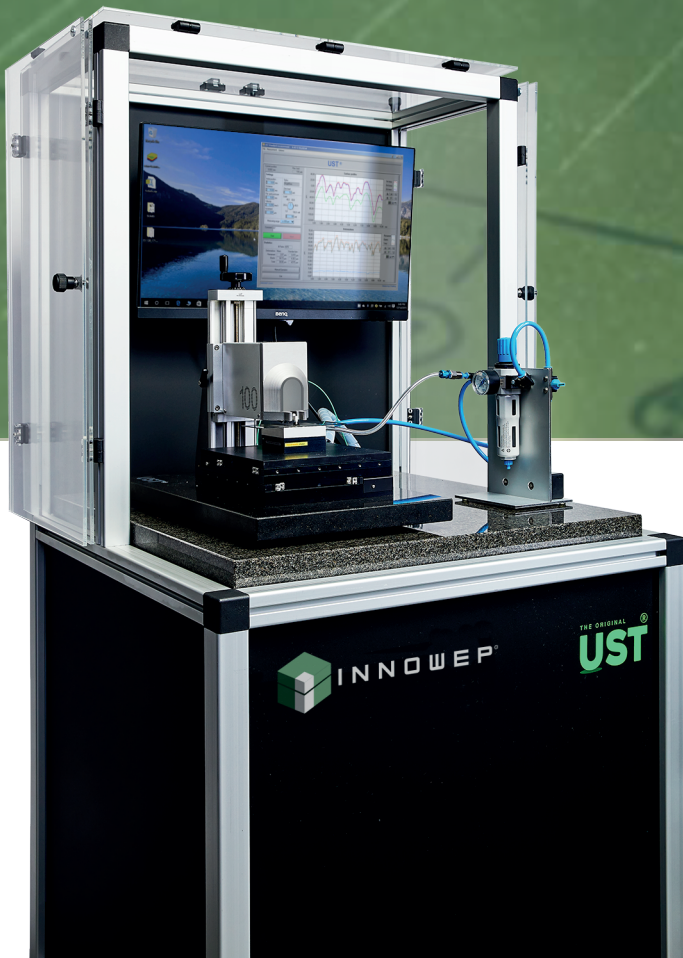
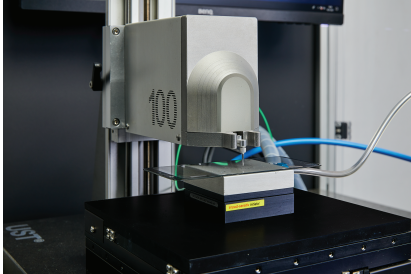


UST[®]



Indentation
Scratch
Deformation
Tribology
Surface Profile
Haptics



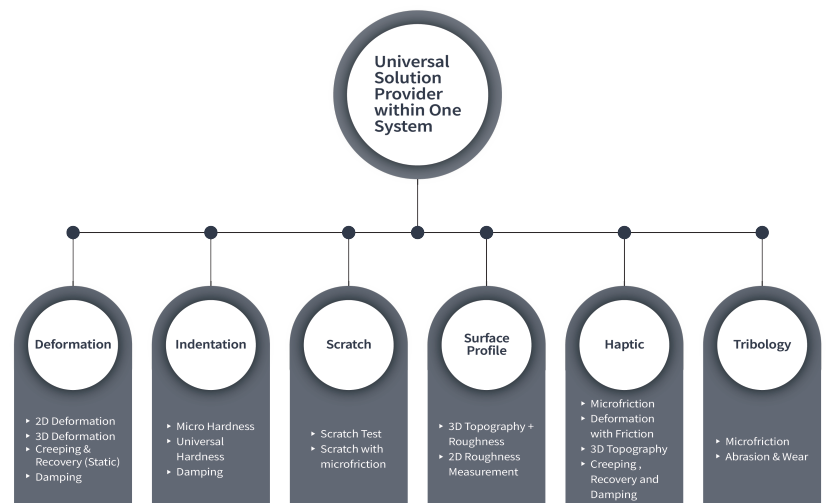
HIGHLIGHTS

- One machine for all measurements.
- All measurements with same resolution
- All measurements in real time, continuous and in-situ
- Mechanical property with local surface profile resolution
- Wide selection of tips from nanometer to centimeter

BASIC FUNCTIONS

Adequate measurements are of great importance for a reliable simulation and evaluation of micromechanical properties of materials and surface coatings, such as deformation of haptics. As material and coating behavior can vary considerably, a series of proper, real-time, quantitative measurements have to be performed with high resolution in the right dimension.

UST® - Universal Surface Tester, is by far the only open multi-modular system that provides a complete mechanical testing solution for the evaluation of bulk materials and surface coatings. Its unique configuration allows for a wide range of tip choices with various materials and sizes ranging from nanometer to centimeter.



UST® - Universal Surface Tester

- One machine for all tests
- Same Resolution (60nm)
- No need for correlation
- Local resolution
- Continuous measurement
- Surface structure combined with properties



Other Systems

- One machine for one type measurement
- Different resolution
- Need for further correlation
- No record with local resolution
- Point by point measurement
- No surface structure vs. properties

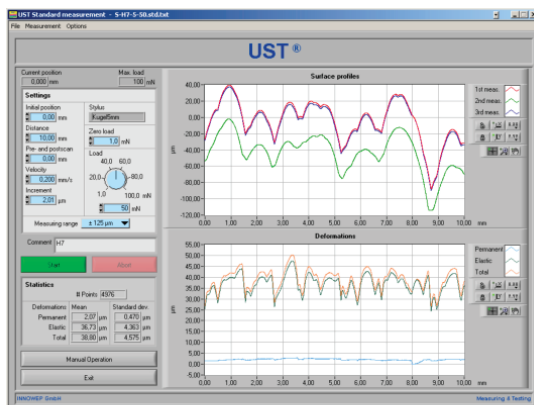
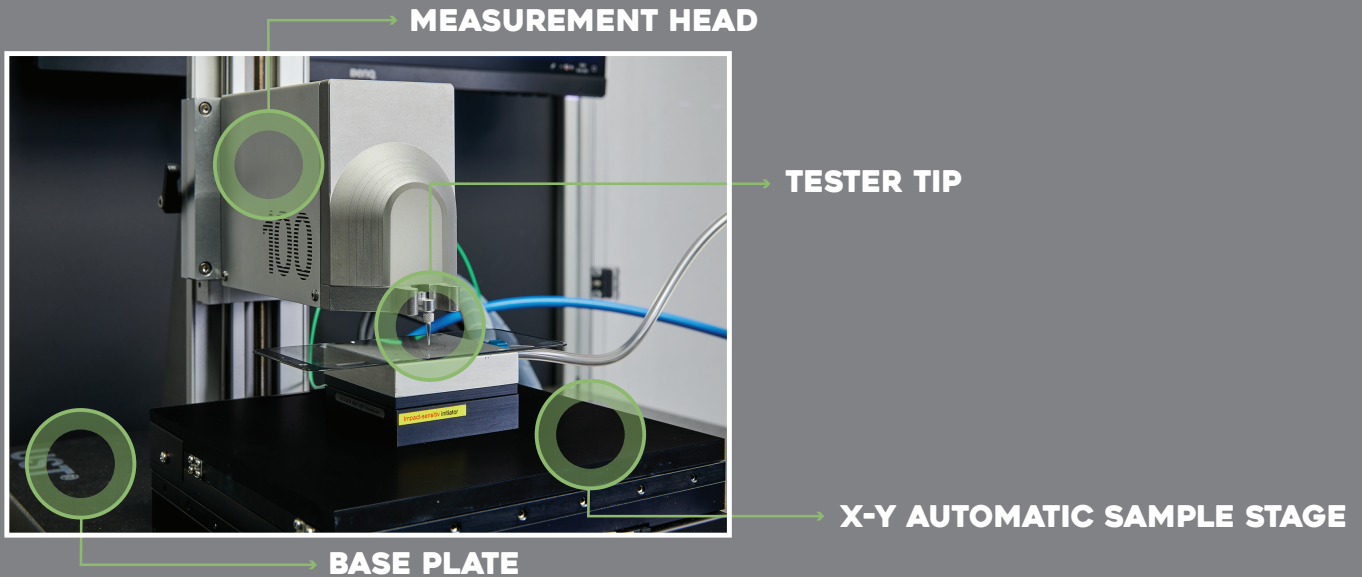
BASIC UNIT

Option 1:

UST[®] - 100 | Load range: 1mN - 100mN

Option 2:

UST[®] - 1000 | Load range: 10mN - 1000mN
(for harder surfaces and coatings)

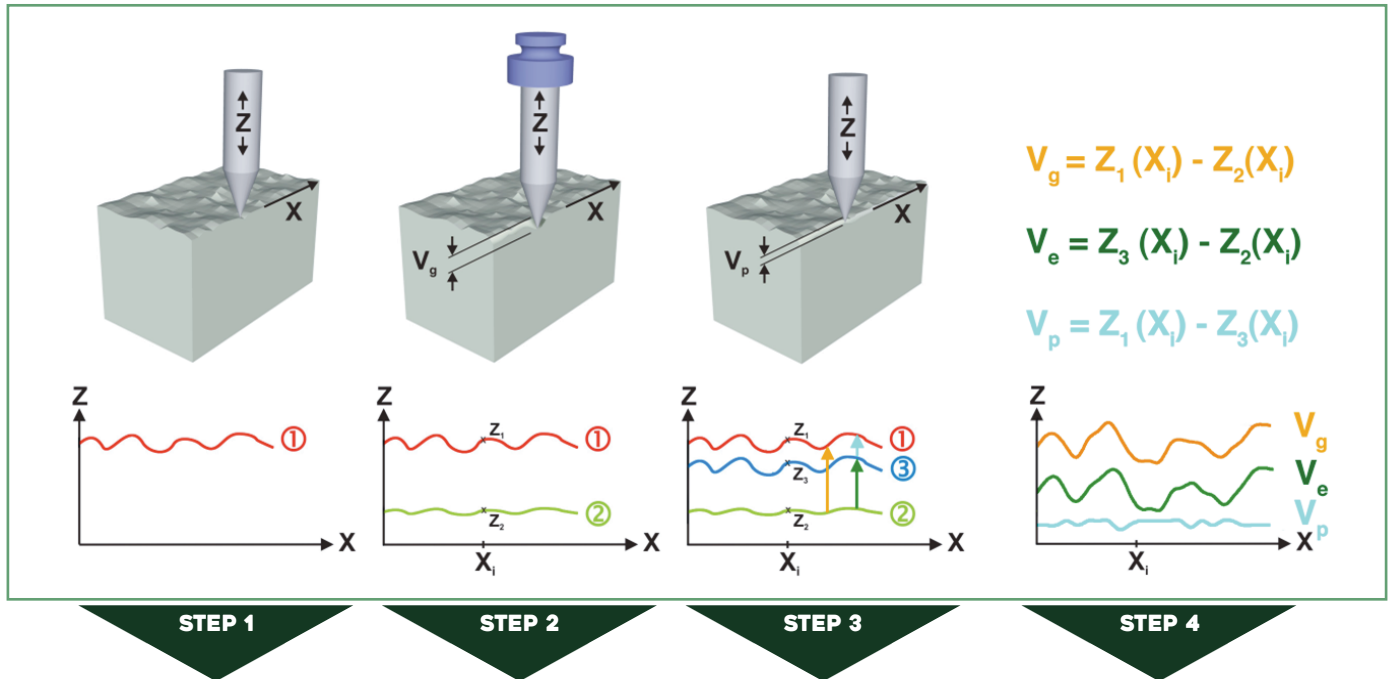


Standard Measurement: 2D Deformation
(total, permanent and elastic deformation)

UST[®] - Universal Surface Tester includes:

- 2D Deformation Measurement
- Tip check Calibration
- 3 Standard Tips (2 Steel Cones, Ball)
- 1 Big Clamp
- 1 Small Clamp
- Tools
- Screws

TEST PRINCIPLE OF UST[®] - WEINHOLD'S METHOD



Step 1 - Scan with no load. Surface structure is continuously determined.

Step 2 - Scan on the same path with additional load to determine total deformation.

Step 3 - Scan on the same path with no load to determine the elastic deformation.

Total deformation = Step 1 - Step 2

Elastic deformation = Step 3 - Step 2

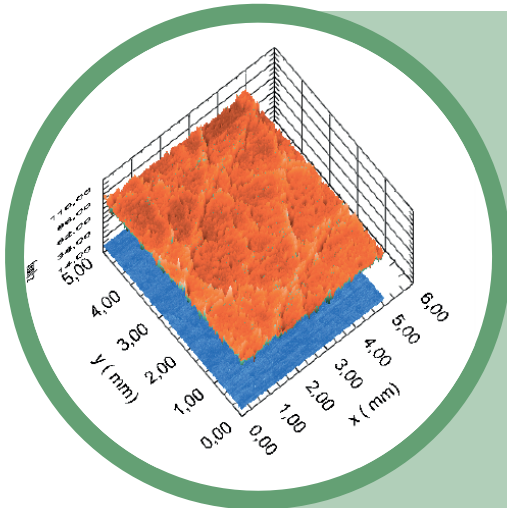
Permanent deformation = Step 1 - Step 3

STANDARDS AND SPECIFICATIONS

DIN EN ISO 14577-1 | DIN 4762, 4768 | ISO 4287, 4288

MODULES

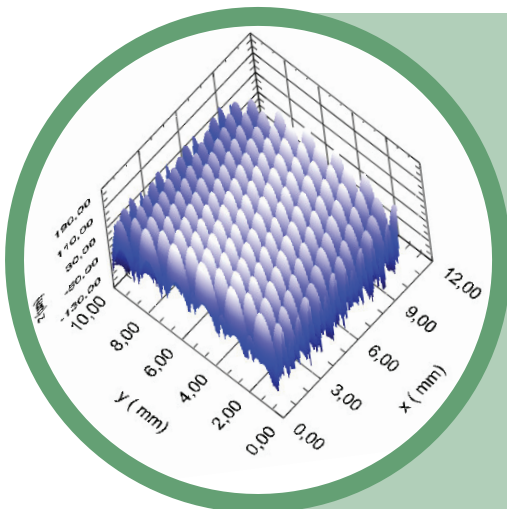
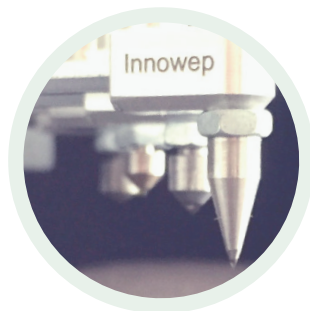
A selection of 10 different modules is available for all types of measurements and applications. Each module includes all necessary hardware, software, suggested tip and necessary tools.



MODULE 1: 3D DEFORMATION

Performs several single scans automatically on an area and registers the 3D deformation properties of a complete surface.

- 3D Deformation
- Tips: Diamond Cone 60°/90°/120°
Steel Cone 60°



MODULE 2: 3D TOPOGRAPHY

Performs several single scans automatically on an area and registers both: the 3D topography and the material properties of a complete surface.

- 3D Topography
- 3D Roughness
- Particle Mode
- Tips: Diamond Cone 60o | 90o | 120o
Steel Cone 60o

MODULE 3: SCRATCH

Standard Scratch (Budget Version)

Standard scratch test with local surface profile

Tip: Scratch Diamond 5° undercut



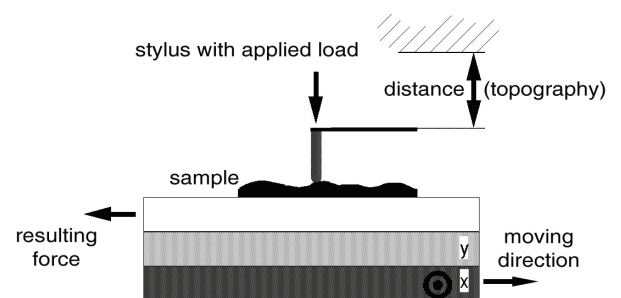
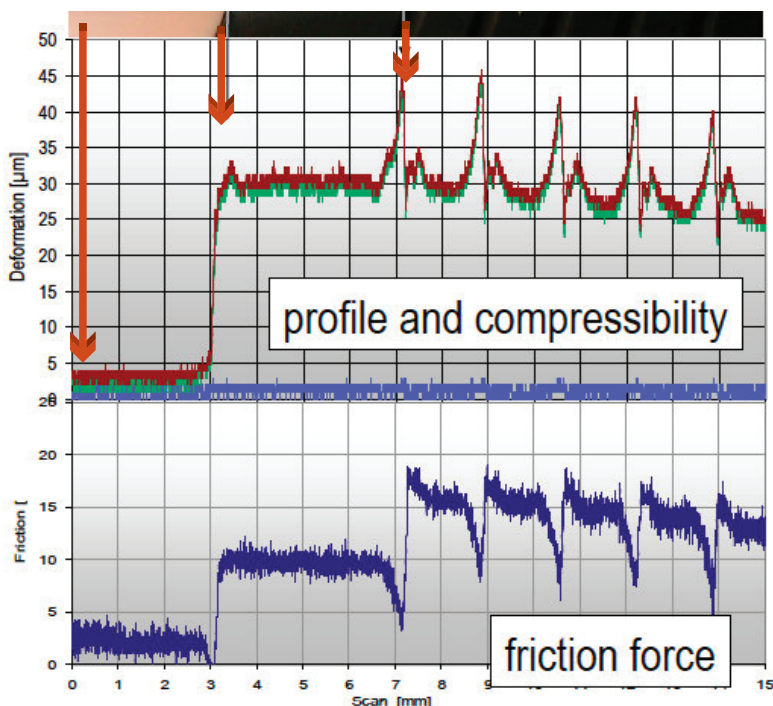
Micro Scratch with Microfriction (Premium Version)

Hardware: - Friction table with high resolution piezo sensor
- Controller card for PC
- Sample fixing and clamping set

Tip: Scratch Diamond 5° undercut



Continuous Measurement Along the Sample



Continuous measurements along one line on a sample made out of three different materials: wood, flat, polymer, polymer with grooves for the correlation of surface profile and microfriction.

MODULE 4: MICROFICTION (STANDARD)

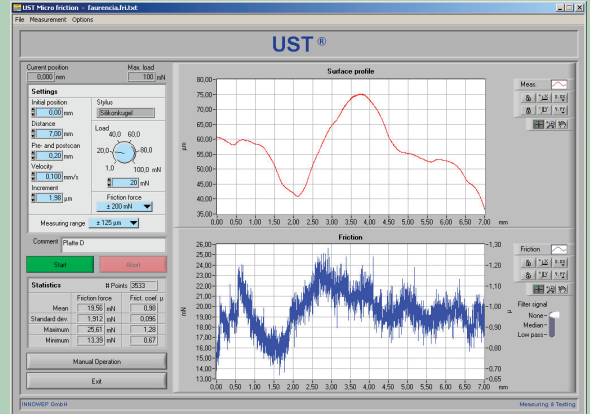
Measures the friction force between a sample and the tip during a scan with an accuracy in nM.

Hardware: - Friction table with sensor
 - Controller card for PC
 - Sample fixing and clamping

Micro Fiction + 2D Topography

Micro Fiction + 2D Deformation

Tip: Customized tip on request (e.g. haptical tip)



MODULE 5: ABRASION AND WEAR

Measures the abrasion rate with certain load repeating several times.

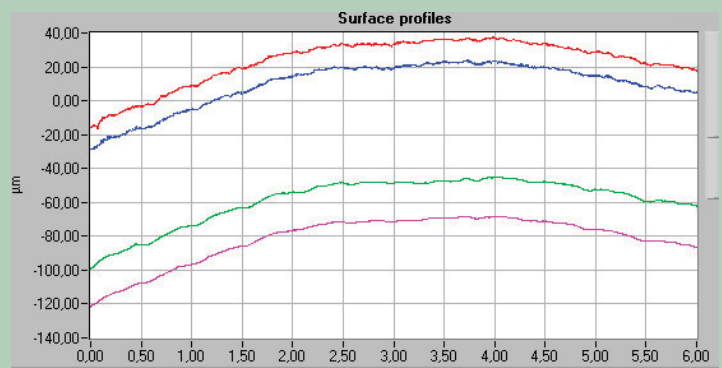
- Total Abrasion'
- Wear Rate
- Tip: Steel Ball 20mm

Red Line (1st measurement): surface profile

Blue Line (4th measurement): last measurement

Green Line (2nd measurement): with 1st load

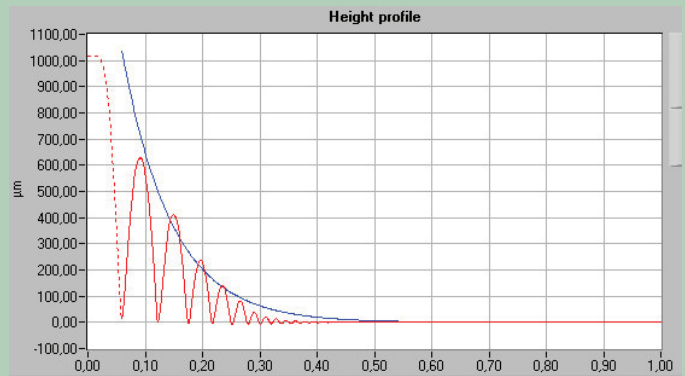
Purple Line (3rd measurement): 50th Abrasion time



MODULE 6: DAMPING

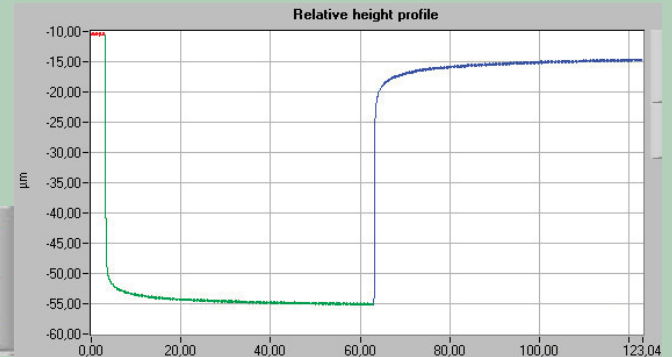
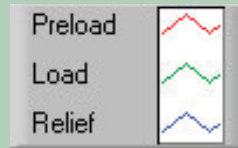
Special measuring mode for examining the elastic behavior of soft materials.

- Surface height profile is continuously recorded.
- Damping Oscillation
- Tip: Papillary stylus or customized tip on request.



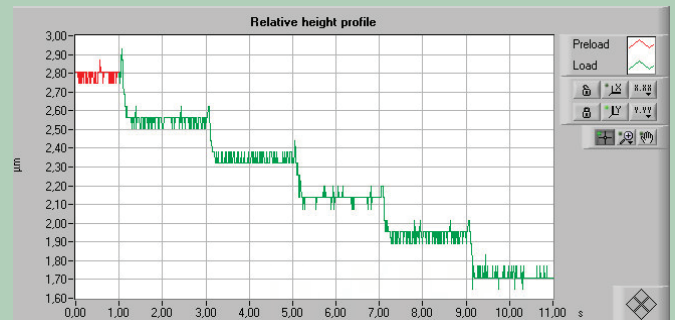
MODULE 7: VISCOELASTICITY (CREEPING & RECOVERY)

- 3-Step Measurement
- Materials reaction under strain and the relief property
- Tip: Customized tip on request



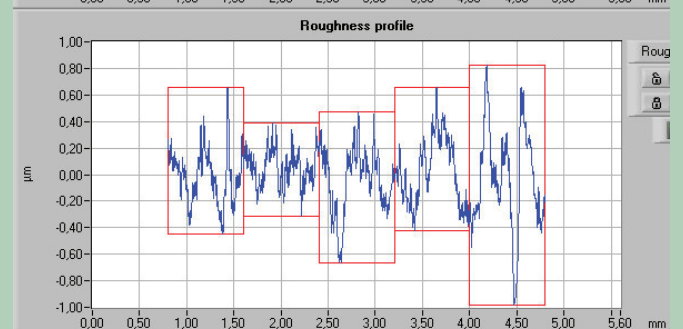
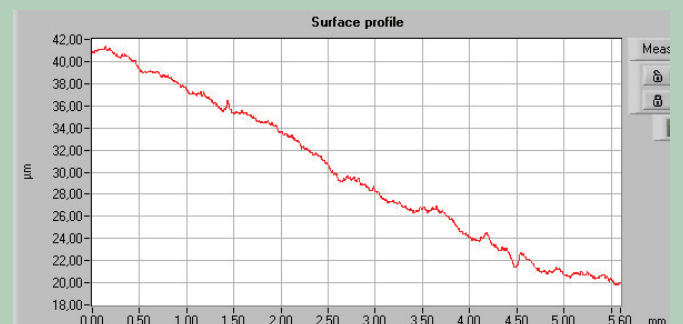
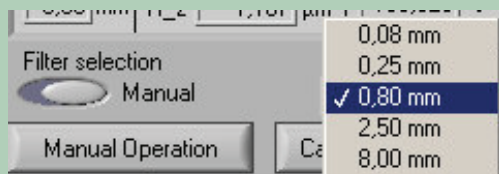
MODULE 8: UNIVERSAL HARDNESS

- According to DIN EN ISO 14577-1
- 2-Step Measurement
- Total Deformation
- Tip: Vickers Diamond | Berkovich-Diamond
or customized tip on request



MODULE 9: UNIVERSAL HARDNESS

- According to DIN 4762, 4768 | ISO 4287, 4288
- Scan once with a certain load
- Ra, Rq, Rz
- Automatic filter selection
- Tip: Diamond Cone 60° | 90° | 120°
Steel Cone 60°



MODULE 10: TAX

High quality measurement module for the evaluation of the abrasive wear resistance on the micro and macro scale.

It is available as a module on **UST®** or provide as a micro-calotester: **TAPERADER®**



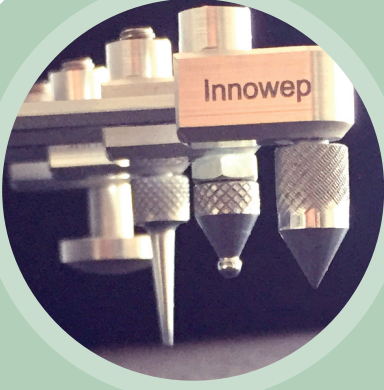
HARDWARE OPTIONS

- 1- Exchangeable Measurement Head: **UST® 100 mN** and **UST® 1000 mN**
- 2- Microscope: for documentation of the measurement process and results (photo function)
- 3- Videocamera: for documentation of the measurement process and results (video function)
- 4- Optical 3D Topography Module: non-tactile optical measurement of 3D topography
- 5- Vacuum Plate Package: for fixing samples. (Vacuum pump is included)
- 6- Mini-Clamping Tool Set: fixing tool for harder samples
- 7- Quick Plates: for easy and quick fixture of samples

UPGRADE OPTIONS

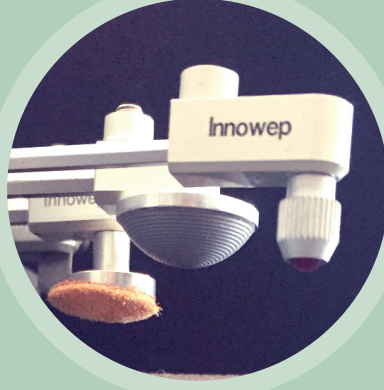
New X-Y automatic sample table and all software are available for upgrade. Please, contact our technical engineer department for detailed information.

TIP OPTIONS



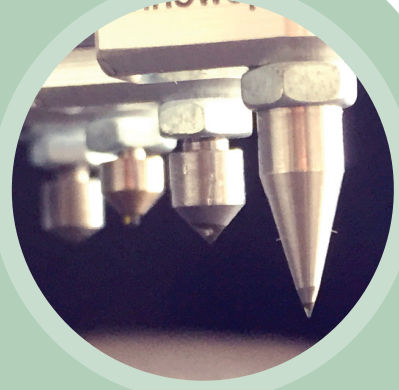
Steel Tip Groups

Steel ball: 0.8 mm
1.8 mm
5.0 mm
Steel Cibe: 60°



Other Tip Groups

Cutting tool
Aluminum ball 20mm
Table Tennis
Juby | Leather | Papillar



Diamond Tip Groups

Diamond Pyramid 60°
Diamond 60°
Diamond 90°
Diamond 120°

