

NANOVEA PB1000

***THE MOST POWERFUL
MECHANICAL TESTER***





ULTIMATE TESTING

All modes of testing with true feedback load control from independent load and depth sensors provide unmatched accuracy and the highest repeatability available on the market.

**NANO & MICRO
MODULES ON ONE SYSTEM**

**MOTORIZED Z MOTION
CAPABLE OF MOVING 50mm
w/ VIDEO ZOOM**

**LATERAL ACCURACY of $<0.2\mu\text{m}$
w/ PRECISION ENCODER**

**ADJUSTABLE
140mm HEIGHT**

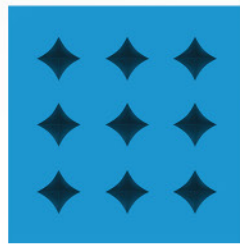
WIDE RANGE OF TESTING SOLUTIONS

Designed with unique advanced technologies, **NANOVEA** systems provide the highest accuracy and repeatability with the widest range of measurements capabilities.

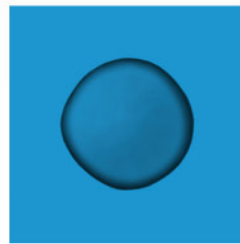
INDENTATION



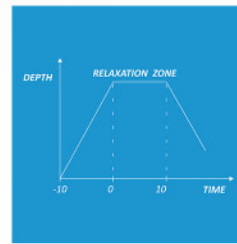
FRACTURE TOUGHNESS



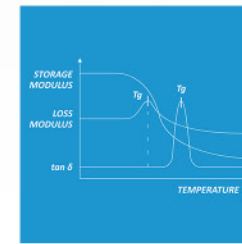
HARDNESS MAPPING



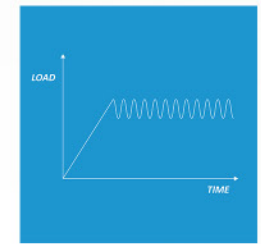
YIELD STRENGTH
& FATIGUE



CREEP & RELAXATION



GLASS TRANSITION (T_g)



LOSS & STORAGE
MODULUS

SCRATCH

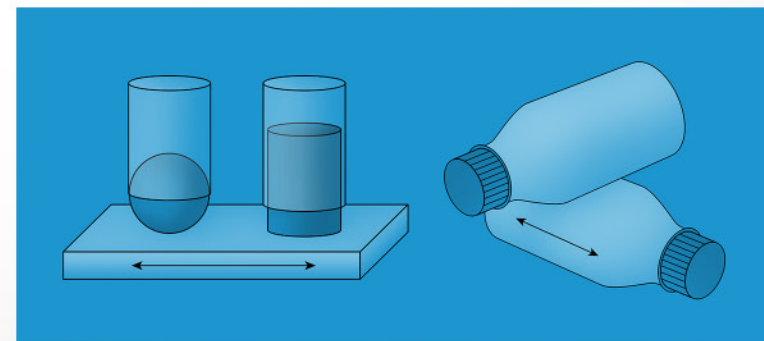


COHESIVE & ADHESIVE FAILURE



SCRATCH HARDNESS

FRICTION



COEFFICIENT OF FRICTION

LOAD MODULES AVAILABLE ON PB1000:

NANO AND MICRO

HIGH PRECISION CAPACITOR DEPTH SENSOR

DESIGNED TO ELIMINATE INACCURATE SLOW SURFACE REFERENCE

DIRECT VERTICAL LOADING | NO CANTILEVER OR PIVOT POINT

**INDEPENDENT DEPTH & LOAD SENSORS
FOR HIGHEST ACCURACY**

Fast Piezo Electric Actuator
Optional 1.5mm depth
Accurate DMA & CSM
Ultra sensitive Load Cell
Fast Speed Mapping



Powerful Leadscrew Servomotor
Most sensitive AE sensor
Widest usable load range
(5 orders of magnitude)
Best sensitivity down to nano load
Optional 400N

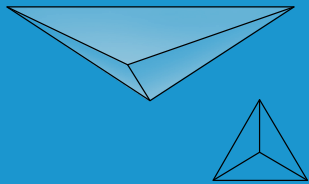
INDENTATION • SCRATCH • WEAR • FRICTION

Indentation, Scratch, Wear & Friction	MODES OF TESTING	Indentation, Scratch, Wear & Friction
Piezo Electric Actuator	LOADING SYSTEM	Ball Screw Servomotor
Ultra Precision Load Cell	LOAD SENSOR	Precision Load Cell
80 400 1800 4800mN	LOAD RANGE	20 40 200 400N
0.004 0.03 0.14 0.28μN	LOAD RESOLUTION (24bit)	1.2 2.4 12 24μN
0.12 1 4 12μN	LOAD NOISE FLOOR RMS	50 100 500 1000μN
Capacitor Ring	DEPTH SENSOR	Large Area Capacitor
250 1500μm	DEPTH RANGE	1mm w/ 50mm motor encoder
0.003nm	DEPTH RESOLUTION (24bit)	0.01nm
0.04nm	DEPTH NOISE FLOOR RMS	0.15nm
Ultra Precision Load Cell	FRICTION SENSOR	Precision Load Cell
40 400 1800mN	FRICTION RANGE	20 200N
0.004 0.14 0.28μN	FRICTION RESOLUTION	1.2 12μN
0.3 6 12μN	FRICTION NOISE FLOOR RMS	1.2 2mN
150 - 400kHz *	ACOUSTIC EMISSION FREQUENCIES	150 - 400kHz
0.005aJ	SENSITIVITY OF AE ABSOLUTE ENERGY	0.005aJ
0.1 to 100Hz	DMA / CSM FREQUENCIES	N/A
Yes	FREQUENCY & TEMPERATURE SWEEP AT CONSTANT LOAD	N/A
5min (100 indents)	FASTMAP	12min (100 indents)
275° 450°C	HIGH TEMPERATURE	275° 450° 600°C
Down to -10°C <-40°C	LOW TEMPERATURE	Down to -10°C <-40°C
5% to Dew Point	HUMIDITY	5% to Dew Point
Yes	LIQUID	Yes

* Other frequency range available; Nano only available under sample

Specifications subject to change, please contact us for the latest.

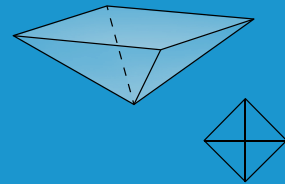
GUIDE TO INDENTER GEOMETRIES



BERKOVICH

BEST FOR

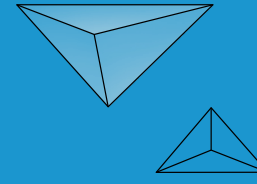
Instrumented Indentation:
Hardness & Modulus



VICKERS

BEST FOR

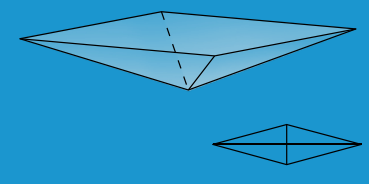
Instrumented Indentation:
Hardness, Modulus
& Fracture Toughness



CUBE CORNER

BEST FOR

Instrumented Indentation:
Hardness, Modulus
& Fracture Toughness

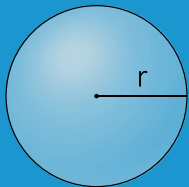


KNOOP

BEST FOR

Instrumented Indentation:
Hardness & Modulus

Anisotropic Material Studies

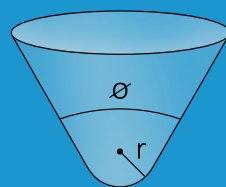


BALL

BEST FOR

Instrumented Indentation:
Hardness & Modulus
on soft materials (ex. hydrogels)
high indentation depth & force testing

Instrumented Scratch & Wear:
Adhesive & Cohesive Failures,
Scratch Resistance, Wear Rate & COF

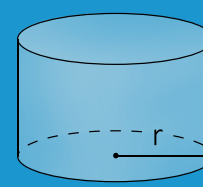


CONICO-SPHERICAL

BEST FOR

Instrumented Indentation:
Hardness, Modulus & Stress-Strain
(60° cone angle) of Polymers & Metals

Instrumented Scratch:
90° cone angle
Low Load Adhesive & Cohesive Coating Failure
120° cone angle
High Load Adhesive & Cohesive Coating Failure

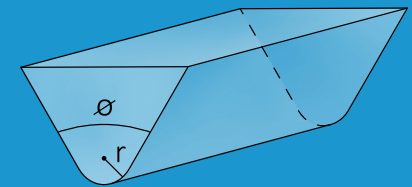


CIRCULAR FLAT

BEST FOR

Instrumented Indentation:
Ultimate Yield Strength (UYS)
& Yield Strength (YS)

Metals, Polymers & Small Particles



KNIFE

BEST FOR

Instrumented Scratch:
Adhesive & Cohesive Failures

Small Diameter Coated Cylinders



HIGH TEMP

Temperatures up to 600°C

Full enclosure of heating components, sample & indenter for optimal accuracy

Designed w/ MACOR material (thermal expansion coefficient <math> < 10^{-6}/^{\circ}\text{C}</math>)



LOW TEMP

Temperatures lower than -40°C

Full enclosure of sample & indenter

Peltier cooling system for optimal accuracy

ENVIRONMENTAL MODULES



HUMIDITY

Humidity control below 5% & up to environmental dew point

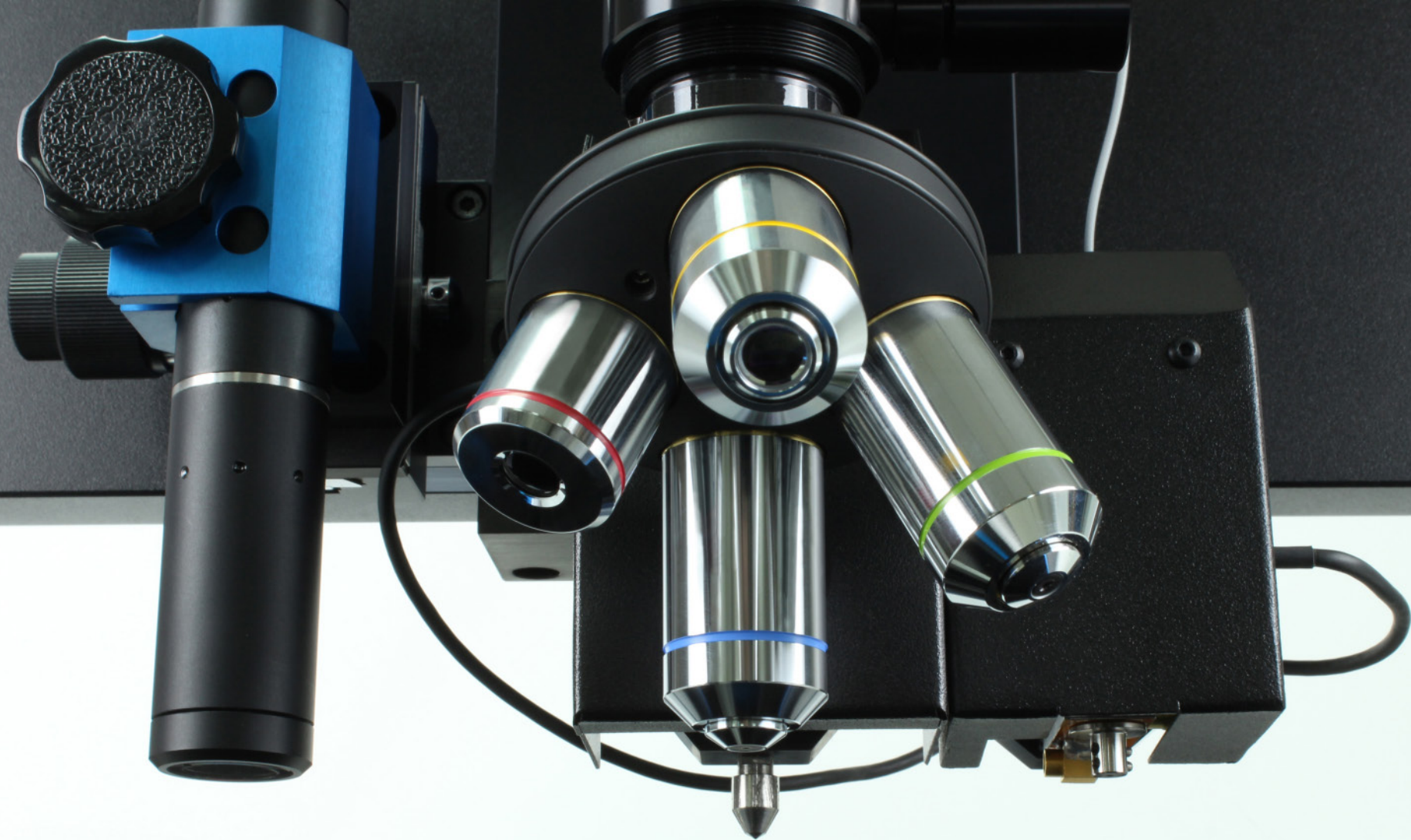
Full enclosure of sample & indenter within humidity chamber for optimal accuracy



LIQUID

Custom liquid cup designs for every applications needs

Liquid heating option available



X-Y

**MOTORIZED
STAGES**

200 x 150mm

Z

**MOTORIZED
APPROACH**

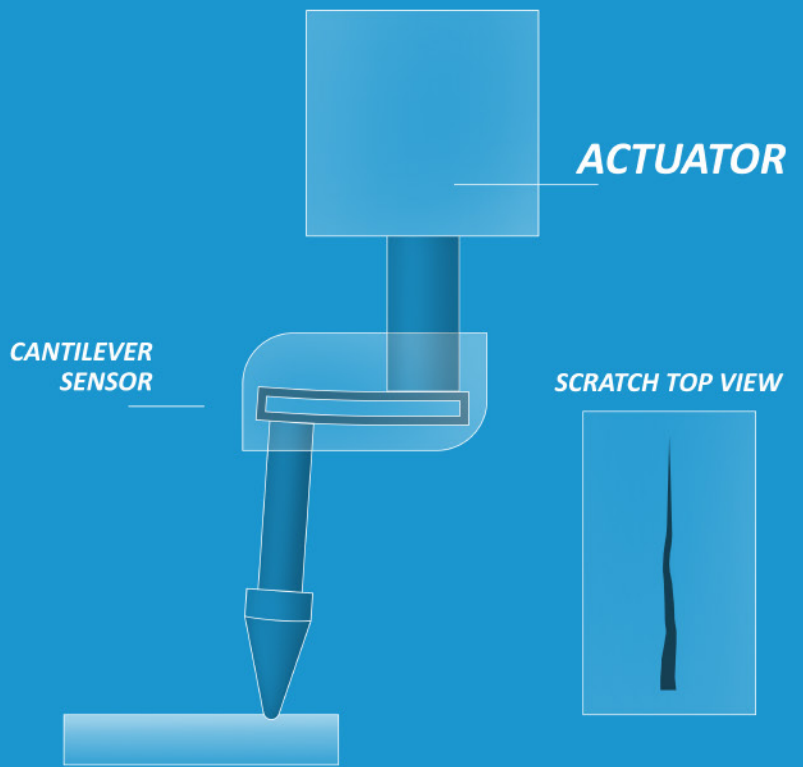
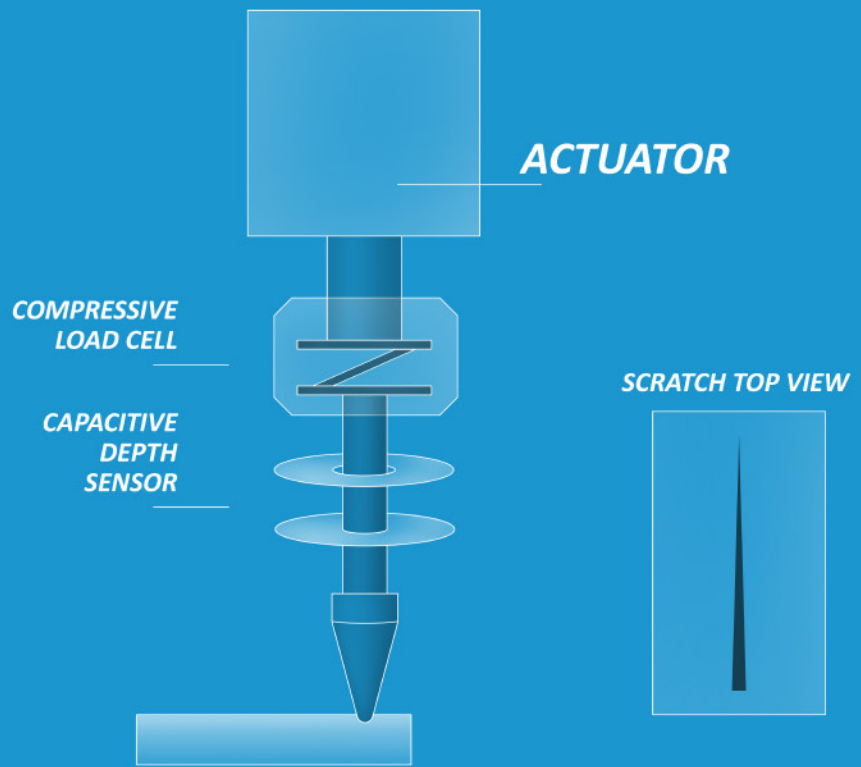
50mm
+140mm manual extra slide

XY

**LATERAL
RESOLUTION**

0.1 μ m

SUPERIORITY OF COMPRESSIVE LOAD CELL



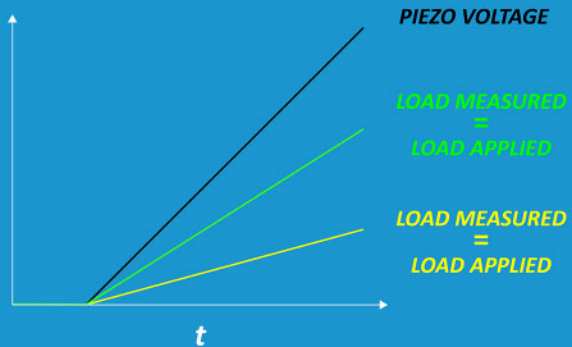
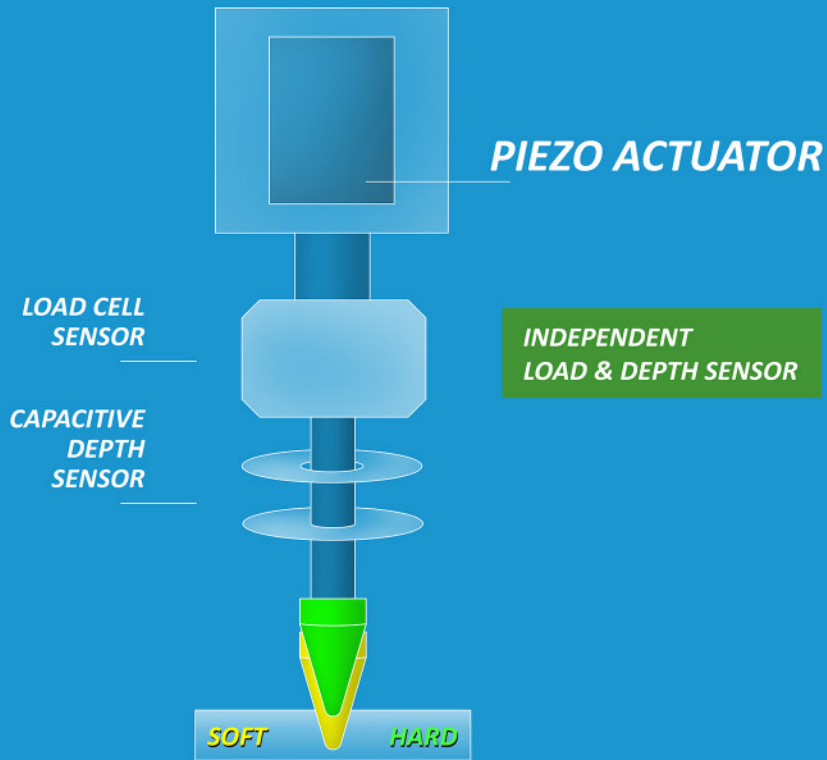
INDENTATION



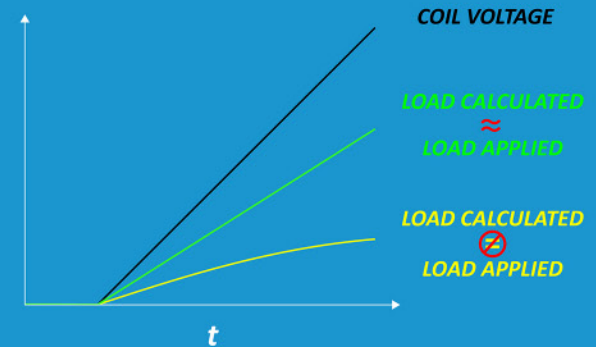
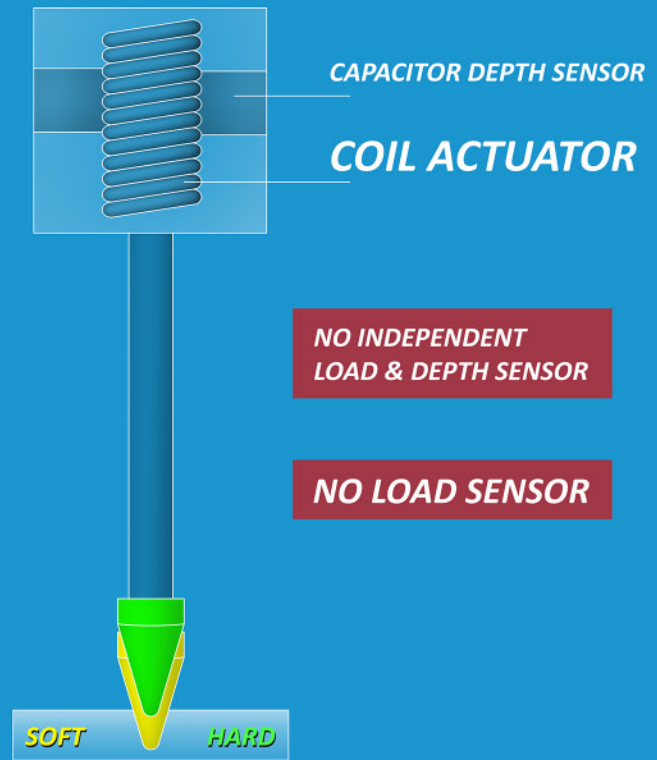
N **NANOVEA**

OTHERS

THE BETTER INDENTATION ACCURACY

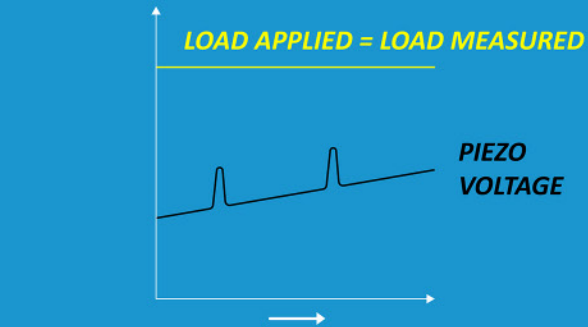
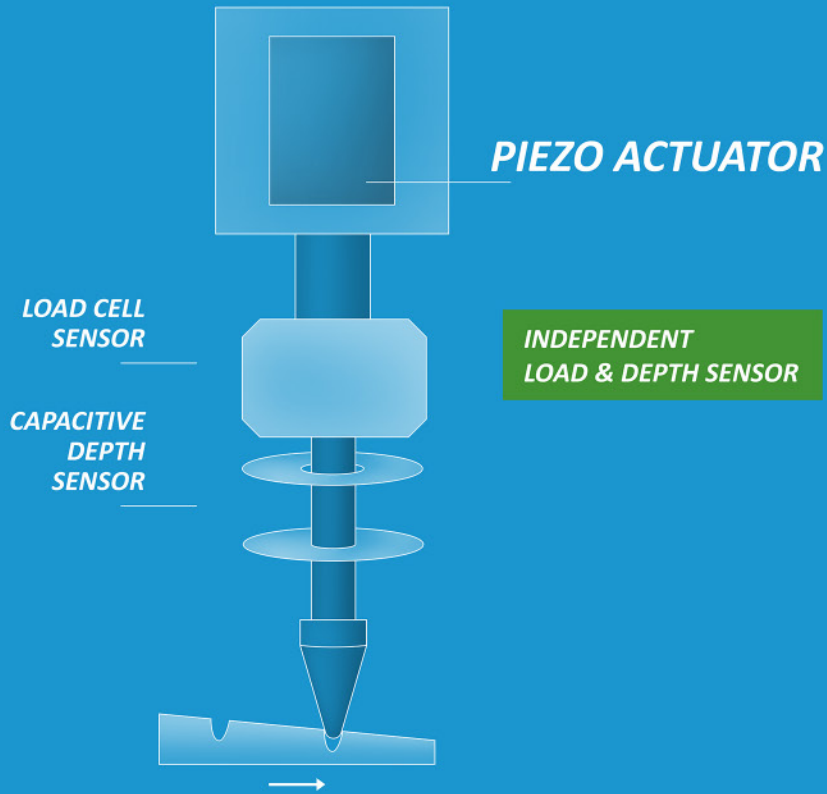


N **NANOVEA**

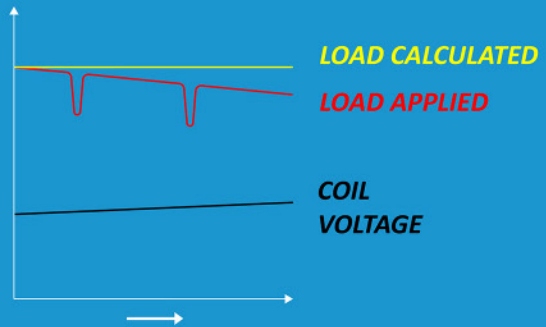
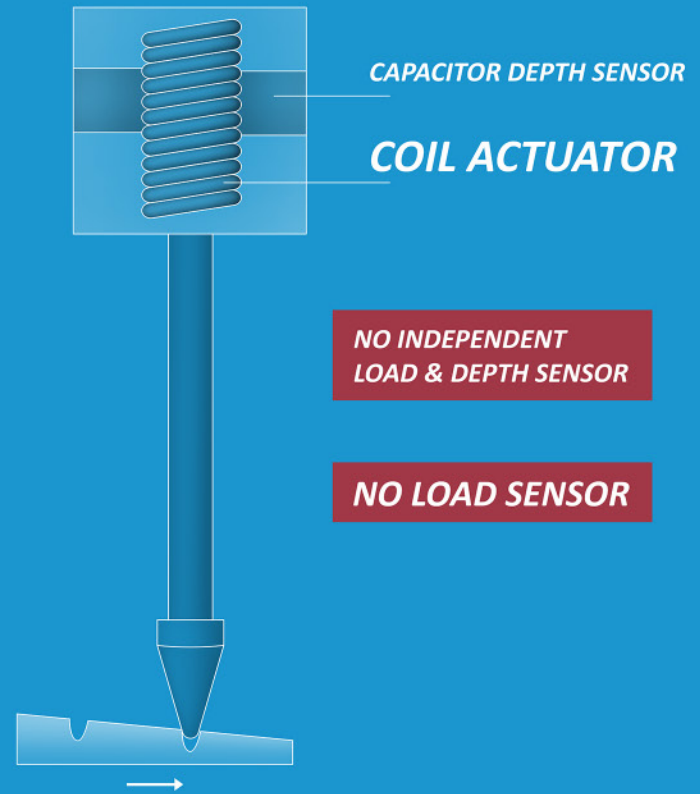


OTHERS

THE BETTER SCRATCH & WEAR

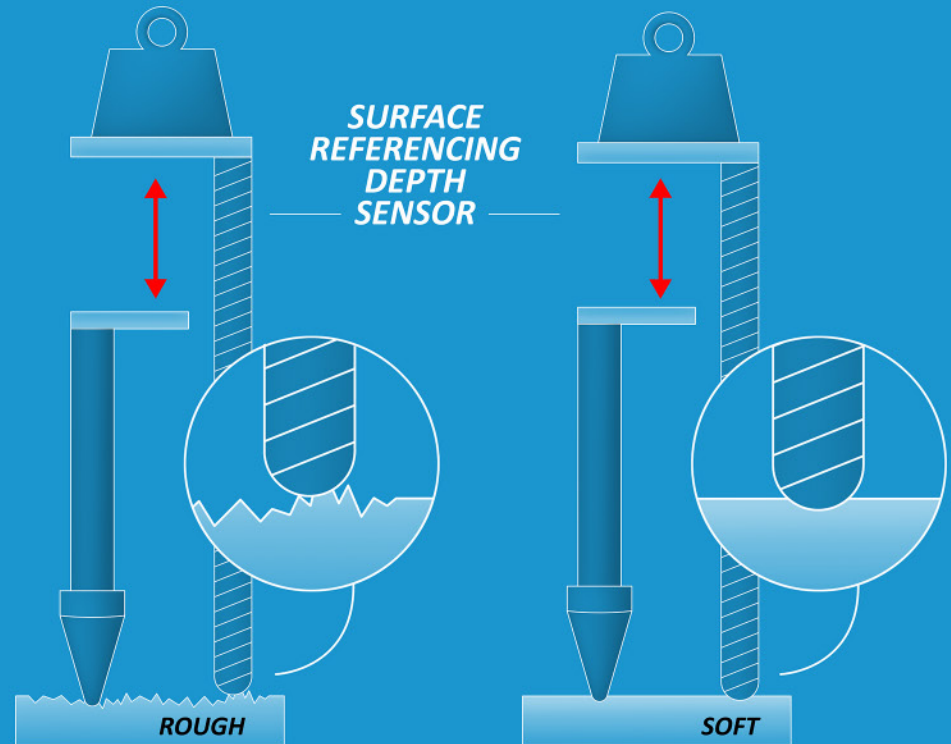
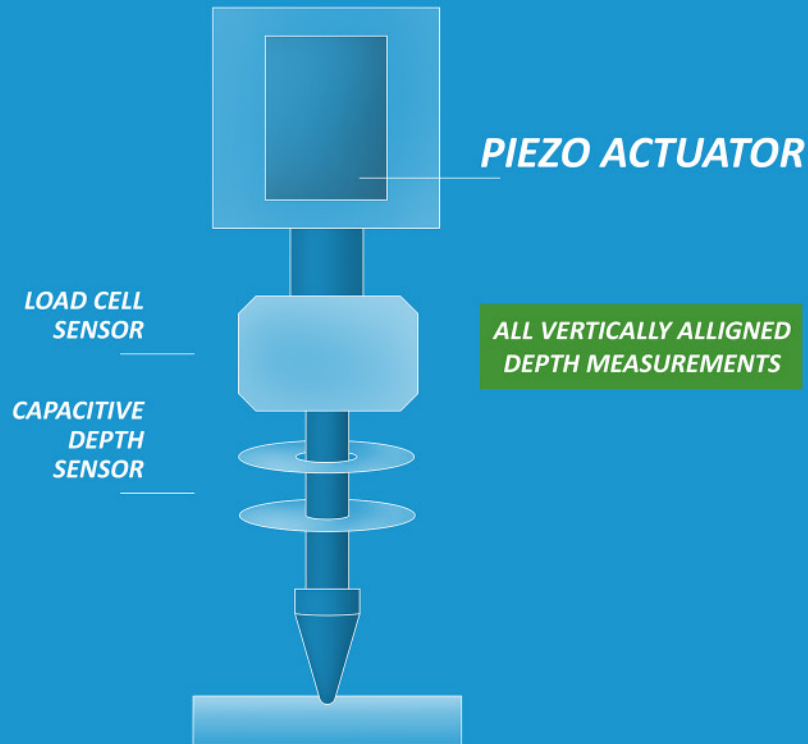


N NANOVEA

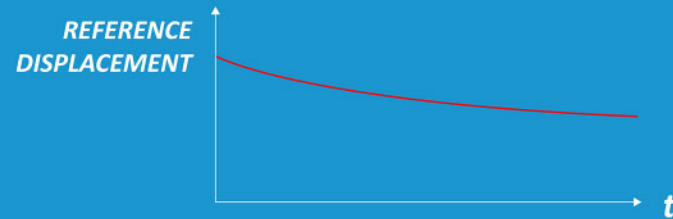


OTHERS

FLAWS OF SURFACE REFERENCING TECHNOLOGY



NO EFFECT FROM SURFACE REFERENCING



EVEN NANOMETER MOVEMENT AFFECTS DATA ACCURACY

N **NANOVEA**

OTHERS

MICROSCOPE VIDEO IMAGING

up to 100x
objective magnification

1200 x 1600
color video camera

ACCURACY OF $<0.2\mu\text{m}$
to/from indenter position

LARGE AREA STITCHING
capability



ATOMIC FORCE MICROSCOPE

AFM expands 3D capabilities into sub-nanometer range down to a single angstrom, including laterally, which is not attainable with any optical technique.

1.7nm
lateral resolution

0.4nm | 0.13nm
height resolution

**STATIC, DYNAMIC
& EXTENDED**
modes

VIDEO CAMERA
integrated



110 μ m X-Y scan
25 μ m high resolution X-Y

22 μ m | 5 μ m
max Z range

ACCURACY of <0.2 μ m
to/from indenter position
or video imaging

3D OPTICAL PROFILER

By measuring the direct physical wavelength linked to a specific height, NANOVEA Profilers provide unmatched accuracy of surface measurements on any material.

No complex algorithms. No sample leveling. No wasted time.

up to 3mm
max Z range

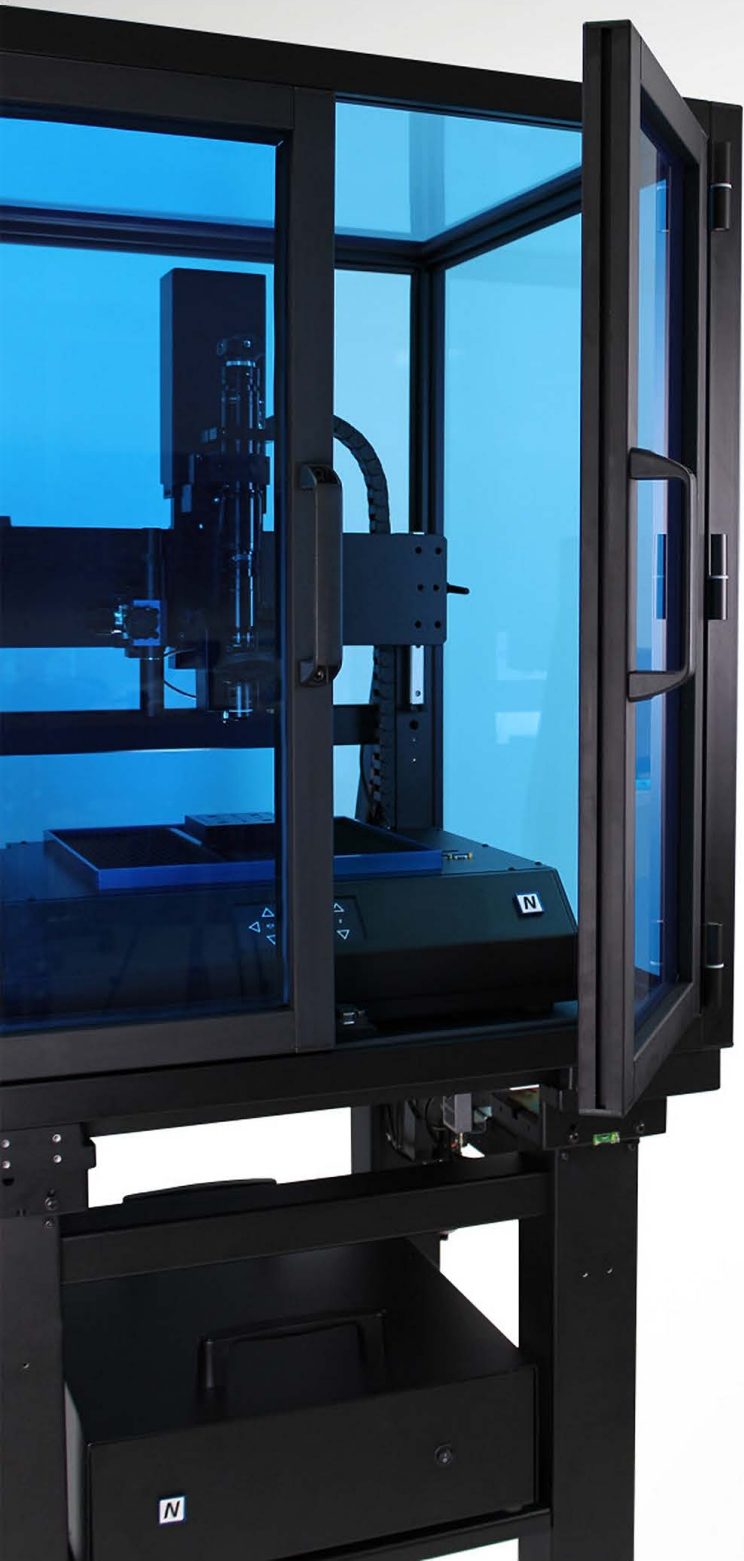
2D & 3D NON-CONTACT
surface measurements

ACCURACY OF $<0.2\mu\text{m}$
to/from indenter position or video imaging

LARGE SURFACE SCAN
no image stitching required

ANY ROUGHNESS, ANY MATERIAL
highest accuracy on any form





NANOVEA

PB1000

MECHANICAL TESTER



microworld®

GRENOBLE - FRANCE

Tel : +33 (0)4 76 56 16 17

Email : contact@microworld.eu

www.microworld.eu

Also, available as a compact
desktop version - **CB500**

