	TESP/NCH	
Shape	beam	
Force constant	42 N/m	27–75 N/m
Resolution frequency	320 kHz	270-350 kHz
length (i)	125 nm	115-135 nm
Width (w)	30 um	22–38 um
Thickness (t)	4 um	3–5 um



Coating

Tip side : very thin Al
Back side : none

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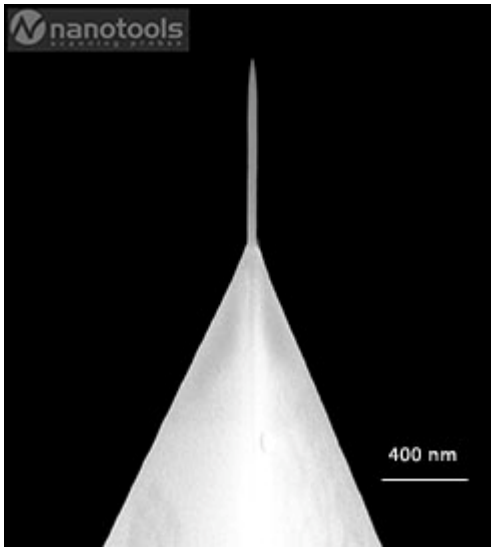
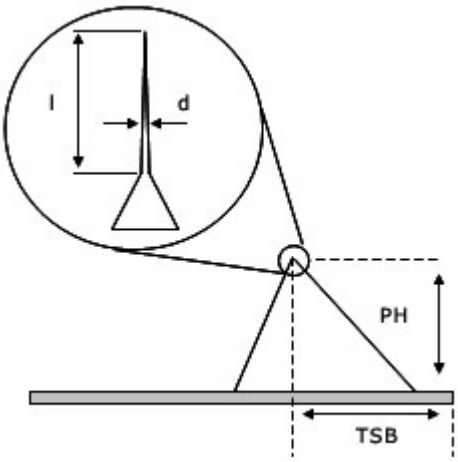
MC90-70_ArrowNCR_3



The nanotools® MC90/70 probes feature a perfectly cylindrical tip shape providing the highest repeatability of depth and bottom width measurements (constant bottom travel distance). The nanotools® MC90/70 high aspect ratio probes with cylindrical shape are the AFM In-Line metrology solution for 90 nm and 70 nm. MC tips are tilt compensated and are available for most AFM systems.

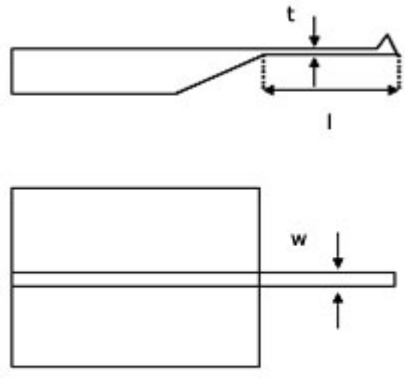
Tip Spec

	nominal	**range**
Shape	cylindrical	
Tip length (l)	800 nm	+/- 200 nm
Tip radius (r)	< 5 nm	+/- 7 nm
Tip diameter (d)	55 nm	+/- 5 nm
Tilt compensation	3 deg	+/- 0.5 deg
Pyramid height (PH)	15 um	10–15 um
Tip set back (TSB)	5.2 um	4- 5.5 um



Cantilever Spec

	nominal	**Range**
Type	ArrowNCR	
Shape	beam	
Force constant	42 N/m	27–80 N/m
Resolution frequency	285 kHz	240-380 kHz
length (i)	160 nm	150-170 nm
Width (w)	45 um	37.5–52.5 um
Thickness (t)	4 um	3–5 um



Coating

Tip side : none
Back side : 30 nm Al reflex

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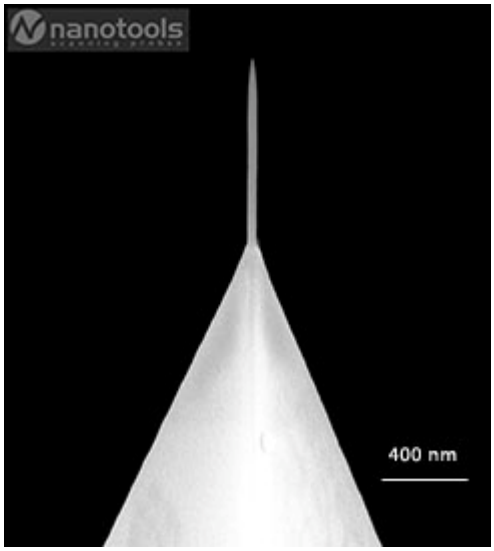
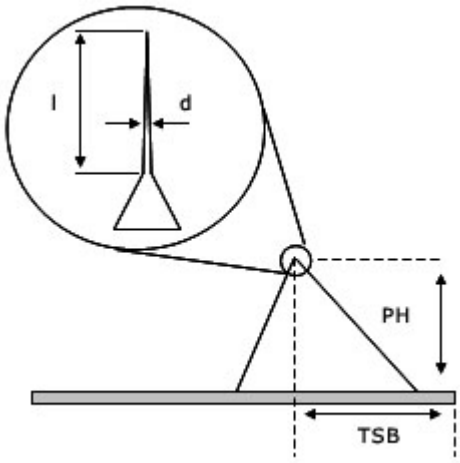
MC60_ArrowNCR_3

The nanotools® MC60 probes feature a perfectly cylindrical tip shape providing the highest repeatability of depth and bottom width measurements (constant bottom travel distance). The nanotools® MC60 high aspect ratio probes with cylindrical shape are the AFM In-Line metrology solution for 60 nm. MC tips are tilt compensated and are available for most AFM systems.



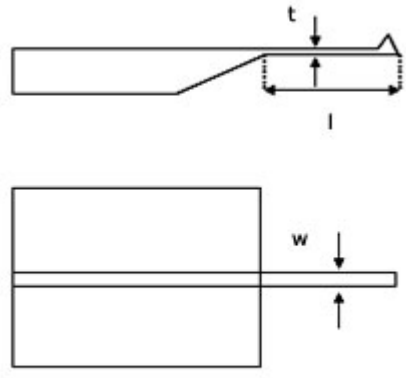
Tip Spec

	nominal	range
Shape	cylindrical	
Tip length (l)	500 nm	+/- 100 nm
Tip radius (r)	< 5 nm	+/- 7 nm
Tip diameter (d)	30 nm	+/- 5 nm
Tilt compensation	3 deg	+/- 0.5 deg
Pyramid height (PH)	15 um	10–15 um
Tip set back (TSB)	5.2 um	4- 5.5 um



Cantilever Spec

	nominal	Range
Type	ArrowNCR	
Shape	beam	
Force constant	42 N/m	27–80 N/m
Resolution frequency	285 kHz	240-380 kHz
length (i)	160 nm	150-170 nm
Width (w)	45 um	37.5–52.5 um
Thickness (t)	4 um	3–5 um



Coating

Tip side : none
Back side : 30 nm Al reflex

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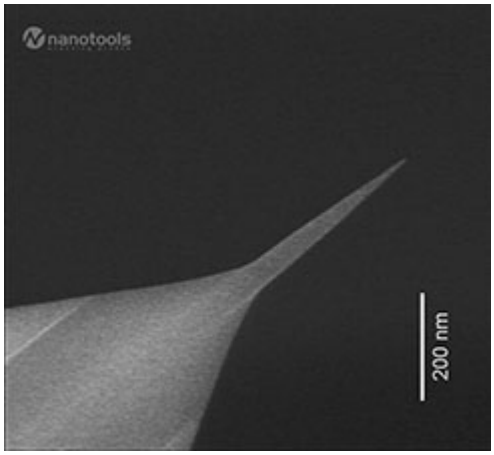
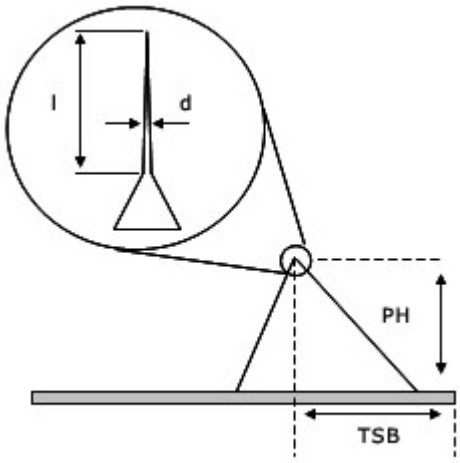
MSS_NCHR_13



Multipurpose high resolution probe with excellent lifetime and reliability. The nanotools® MSS_NCHR_13 tip is designed for non-contact / high frequency mode. It delivers outstanding resolution in critical AFM applications even on hard, tip eating samples like ceramics, silicon oxide/nitride or polysilicon to name a few.

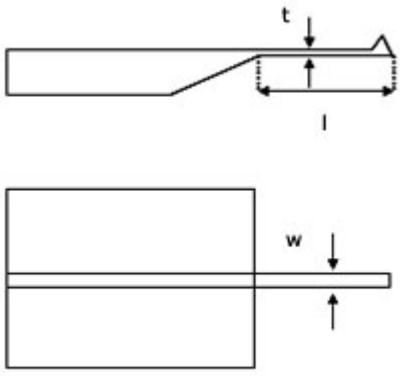
Tip Spec

	nominal	**range**
Shape	conical	
Tip length (l)	400 nm	+/- 100 nm
Tip radius (r)	< 2-3 nm	+/- 5 nm
Tip diameter (d) measured at 300 nm	20 nm	+/- 5 nm
Tilt compensation	13 deg	+/- 1 deg
Pyramid height (PH)	15 um	10–15 um
Tip set back (TSB)	15 um	5- 25 um



Cantilever Spec

	nominal	**range**
Type	TESP/NCH	
Shape	beam	
Force constant	42 N/m	27–75 N/m
Resolution frequency	320 kHz	270-350 kHz
length (i)	125 nm	115-135 nm
Width (w)	30 um	22–38 um
Thickness (t)	4 um	3–5 um



Coating

Tip side : none
Back side : 30 nm Al reflex

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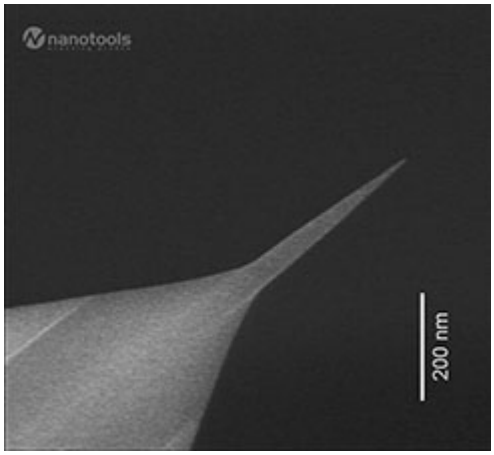
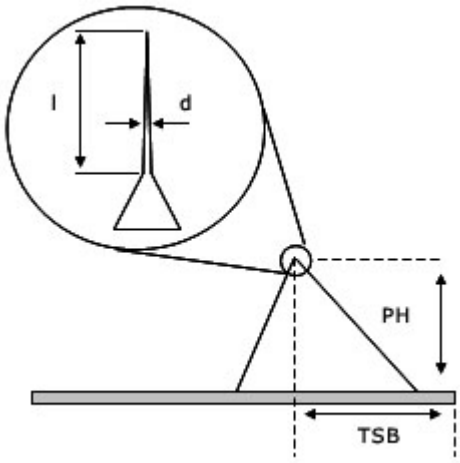
MSS_NCHR_3



Multipurpose high resolution probe with excellent lifetime and reliability. The nanotools® MSS_NCHR_3 tip is designed for non-contact / high frequency mode. It delivers outstanding resolution in critical AFM applications even on hard, tip eating samples like ceramics, silicon oxide/nitride or polysilicon to name a few.

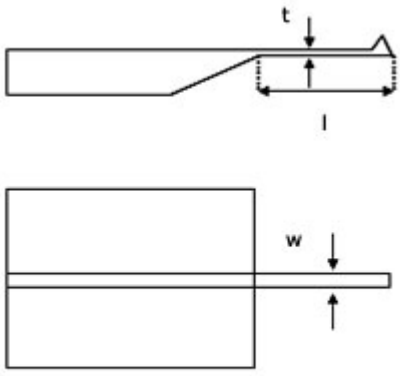
Tip Spec

	nominal	**range**
Shape	conical	
Tip length (l)	400 nm	+/- 100 nm
Tip radius (r)	< 2-3 nm	+/- 5 nm
Tip diameter (d) measured at 300nm	20 nm	+/- 5 nm
Tilt compensation	3 deg	+/- 1 deg
Pyramid height (PH)	15 um	10–15 um
Tip set back (TSB)	15 um	5- 25 um



Cantilever Spec

	nominal	**range**
Type	TESP/NCH	
Shape	beam	
Force constant	42 N/m	27–75 N/m
Resolution frequency	320 kHz	270-350 kHz
length (i)	125 nm	115-135 nm
Width (w)	30 um	22–38 um
Thickness (t)	4 um	3–5 um



Coating

Tip side : none
Back side : 30 nm Al reflex

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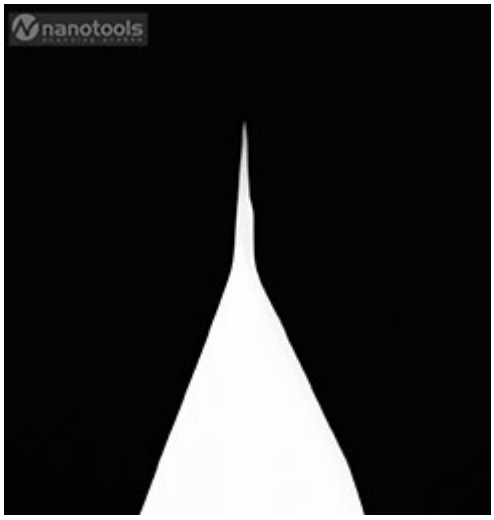
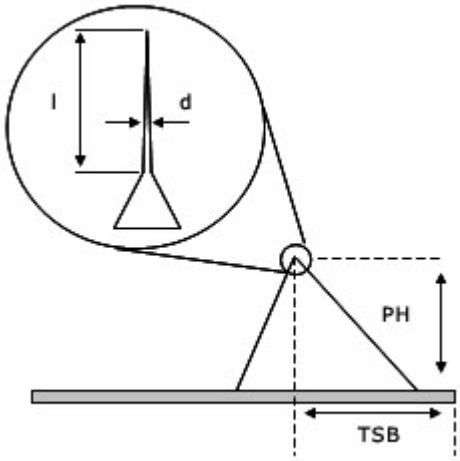
MSS_FMR_13



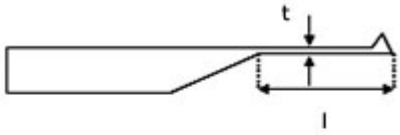
Due to the softer FMR cantilever this multipurpose high resolution probe approaches ultimative lifetime and reliability. The special qualities of our MSS PatternedMedia also lead to the best interaction between tip and cantilever. The nanotools® MSS_FMR_13 tip is designed for non-contact / high frequency mode. It delivers outstanding resolution in critical AFM applications even on hard, tip eating samples like ceramics, silicon oxide/nitride or polysilicon to name a few.

Tip Spec



	nominal	range
Shape	conical	
Tip length (l)	400 nm	+/- 100 nm
Tip radius (r)	< 2-3 nm	+/- 5 nm
Tip diameter (d) measured at 300nm	15 nm	+/- 5 nm
Tilt compensation	3 deg	+/- 1 deg
Pyramid height (PH)	15 um	10–15 um
Tip set back (TSB)	15 um	5- 25 um

Cantilever Spec



	nominal	range
Type	FMR	
Shape	beam	
Force constant	2.8 N/m	0.5–9.5 N/m
Resolution frequency	75 kHz	40-115 kHz
length (i)	225 nm	215-235 nm
Width (w)	28 um	20–35 um
Thickness (t)	3 um	2–4 um

Coating

Tip side : none
Back side : reflex

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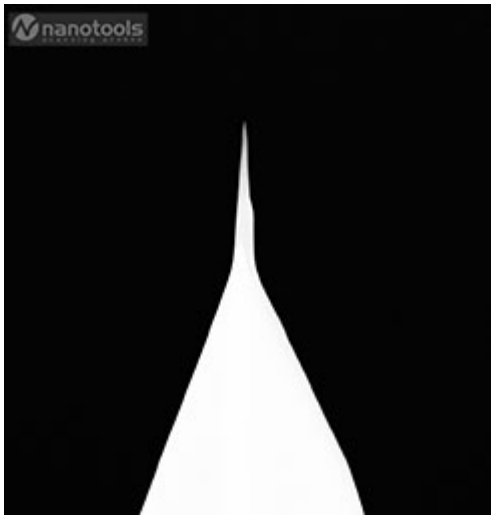
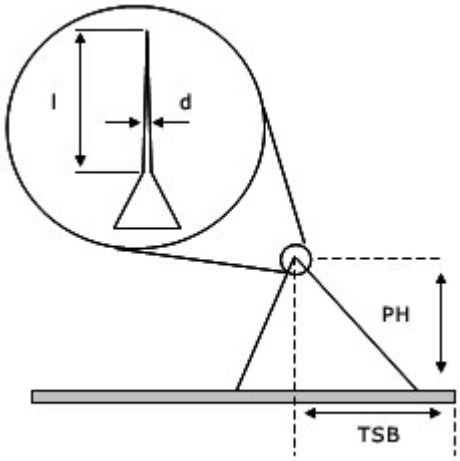
MSS_FMR_3



Due to the softer FMR cantilever this multipurpose high resolution probe approaches ultimative lifetime and reliability. The special qualities of our MSS PatternedMedia also lead to the best interaction between tip and cantilever. The nanotools® MSS_FMR_3 tip is designed for non-contact / high frequency mode. It delivers outstanding resolution in critical AFM applications even on hard, tip eating samples like ceramics, silicon oxide/nitride or polysilicon to name a few.

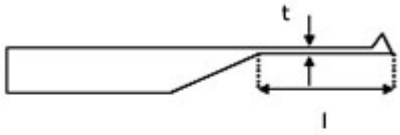
Tip Spec

	nominal	range
Shape	conical	
Tip length (l)	400 nm	+/- 100 nm
Tip radius (r)	< 2-3 nm	+/- 5 nm
Tip diameter (d) measured at 300nm	15 nm	+/- 5 nm
Tilt compensation	3 deg	+/- 0.5 deg
Pyramid height (PH)	15 um	10–15 um
Tip set back (TSB)	15 um	5- 25 um



Cantilever Spec

	nominal	range
Type	FMR	
Shape	beam	
Force constant	2.8 N/m	0.5–9.5 N/m
Resolution frequency	75 kHz	40-115 kHz
length (i)	225 nm	215-235 nm
Width (w)	28 um	20–35 um
Thickness (t)	3 um	2–4 um



Coating

Tip side : none
Back side : reflex

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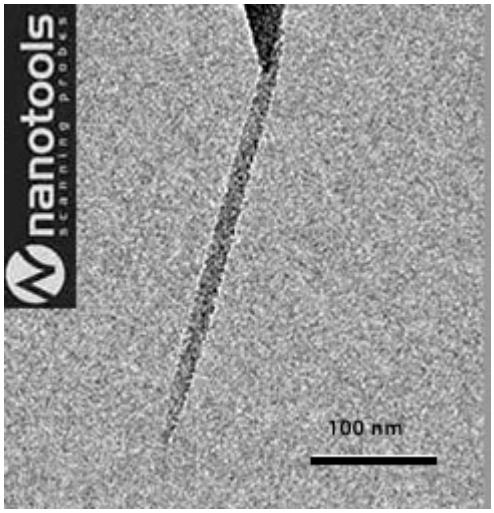
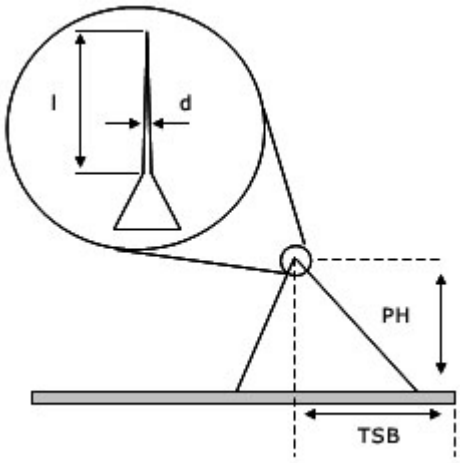
CNT300_ArrowNCR_3



The nanotools® M*-CNT is not using a multiwall carbon nanotube attached to a silicon cantilever. Moreover we pushed our proofen EBD technology to the dimensions of a CNT, but maintaining EBD´s key strength: precise tip orientation, precise control in tip dimensions (length and diameter), large volume production. What is critical in nanotube technology is solved for the M*-CNT:

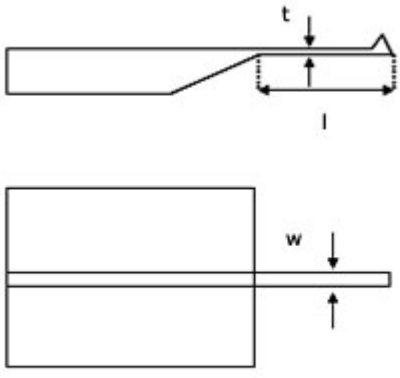
- controlled tip length
- controlled tip orientation (angle accuracy better 0.5deg)
- automated fabrication process

Tip Spec



	nominal	**range**
Shape	cylindrical	
Tip length (l)	300 nm	+/- 50 nm
Tip radius (r)	< 2-3 nm	+/- 5 nm
Tip diameter (d)	20 nm	+/- 5 nm
Tilt compensation	3 deg	+/- 0.5 deg
Pyramid height (PH)	15 um	10–15 um
Tip set back (TSB)	5.2 um	4- 5.5 um

Cantilever Spec



	nominal	**Range**
Type	ArrowNCR	
Shape	beam	
Force constant	42 N/m	27–80 N/m
Resolution frequency	285 kHz	240-380 kHz
length (i)	160 nm	150-170 nm
Width (w)	45 um	37.5–52.5 um
Thickness (t)	4.6 um	3.6–5.6 um

Coating

Tip side : none
Back side : 30 nm Al reflex

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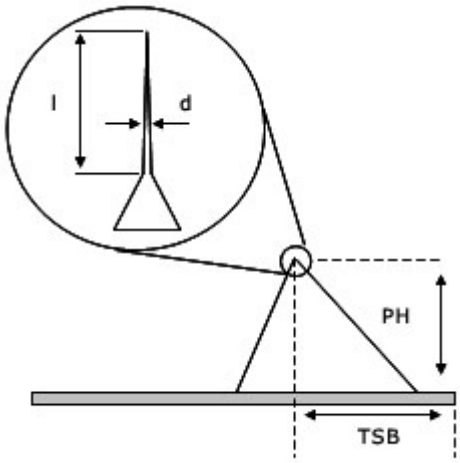
EBD2-100_NCH_13

The nanotools® EBD2-100_NCH_13 tip is designed for non-contact / high frequency mode, in particular for automated AFM systems for in-line process control as well as general purpose AFM. Excellent lifetime and reliability for high aspect ratio applications are key features.

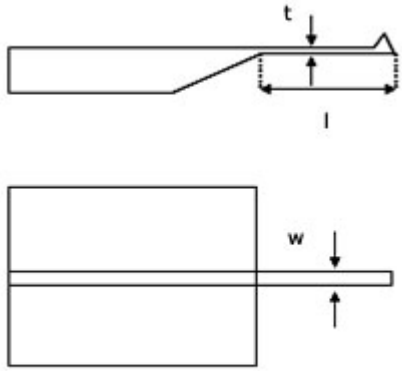
Tip Spec

	nominal	range
Shape	conical	
Tip length (l)	2000 nm	+/- 600 nm
Tip radius (r)	< 5 nm	+/- 10 nm
Tip diameter (d) measured at 1000nm	< 100 nm	80-100 nm
Tilt compensation	13 deg	+/- 1 deg
Pyramid height (PH)	15 um	10–15 um
Tip set back (TSB)	15 um	5- 25 um



Cantilever Spec

	nominal	range
Type	TESP/NCH	
Shape	beam	
Force constant	42 N/m	27–75 N/m
Resolution frequency	320 kHz	270-350 kHz
length (i)	125 nm	115-135 nm
Width (w)	30 um	22–38 um
Thickness (t)	4 um	3–5 um



Coating

Tip side : none
Back side : none

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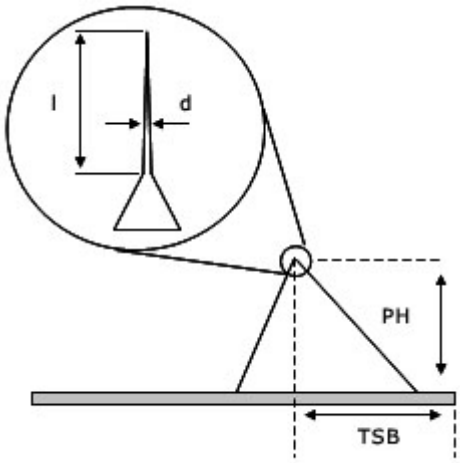
EBD2-100_NCH_3

The nanotools® EBD2-100_NCH_3 tip is designed for non-contact / high frequency mode, in particular for automated AFM systems for in-line process control as well as general purpose AFM. Excellent lifetime and reliability for high aspect ratio applications are key features.

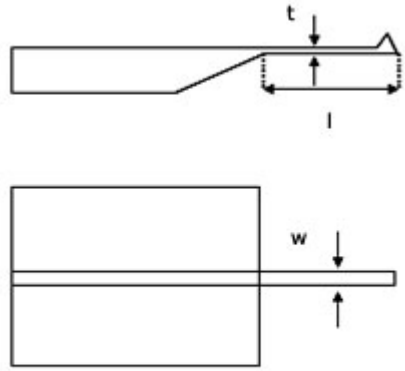
Tip Spec

	nominal	range
Shape	conical	
Tip length (l)	2000 nm	+/- 600 nm
Tip radius (r)	< 5 nm	+/- 10 nm
Tip diameter (d) measured at 1000nm	< 100 nm	80-100 nm
Tilt compensation	3 deg	+/- 0.5 deg
Pyramid height (PH)	15 um	10–15 um
Tip set back (TSB)	15 um	5- 25 um



Cantilever Spec

	nominal	range
Type	TESP/NCH	
Shape	beam	
Force constant	42 N/m	27–75 N/m
Resolution frequency	320 kHz	270-350 kHz
length (i)	125 nm	115-135 nm
Width (w)	30 um	22–38 um
Thickness (t)	4 um	3–5 um



Coating

Tip side : none
Back side : none

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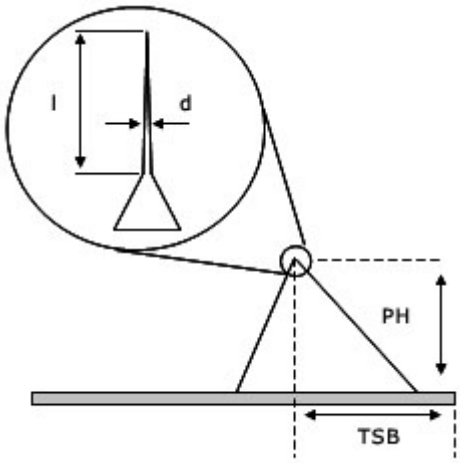
EBD2-100_NCHR_3

The nanotools® EBD2-100_NCHR_3 tip is designed for non-contact / high frequency mode, in particular for automated AFM systems for in-line process control as well as general purpose AFM. Excellent lifetime and reliability for high aspect ratio applications are key features.

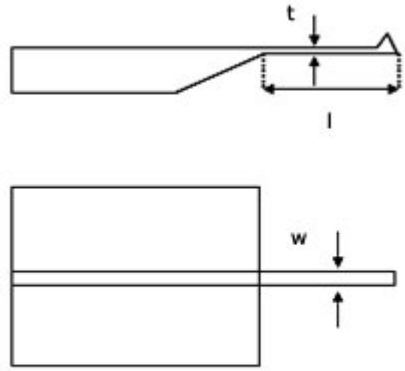
Tip Spec

	nominal	range
Shape	conical	
Tip length (l)	2000 nm	+/- 600 nm
Tip radius (r)	< 5 nm	+/- 10 nm
Tip diameter (d) measured at 1000nm	< 100 nm	80-100 nm
Tilt compensation	3 deg	+/- 0.5 deg
Pyramid height (PH)	15 um	10–15 um
Tip set back (TSB)	15 um	5- 25 um



Cantilever Spec

	nominal	range
Type	TESP/NCH	
Shape	beam	
Force constant	42 N/m	27–75 N/m
Resolution frequency	320 kHz	270-350 kHz
length (i)	125 nm	115-135 nm
Width (w)	30 um	22–38 um
Thickness (t)	4 um	3–5 um



Coating

Tip side : none
Back side : 30 nm Al reflex

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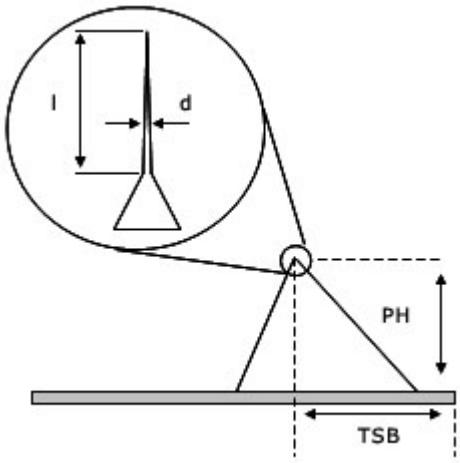
SSE_NCHR_13

2 nm tip radius, high resolution probe with excellent lifetime and reliability. The nanotools® SSE - SuperSharp Enhanced is designed for non-contact / high frequency mode. It delivers outstanding resolution and image stability in critical AFM applications even on hard, tip eating samples like ceramics, silicon oxide/nitride, polysilicon to name a few.

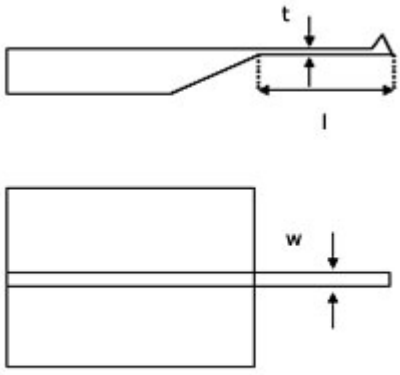
Tip Spec

	nominal	range
Shape	conical	
Tip radius (r)	2-3 nm	< 5 nm
Tilt compensation	13 deg	+/- 1 deg
Pyramid height (PH)	15 um	10–15 um
Tip set back (TSB)	15 um	5- 25 um



Cantilever Spec

	nominal	range
Type	TESP/NCH	
Shape	beam	
Force constant	42 N/m	27–75 N/m
Resolution frequency	320 kHz	270-350 kHz
length (i)	125 nm	115-135 nm
Width (w)	30 um	22–38 um
Thickness (t)	4 um	3–5 um



Coating

Tip side : none
Back side : 30 nm Al reflex

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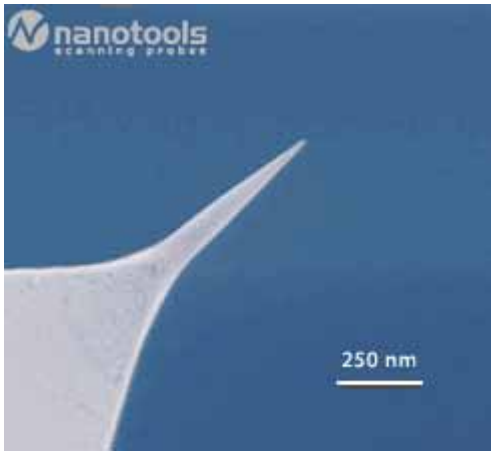
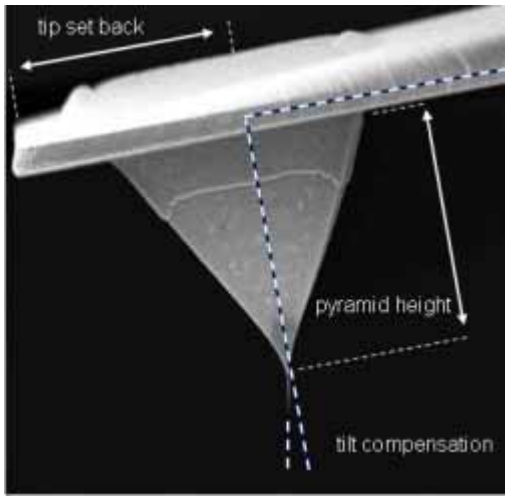
biotool_PNP_TR_10



The nanotools **EBD probe biotool** is specifically designed for biological applications. It is extremly **appropriate for small features** and compatible with both air and liquids. With this probe you get **true dimensions of fine structures** and **clear sidewall information.**

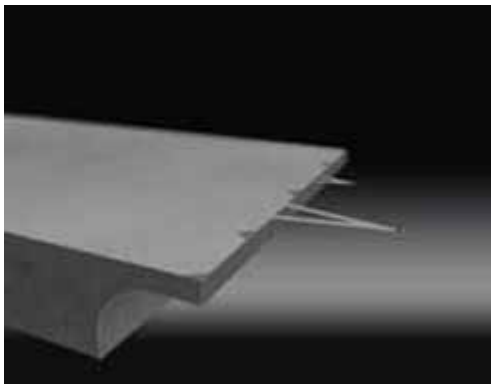
Tip Spec

	nominal	range
Shape	conical	
Tip length (r)	550 nm	+/- 250 nm
Tip radius (r)	< 5 nm	< 10 nm
Tilt compensation	10 deg	+/- 1 deg
Pyramid height (PH)	4 um	
Tip set back (TSB)	4 um	



Cantilever Spec

	nominal
Type	PNP_TR
Shape	triangle
Force constant	0.32 N/m
Resolution frequency	67 kHz
length (i)	100 nm
Width (w)	135 um
Thickness (t)	0.6 um



Coating

Tip side : none
Back side : 65 nm Au reflex

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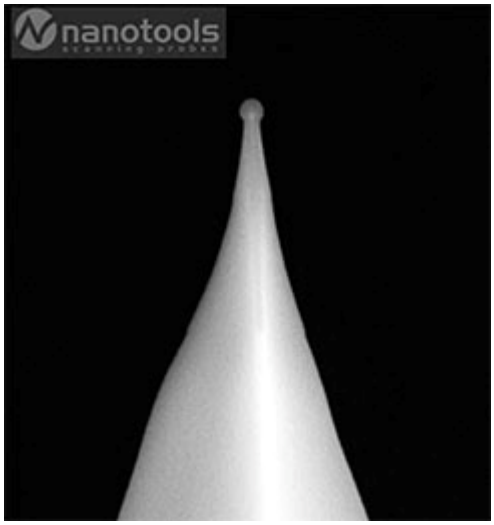
B1, B2, B50, B100, B150

This SPM probe offers a hemispherical, symmetric and extremely smooth hard tip side coating. This coating, made of EBD diamond like carbon, features extremely high wear resistance. The macroscopic tip radius of curvature is precise to +/- 5 nm of the nominal value.



	B1 (r: 10-25 nm)	B2 (r: 30-50 nm)	B50 (r: 50 nm +/- 10%)	B100 (r: 100 nm +/- 10%)	B150 (r: 150 nm +/- 10%)
NCHR l: 125 µm w:30 µm t: 4 µm k: 42 N/m f: 320 kHz	B1_NCHR	B2_NCHR	B50_NCHR	B100_NCHR	B150_NCHR
FMR l: 225 µm w: 28 µm t: 3 µm k: 2.8 N/m f: 75 kHz	B1_FMR	B2_FMR	B50_FMR	B100_FMR	B150_FMR
CONTR l: 450µm w: 50 µm t:2 µm k: 0.2 N/m f: 13 kHz	B1_CONTR	B2_CONTR	B50_CONTR	B100_CONTR	B150_CONTR

Coating / Tip Shape

Tip shape : hemispherical

Tip side : none

Back side : 30 nm Al reflex

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