

The mechanical surface properties testing platform Anton Paar Step 500



Technical description:

The mechanical surface properties testing platform from Anton Paar company model Step 500 is equipped with:

NHT3 tester (nano hardness tester);

MCT3 tester (micro combi tester);

optical head providing magnification of 5,20,50,100 times;

anti-vibration table, movable in x (215 mm), y (75 mm), z (30 mm) axes.

The Nanoindenter NHT3 is a precision instrument designed to determine the mechanical properties of materials and thin films at the nanometer scale. The NHT3 complies with ASTM-E2546 standard for nanoindenters, while the MCT3 module complies with ASTM: C1624, E2546, G171 and ISO: 14577, 20502, 27307.

The micromechanical properties are determined by the deformation of the material as a result of indenting the sample with an indenter. The value of the loading load and the penetration depth of the indenter tip are recorded continuously during the entire cycle (loading and unloading). Properties such as hardness, Young's modulus, creep time, and fracture toughness are determined from the load vs. displacement curve plotted. Using minimum loading forces on the indenter, it is possible to perform measurements at depths of several hundred nanometers, which is especially important when testing thin films where the influence of the substrate on the determined properties should be eliminated. MCT module allows to perform scratch tests.

The platform offers high repositioning accuracy (<1 µm) over the entire distance range and synchronizes the position of the video microscope with the head indenter.

Trade name: The mechanical surface properties testing platform Anton Paar Step 500

More details: </equipment/platforma-do-badan-mechanicznych-wasciwosci-powier/>

Access type: External

Type of accreditation / certificate: Not applicable

Contact person: Drenda Cezary

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Responsible body: Department of Machine Design and Maintenance

Group / laboratory / team: Laboratory of Tribology and Surface Engineering

Last update date: Feb. 13, 2024, 1:08 p.m.

Year of commissioning: 2020

IDUB research areas:

(PRA 4) Technical solutions: from fundamental research, through modelling and design, to prototypes. The application of mathematical, information technology, and electronics tools to macro-, micro-, and nanoscale problems

(PRA 5) Materials, technologies, and processes inspired by nature: biotechnology, bioinspirations in engineering and materials science, biosensors, bioenergetics, biocatalysis, biocomputers, and biocomputation

(PRA 7) Design, production, and testing of modern materials and the technologies of the future based on a multidisciplinary approach combining materials engineering with chemistry, physics, mathematics, and medicine

Research capabilities:

The device allows:

determination of hardness and Young's modulus of soft, hard, brittle and ductile (plastic) materials
performing scratch-test

Measurement capabilities:**NHT:**

indenter loading force setting range 0.1-500 mN

accuracy of penetration depth measurement 0.01 nm

accuracy of indenter loading force measurement 0.5 μ N

sample positioning 1 μ m

MCT:

indenter loading force setting range 0.05-30 N

accuracy of penetration depth measurement 0.03 nm

accuracy of indenter loading force measurement 6 μ N

sample positioning 1 μ m

Conditions for providing infrastructure:

After contacting the laboratory manager