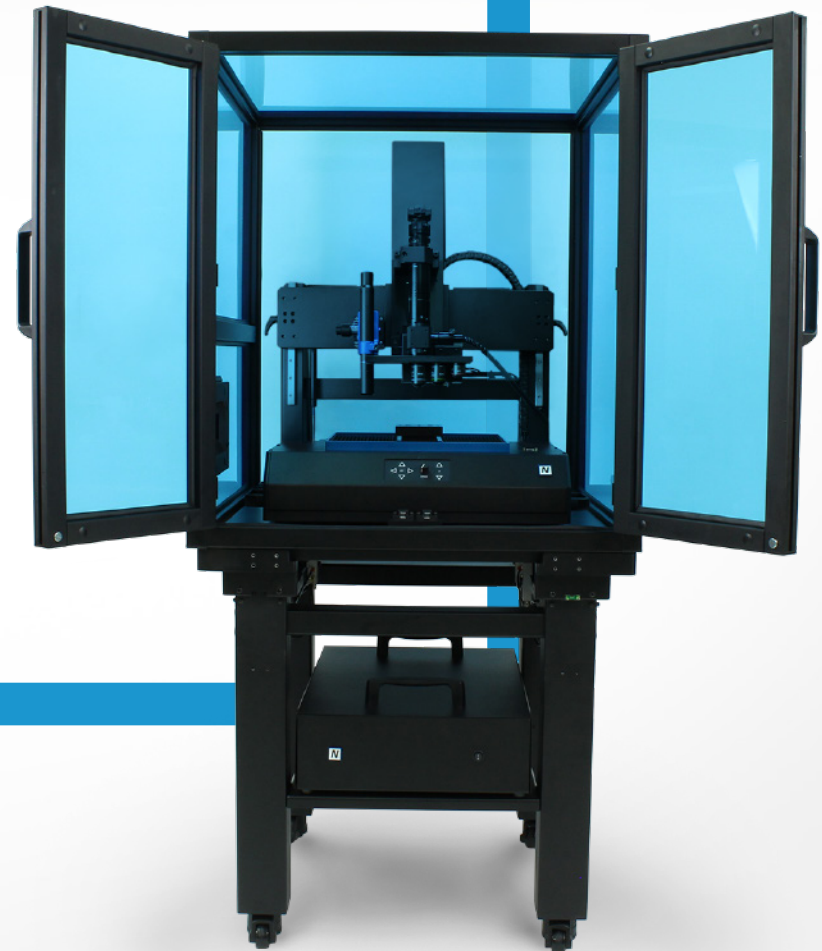


NANOVEA PB1000

***LARGE PLATFORM
MECHANICAL TESTER***





ULTIMATE TESTING

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

***NANO & MICRO MODULES
BOTH ON ONE SYSTEM***

***100 mm MOTORIZED Z STAGE
for a WIDE RANGE OF SAMPLE SIZES***

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

***NON-CONTACT 3D PROFILER, AFM
and VIDEO MICROSCOPE INTEGRATION***

NANOVEA

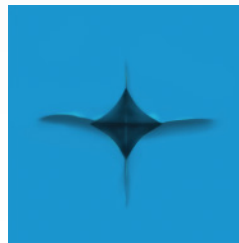
WIDEST RANGE OF TESTING SOLUTIONS

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

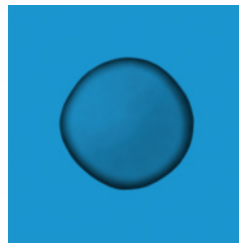
INDENTATION



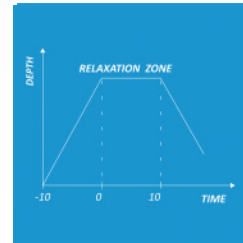
HARDNESS & ELASTIC MODULUS



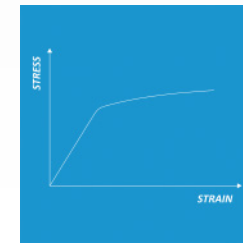
FRACTURE TOUGHNESS



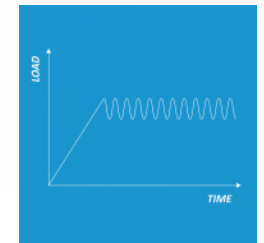
YIELD STRENGTH & FATIGUE



CREEP & RELAXATION

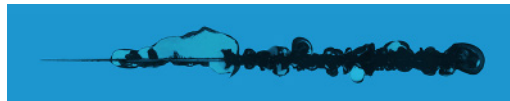


STRESS VS STRAIN



LOSS & STORAGE MODULUS

SCRATCH



COHESIVE FAILURE



ADHESIVE FAILURE

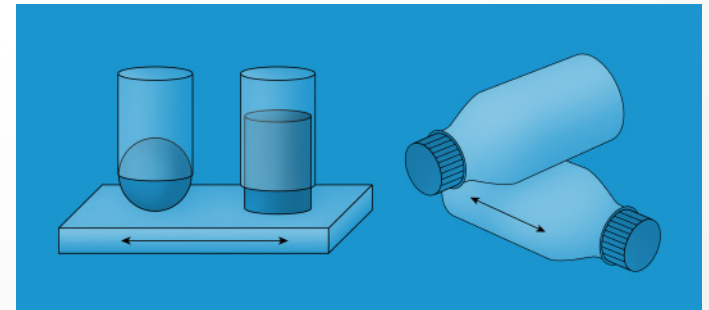


SCRATCH HARDNESS



MULTI-PASS WEAR

FRICTION



COEFFICIENT OF FRICTION

LOAD MODULES AVAILABLE ON PB1000:

NANO AND MICRO

HIGH PRECISION CAPACITOR DEPTH SENSOR

DESIGNED TO ELIMINATE INACCURATE SLOW SURFACE REFERENCING

DIRECT VERTICAL LOADING | NO CANTILEVER OR PIVOT POINT

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

Fast Piezoelectric Actuator
Optional 1.5 mm depth
Accurate DMA & CSM
Ultra sensitive Load Cell
High-speed Mapping



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

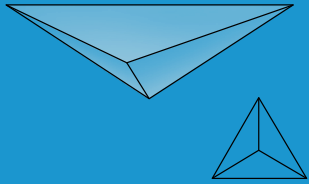
INDENTATION ♦ SCRATCH ♦ WEAR ♦ FRICTION

Indentation, Scratch, Wear & Friction	MODES OF TESTING	Indentation, Scratch, Wear & Friction
Piezoelectric Actuator	LOADING SYSTEM	Ball Screw Servomotor
Ultra Precision Load Cell	LOAD SENSOR	Precision Load Cell
80 400 1800 4800 mN	LOAD RANGE	20 40 200 400 N
0.006 0.03 0.14 0.28 μN	LOAD RESOLUTION (24bit)	1.2 2.4 12 24 μN
0.5 1 4 12 μN	LOAD NOISE FLOOR RMS	50 100 500 1000 μN
Capacitor Ring	DEPTH SENSOR	Large Area Capacitor
250 1500 μm	DEPTH RANGE	1 mm (extended range capability)
0.003 nm	DEPTH RESOLUTION (24bit)	0.01 nm
0.04 nm	DEPTH NOISE FLOOR RMS	0.15 nm
Ultra Precision Load Cell	FRICTION SENSOR	Precision Load Cell
50 400 1800 mN	FRICTION RANGE	20 200 N
0.004 0.14 0.28 μN	FRICTION RESOLUTION	1.2 12 μN
0.3 6 12 μN	FRICTION NOISE FLOOR RMS	1.2 2 mN
150 - 400 kHz*	ACOUSTIC EMISSION FREQUENCIES	150 - 400 kHz
0.005 aJ	SENSITIVITY OF AE ABSOLUTE ENERGY	0.005 aJ
0.1 to 100 Hz	DMA / CSM FREQUENCIES	N/A
Yes	FREQUENCY & TEMPERATURE SWEEP AT CONSTANT LOAD	N/A
5 min (100 indents)	FASTMAP	12 min (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
RT to 60°C	LIQUID	RT to 60°C

* Other frequency range available; Nano only available under sample.

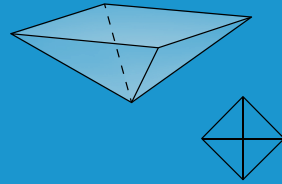
Specifications subject to change, please contact us for the latest.

GUIDE TO INDENTER GEOMETRIES



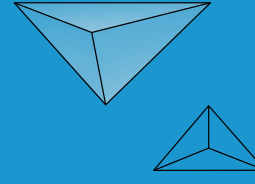
BERKOVICH

INSTRUMENTED INDENTATION:
Hardness & Modulus



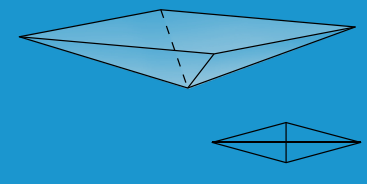
VICKERS

INSTRUMENTED INDENTATION:
Hardness, Modulus
& Fracture Toughness



CUBE CORNER

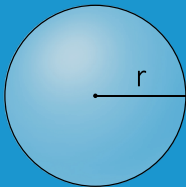
INSTRUMENTED INDENTATION:
Hardness, Modulus
& Fracture Toughness



KNOOP

INSTRUMENTED INDENTATION:
Hardness & Modulus

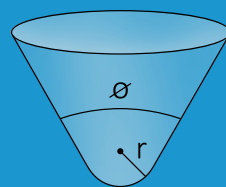
Anisotropic Material Studies



BALL

INSTRUMENTED INDENTATION:
Hardness & Modulus

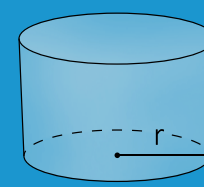
Soft Materials (e.g. hydrogels).
High indentation depth & force testing



CONICO-SPHERICAL

INSTRUMENTED INDENTATION:
Hardness, Modulus & Stress-Strain

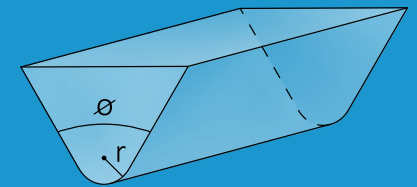
60° cone angle
Polymers & Metals



CIRCULAR FLAT

INSTRUMENTED INDENTATION:
Ultimate Yield Strength (UYS)
& Yield Strength (YS)

Metals, Polymers & Small Particles



KNIFE

INSTRUMENTED SCRATCH:
Adhesive & Cohesive Failures

Small Diameter Coated Cylinders

INSTRUMENTED SCRATCH & WEAR:
Adhesive & Cohesive Failures,
Scratch Resistance, Wear Rate & COF

INSTRUMENTED SCRATCH:
90° cone angle
Low Load Adhesive & Cohesive Coating Failure
120° cone angle
High Load Adhesive & Cohesive Coating Failure



HIGH TEMP

Temperatures up to 600°C.

*Enclosed testing chamber
for homogenous and accurate
temperature control.*

*Designed with MACOR material
(thermal expansion coefficient $< 10^{-6}/^{\circ}\text{C}$).*



LOW TEMP

Temperatures lower than -40°C.

*Enclosed testing chamber
for homogenous and accurate
temperature control.*

*Peltier cooling system
for optimal accuracy.*

ENVIRONMENTAL MODULES



HUMIDITY

*Humidity control below 5%
& up to environmental dew point.*

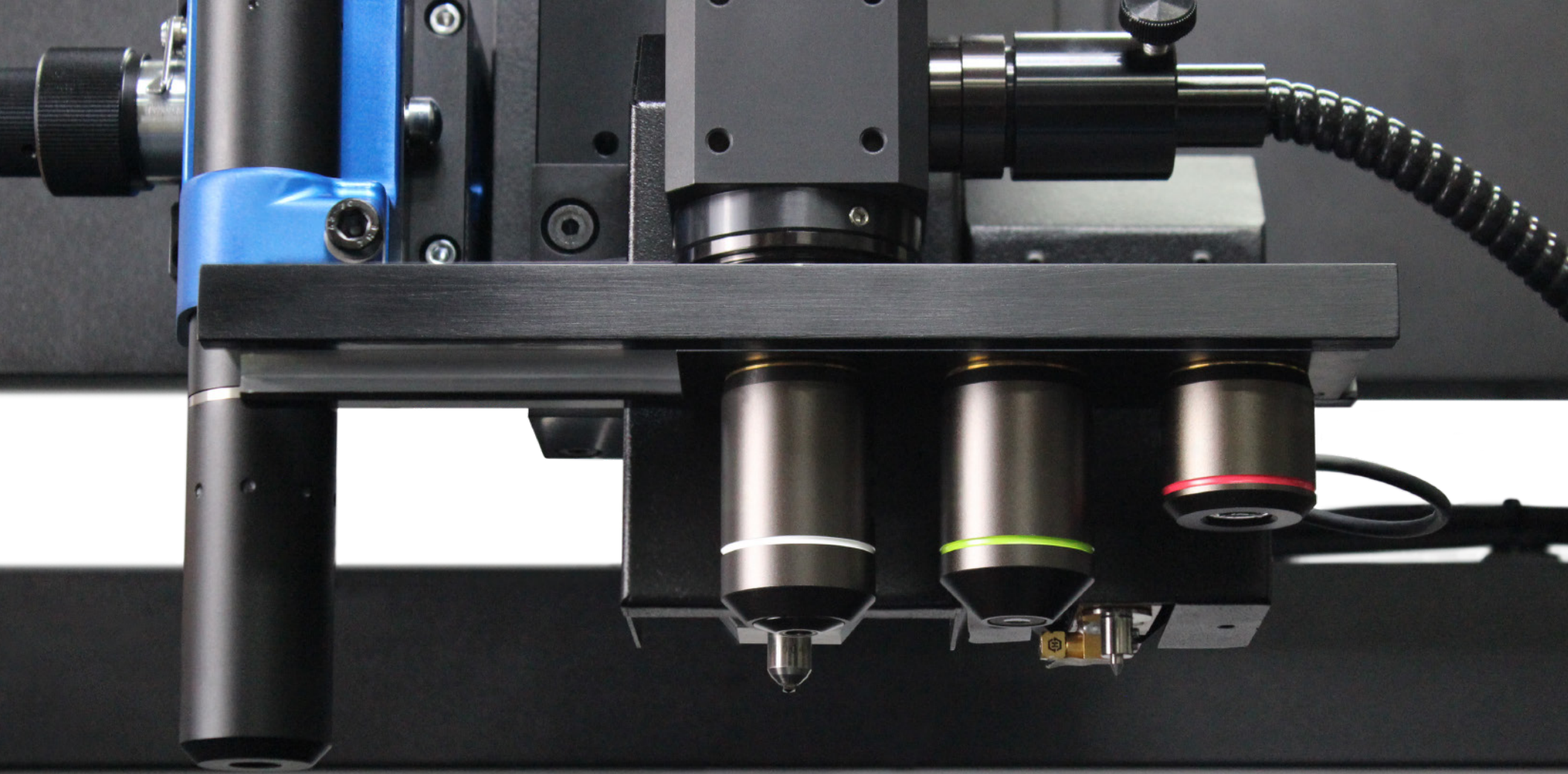
*Enclosed testing chamber
for homogenous and accurate
temperature control.*



LIQUID

Liquid heating up to 60°C.

*Custom liquid cup designs
for every application need.*



X-Y

**MOTORIZED
STAGES**

200 X 150 mm

Z

**MOTORIZED
APPROACH**

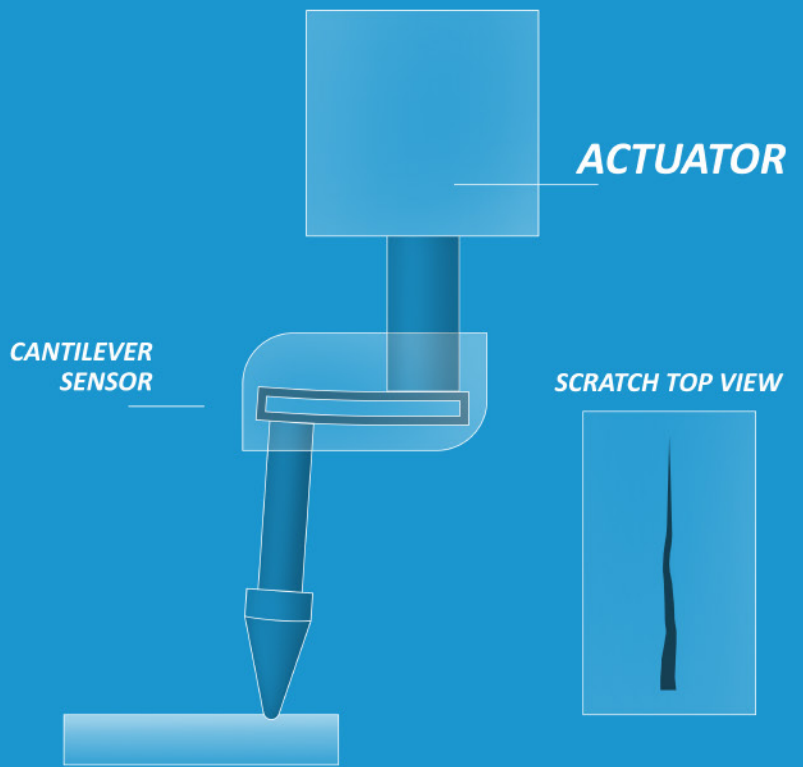
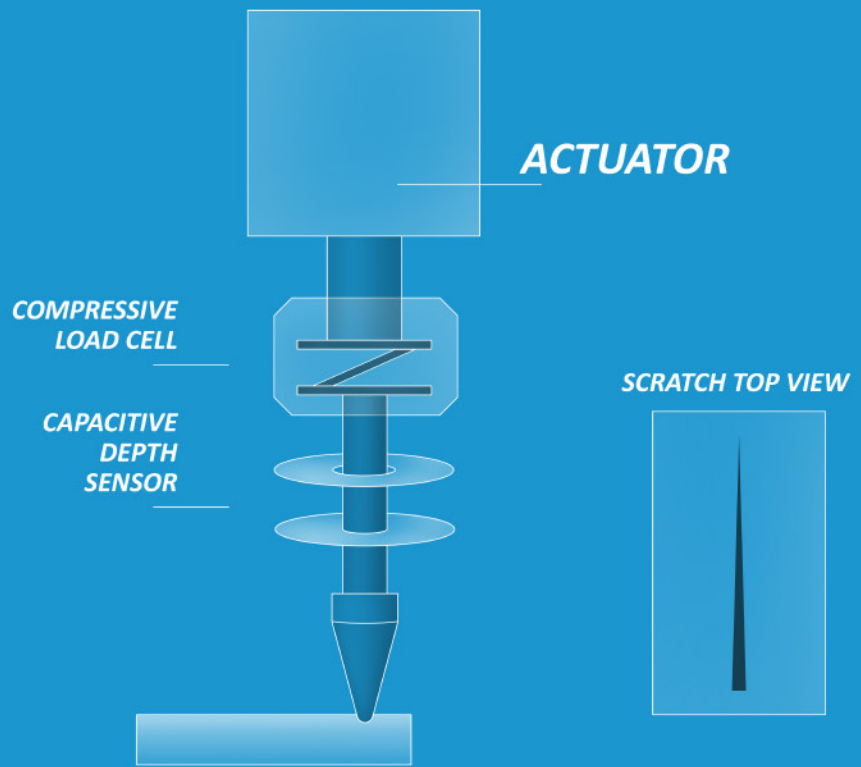
100 mm

X-Y

**LATERAL
RESOLUTION**

0.1 μ m

SUPERIORITY OF COMPRESSIVE LOAD CELL



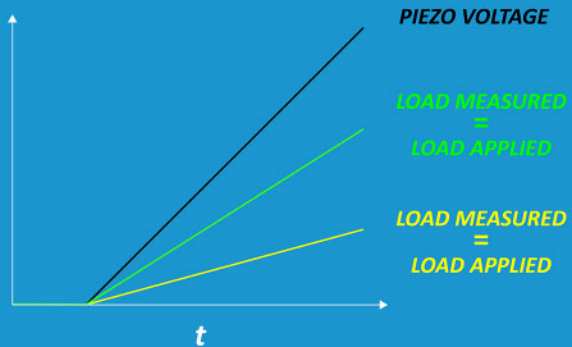
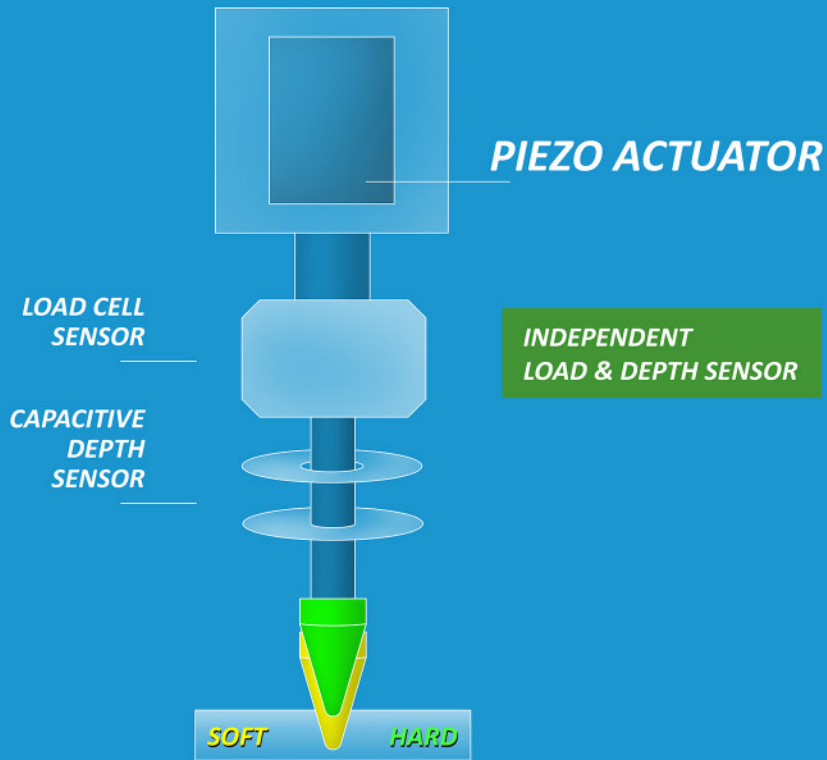
INDENTATION



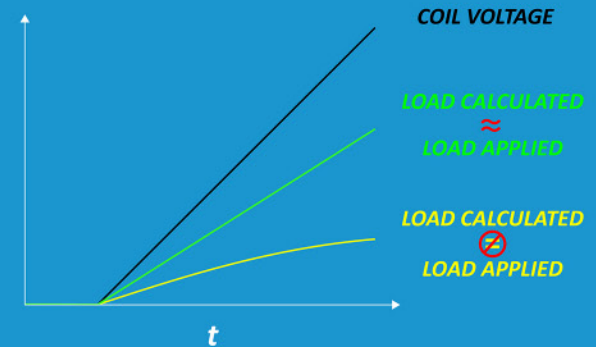
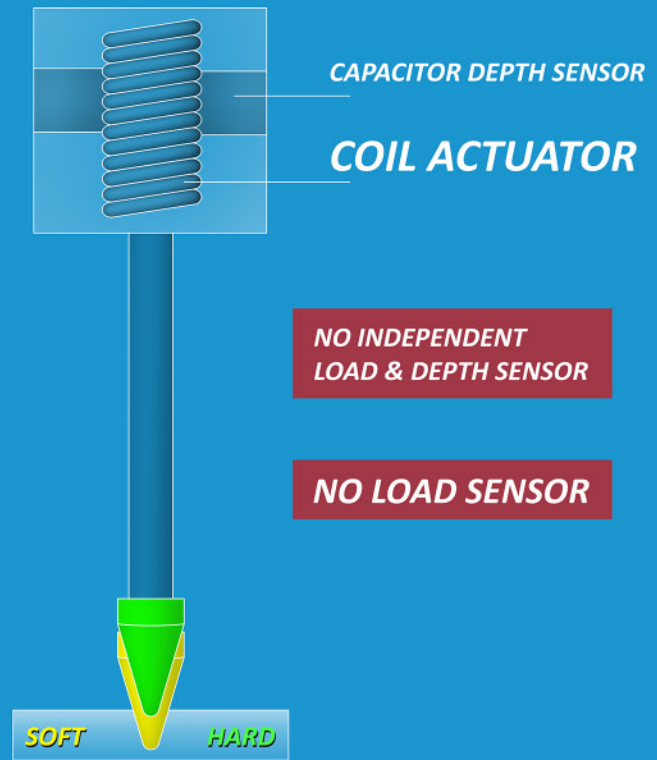
N **NANOVEA**

OTHERS

THE BETTER INDENTATION ACCURACY

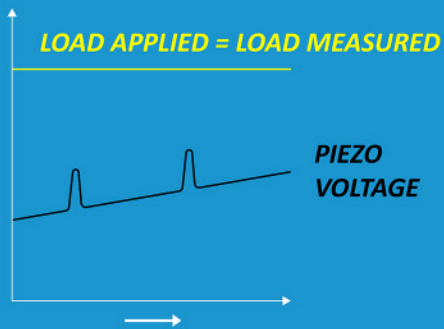
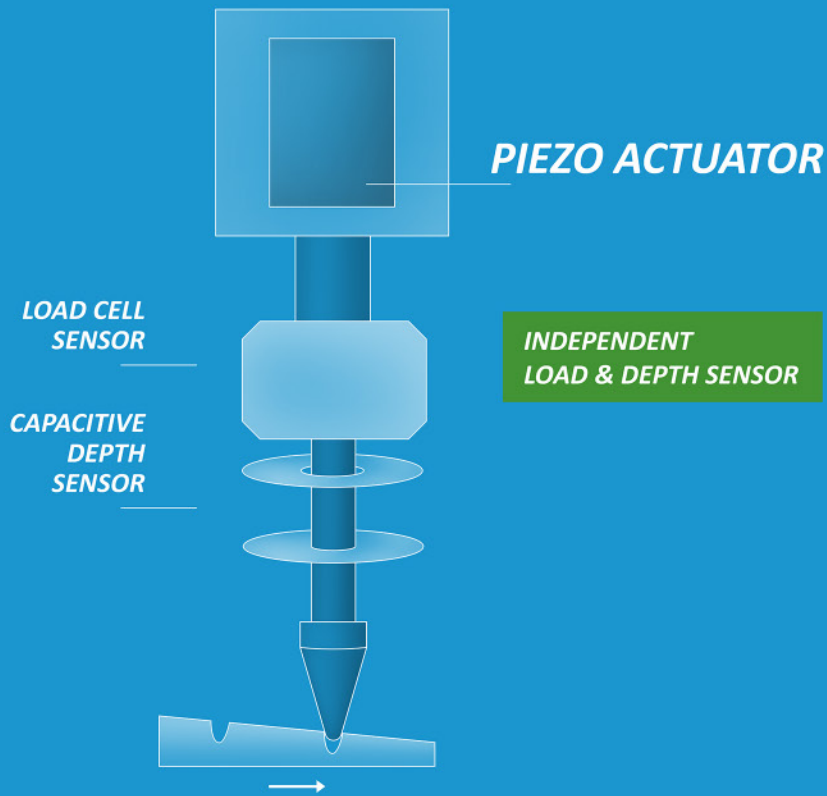


N NANOVEA

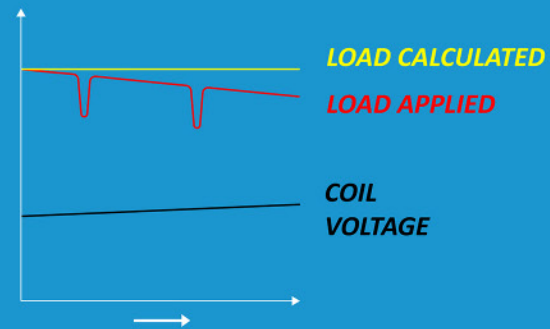
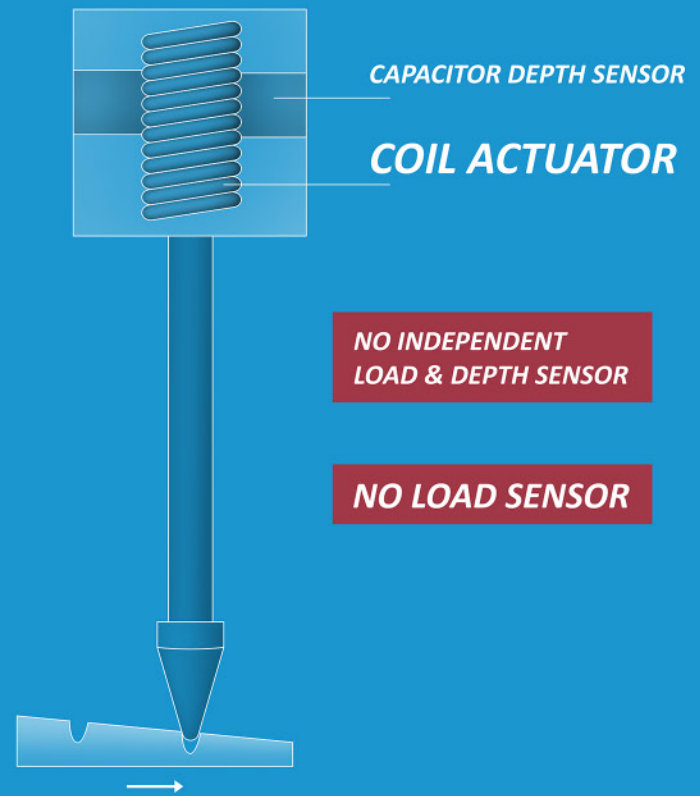


OTHERS

THE BETTER SCRATCH & WEAR

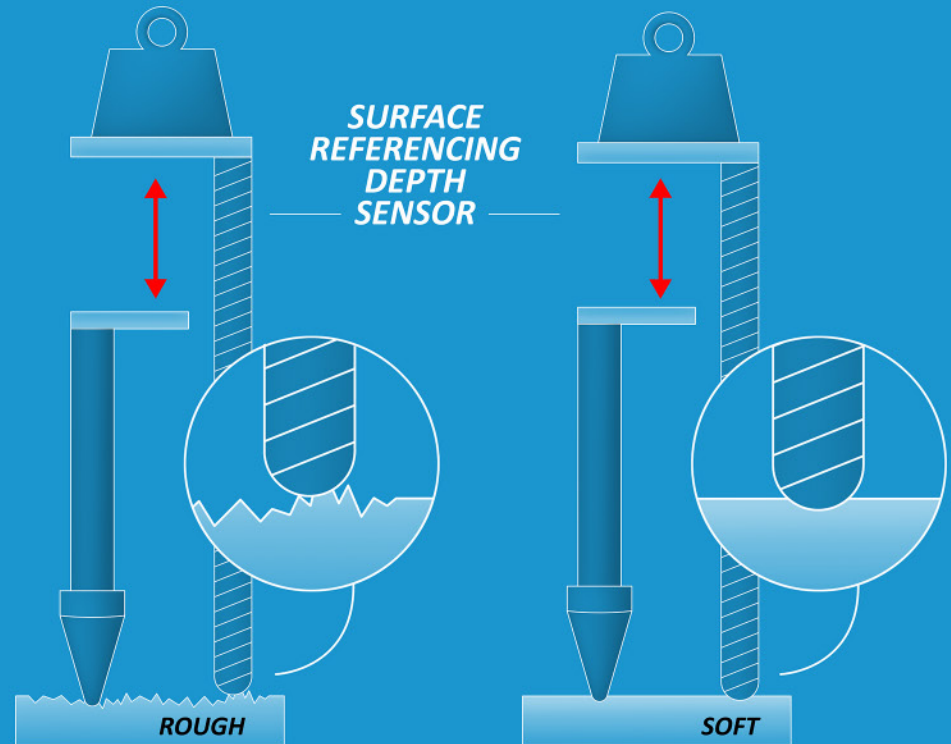
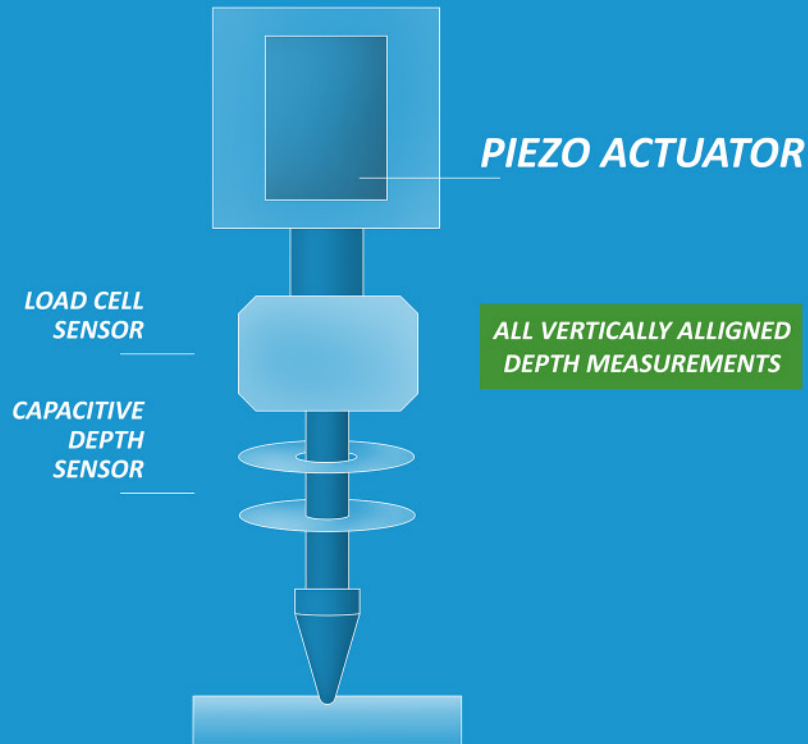


N NANOVEA

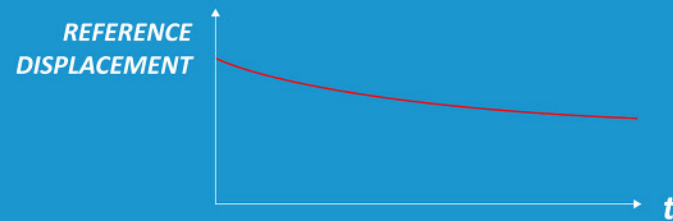


OTHERS

FLAWS OF SURFACE REFERENCING TECHNOLOGY



NO EFFECT FROM SURFACE REFERENCING



EVEN NANOMETER MOVEMENT AFFECTS DATA ACCURACY

N NANOVEA

OTHERS

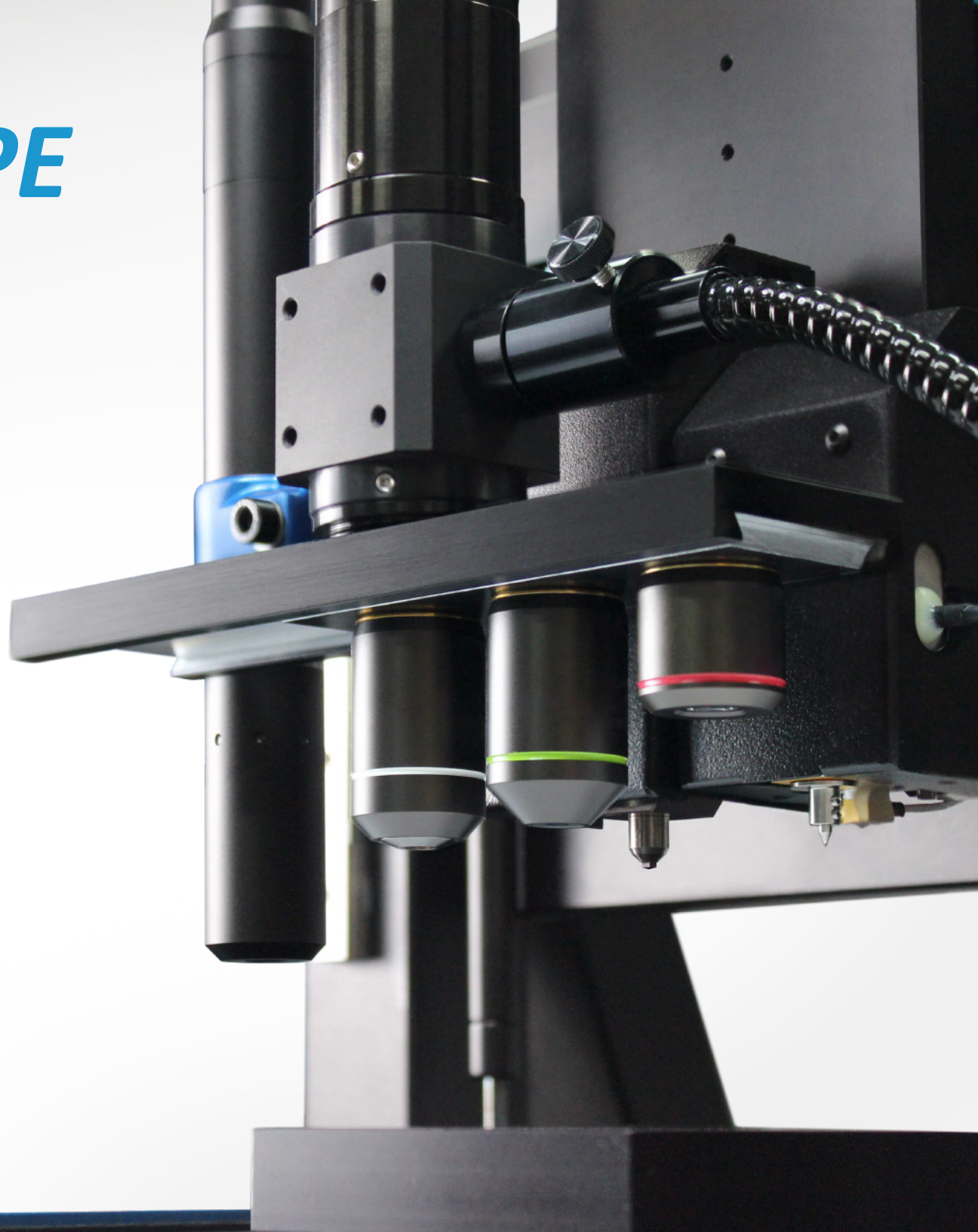
MICROSCOPE VIDEO IMAGING

up to 100x
objective magnification

1200 x 1600
color video camera

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

FLAWLESS STITCHING
and focus stacking



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.

1.7 nm
lateral resolution

0.4 nm | 0.13 nm
height resolution

**STATIC, DYNAMIC &
EXTENDED**
modes

VIDEO CAMERA
integrated



110 μm *X-Y scan*
25 μm *high resolution X-Y*

22 μm | 5 μm
max Z range

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

3D OPTICAL PROFILER

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

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

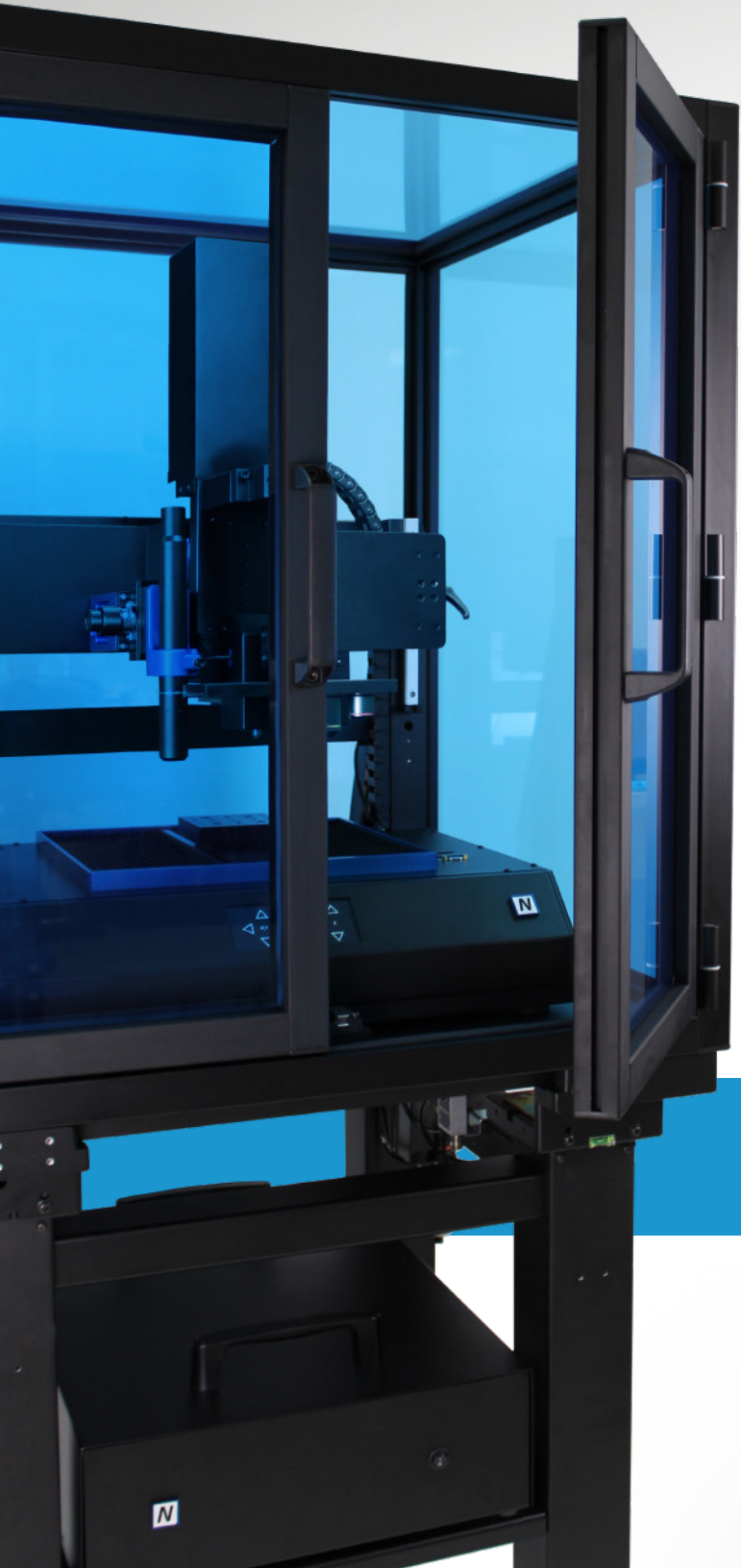
up to 3 mm
max Z range

2D & 3D NON-CONTACT
surface measurements

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

ANY ROUGHNESS, ANY MATERIAL
down to 10 nm accuracy on any form





NANOVEA **PB1000**

**THE LARGE PLATFORM
MECHANICAL TESTER**

*For pricing information, please contact
SALES@NANOVEA.COM*

ALSO AVAILABLE:

NANOVEA CB500

The Advanced Compact Mechanical Tester



NANOVEA.COM