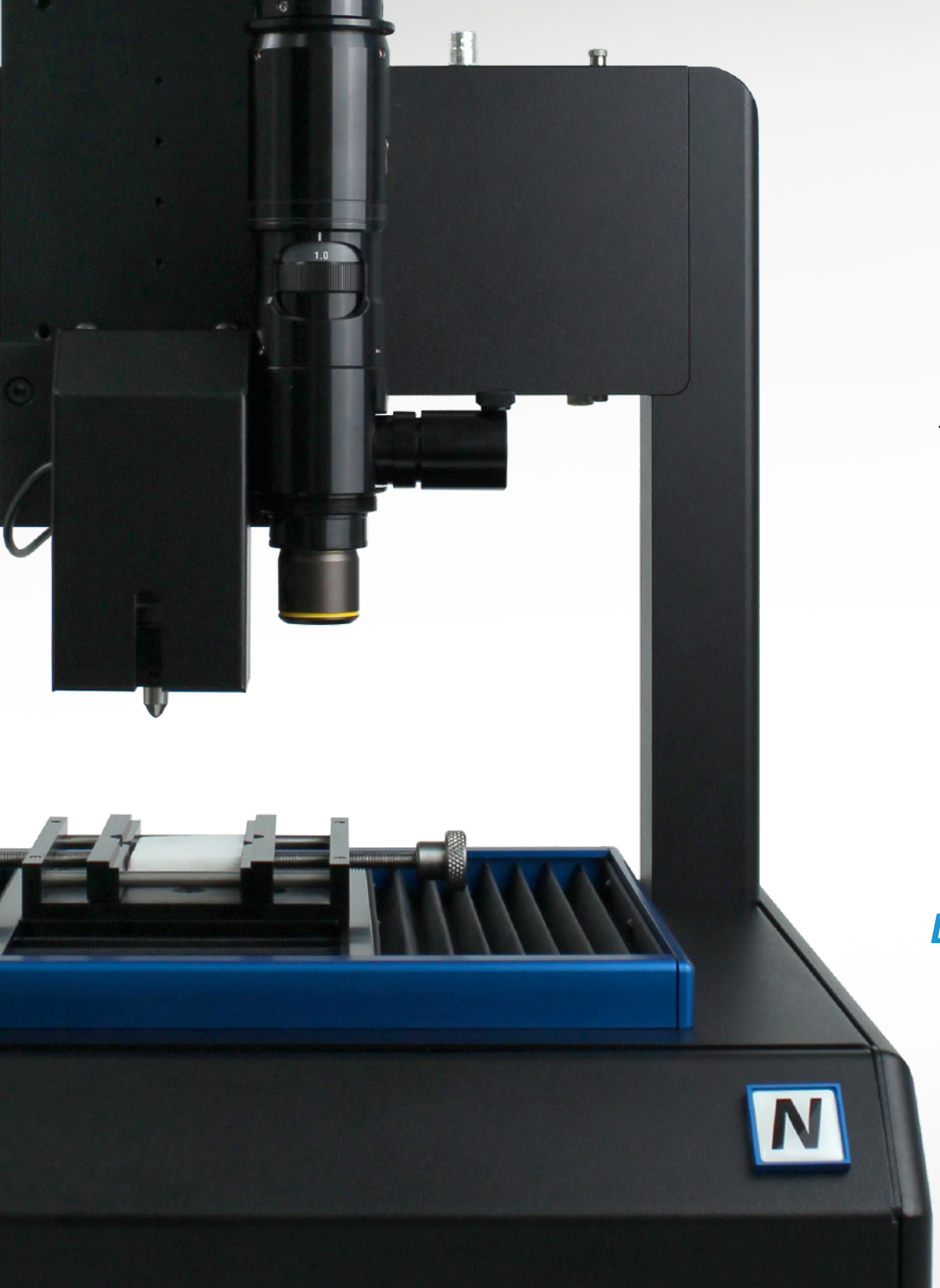
NANOVEA
CB500

COMPACT POWERFUL
MECHANICAL TESTER

microworld®



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.

MOTORIZED Z MOTION

CAPABLE OF MOVING 50mm

w/ VIDEO ZOOM

LATERAL ACCURACY of <0.2µm

w/ PRECISION ENCODER

LOW COST

MAINTENANCE

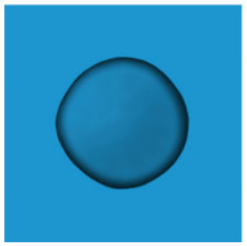
WIDE RANGE OF TESTING SOLUTIONS

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

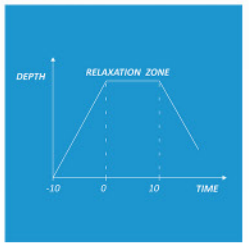
INDENTATION

FRACTURE TOUGHNESS

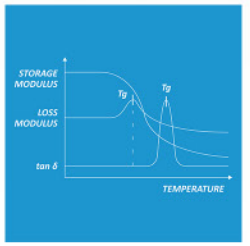
HARDNESS MAPPING



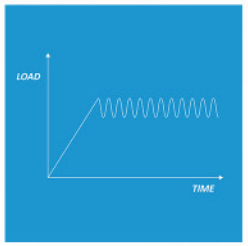
YIELD STRENGTH & FATIGUE



CREEP & RELAXATION



GLASS TRANSITION (Tg)



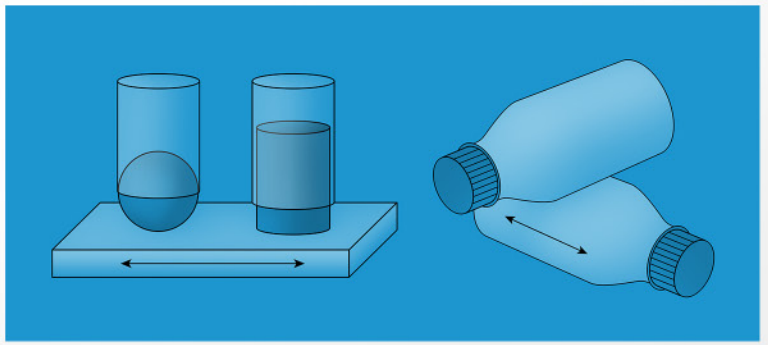
LOSS & STORAGE MODULUS

SCRATCH

COHESIVE & ADHESIVE FAILURE

SCRATCH HARDNESS

FRICTION



COEFFICIENT OF FRICTION

LOAD MODULES AVAILABLE ON CB500:

NANO OR MICRO

HIGH PRECISION CAPACITOR DEPTH SENSOR

DESIGNED TO ELIMINATE INNACURATE 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

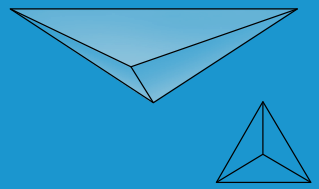
MODULES

NANO		MICRO
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.

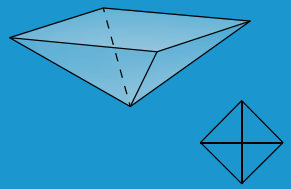
GUIDE TO INDENTER GEOMETRIES



BERKOVICH

BEST FOR

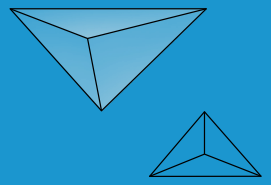
Instrumented Indentation:
Hardness & Modulus



VICKERS

BEST FOR

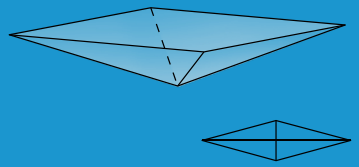
Instrumented Indentation:
Hardness, Modulus
& Fracture Toughness



CUBE CORNER

BEST FOR

Instrumented Indentation:
Hardness, Modulus
& Fracture Toughness

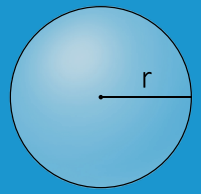


KNOOP

BEST FOR

Instrumented Indentation:
Hardness & Modulus

Anisotropic Material Studies

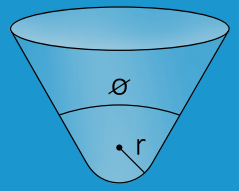


BALL

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

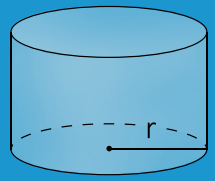


CONICO-SPHERICAL

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

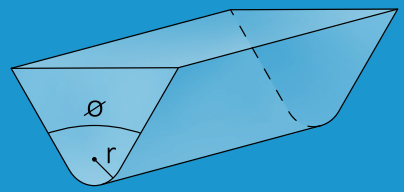


CIRCULAR FLAT

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

ENVIRONMENTAL MODULES

HIGH TEMP

Temperatures up to 600°C

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

Designed w/ MACOR material (thermal expansion coefficient < 10^{-6}/°C)

LOW TEMP

Temperatures lower than -40°C

Full enclosure of sample & indenter

Peltier cooling system for optimal accuracy

HUMIDITY

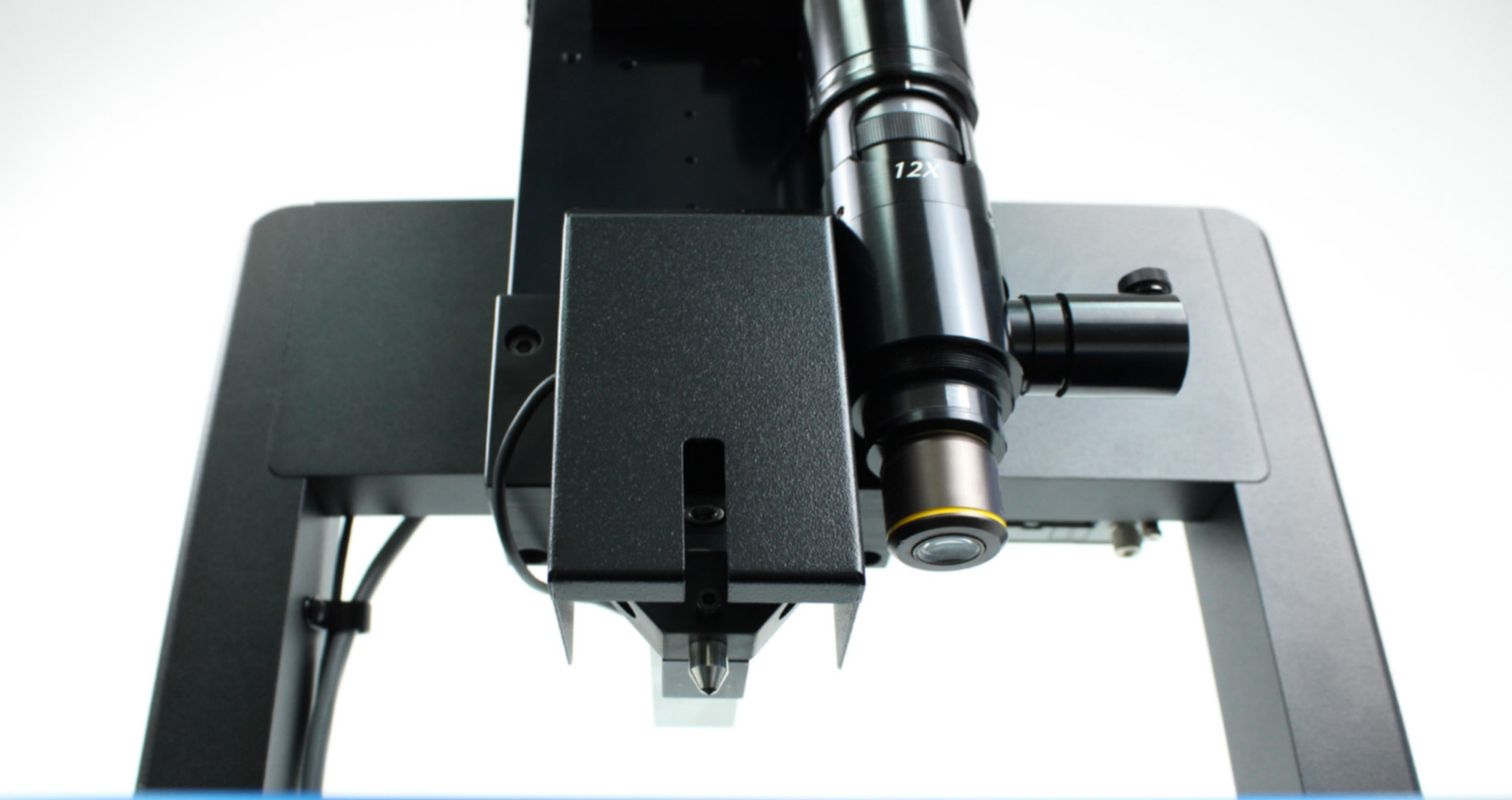
Humidity control below 5% & up to environmental dew point

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

100 x 50mm

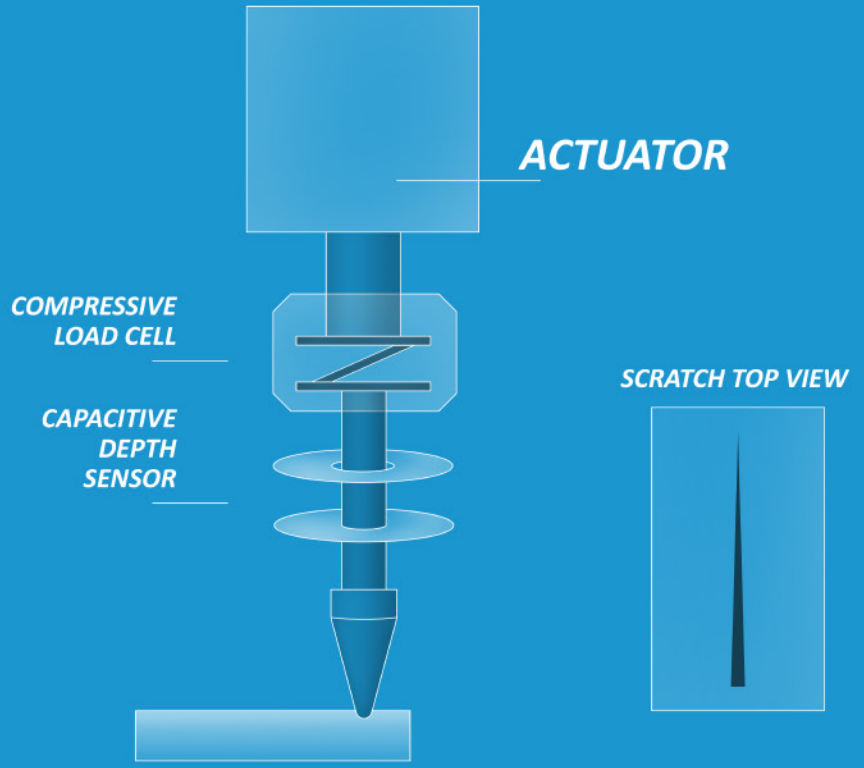
Z
MOTORIZED APPROACH

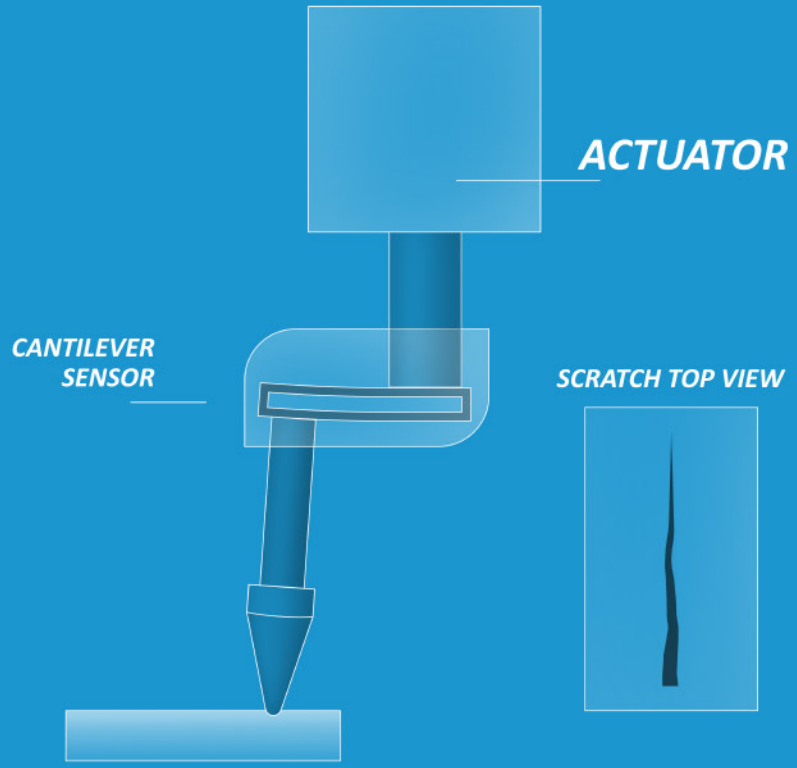
50mm

XY
LATERAL RESOLUTION

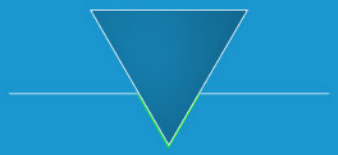
0.1µm

SUPERIORITY OF COMPRESSIVE LOAD CELL

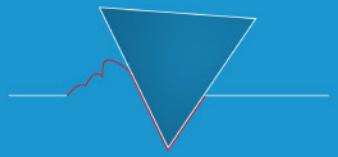




INDENTATION



LOAD IS APPLIED EVENLY

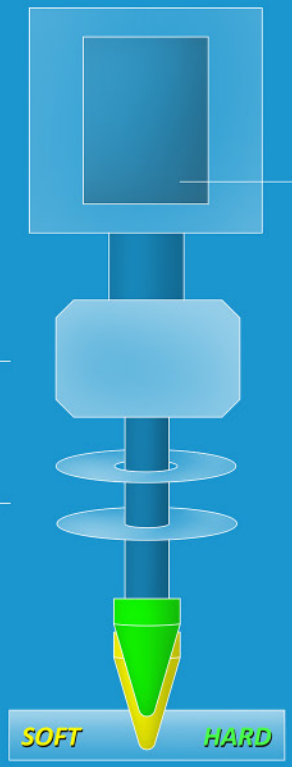


FORWARD MOVEMENT OF TIP DURING LOADING

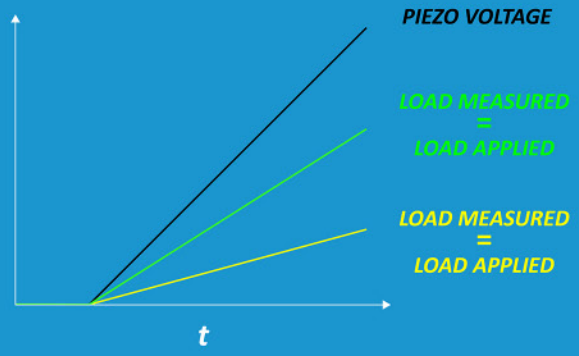
N NANOVEA

OTHERS

THE BETTER INDENTATION ACCURACY



INDEPENDENT LOAD & DEPTH SENSOR



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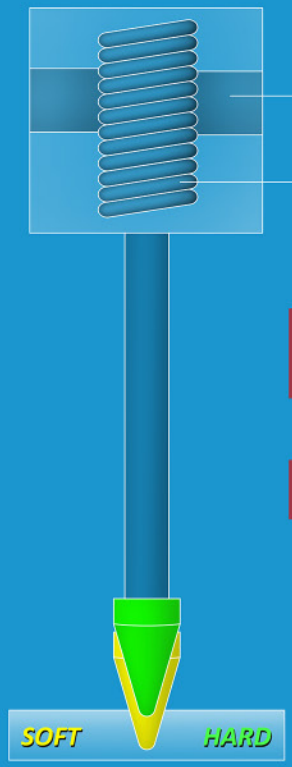
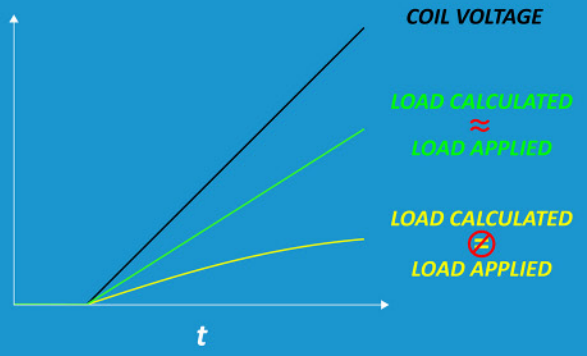


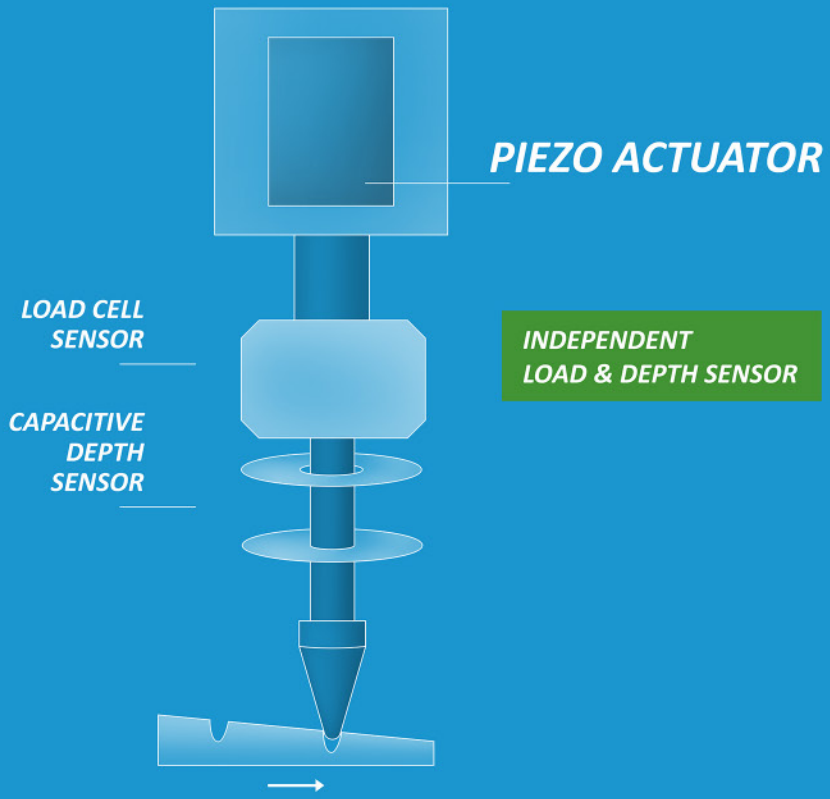
NO INDEPENDENT LOAD & DEPTH SENSOR

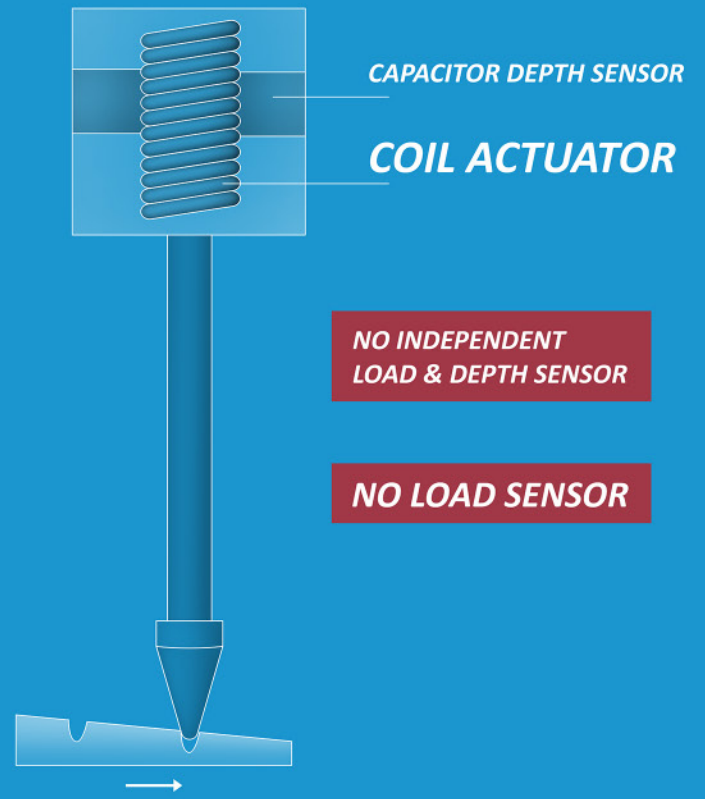
NO LOAD SENSOR



OTHERS

THE BETTER SCRATCH & WEAR

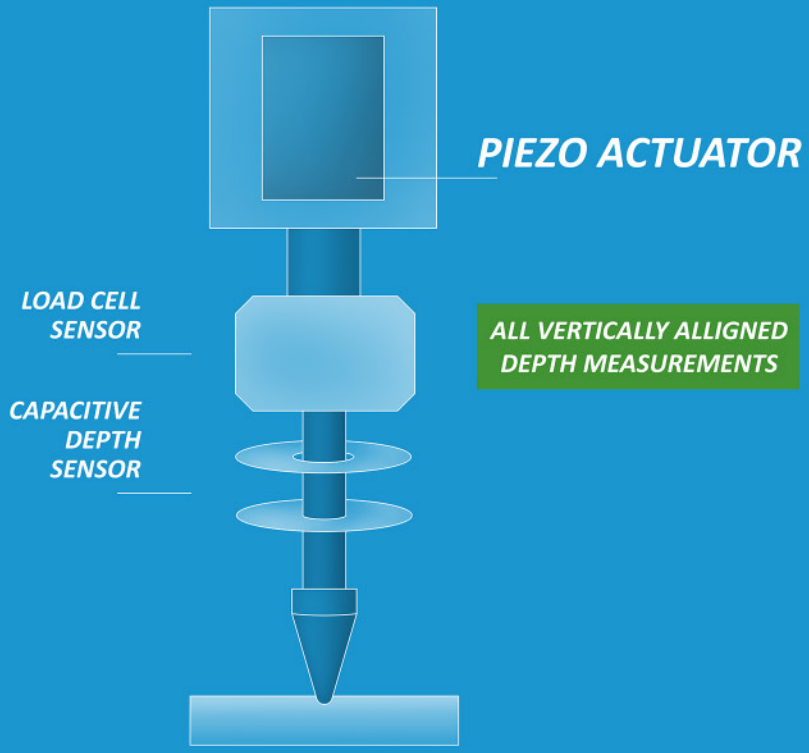




N NANOVEA

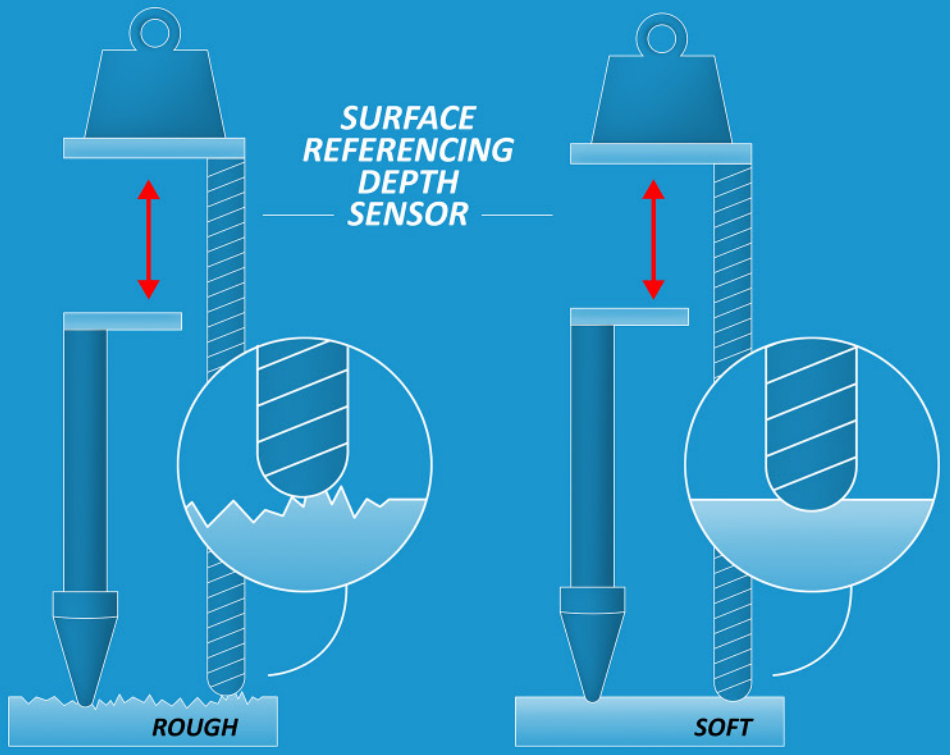
OTHERS

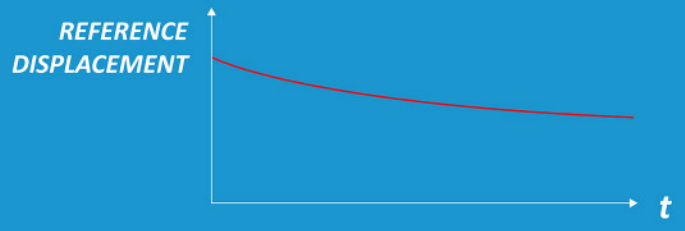
FLAWS OF SURFACE REFERENCING TECHNOLOGY



ALL VERTICALLY ALLIGNED DEPTH MEASUREMENTS

NO EFFECT FROM SURFACE REFERENCING





EVEN NANOMETER MOVEMENT EFFECTS DATA ACCURACY

N NANOVEA

OTHERS

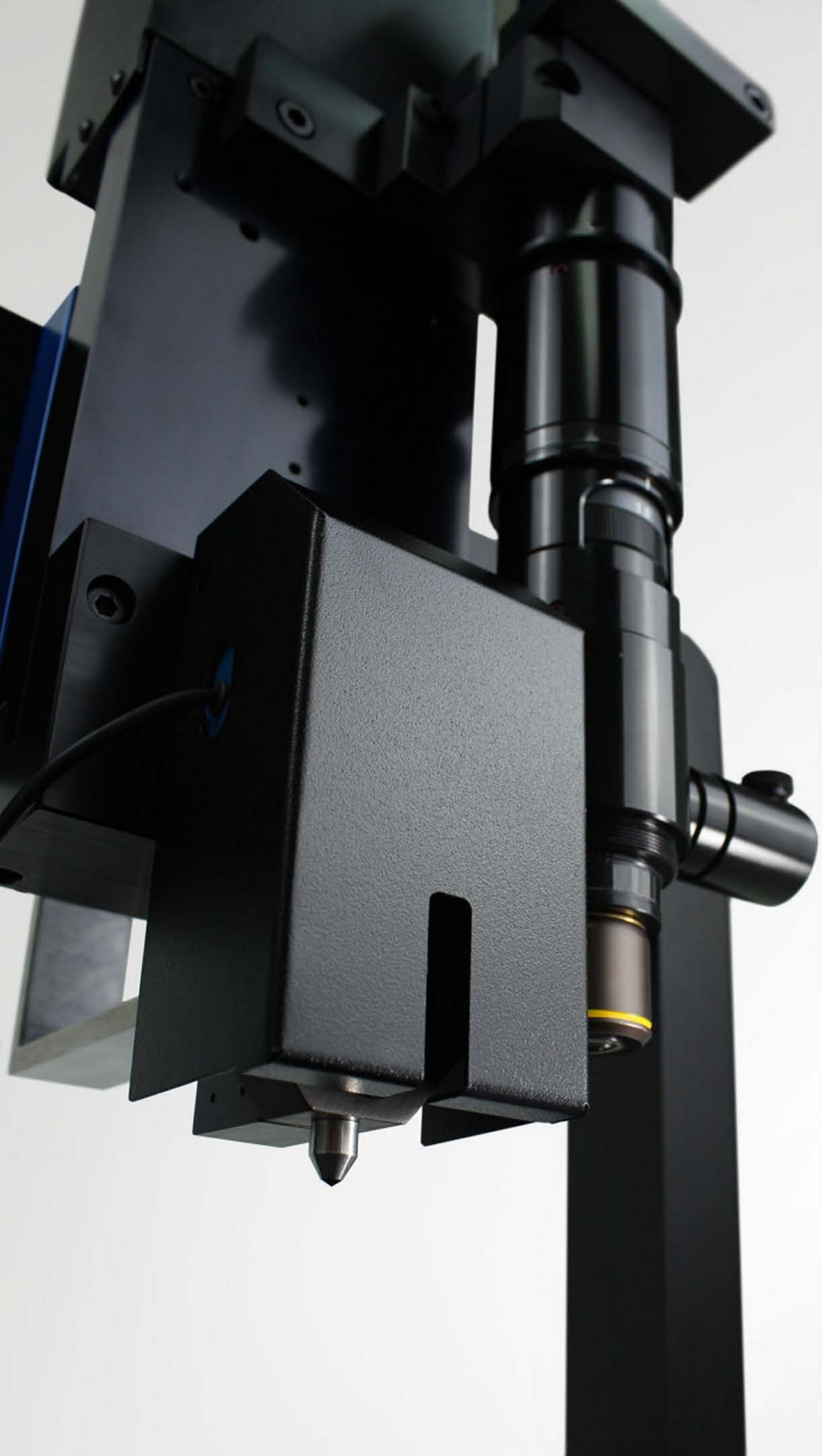
MICROSCOPE VIDEO IMAGING

up to 100x
objective magnification

1200 x 1600
color video camera

ACCURACY OF <0.2µm
to/from indenter position

LARGE AREA STITCHING
capability



NANOVEA

CB500

MECHANICAL TESTER

microworld®

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www.microworld.eu

Also, available as a powerful stand-alone version - ***PB1000***