

FISCHERSCOPE® HM2000 S

Cost-effective Nanoindentation Measuring System with for Bulk Material and Coatings thicker than 1 µm (0.04 mils)



Description

The FISCHERSCOPE® HM2000 S is a cost-effective nanoindentation measuring system and employs the instrumented indentation test method according to ISO 14577 and ASTM E2546. The instrument is perfectly suitable for measurements in development, quality assurance, incoming inspection and process control.

Typical fields of application

- Measurements of specimen with a simple shape
- Paint, plastic or hard material coatings (PVD, CVD)
- Electroplated coatings (decorative, functional)
- Characterisation of hard anodic coatings
- Materials used specifically in medical technology applications
- Plasma-applied coating systems

Measurable characteristic material quantities

Material characteristics computed according to ISO 14577-1 Annex A:

- Martens hardness HM
- Indentation hardness H_{IT} (convertible to Vickers Hardness HV)
- Modulus of indentation E_{IT}
- Indentation creep C_{IT}
- Percent elastic portion η_{IT} of the indentation work W_{elast}/W_{total}
- ESP – mode, partial load and unload measurements, for depth-dependant determination of quantities like E_{IT} , H_{IT}

Design

The measuring head contains the indenter, the test load generating unit, and the position measurement unit for determining the indentation depth, as well as the entire electronic system.

Features

- Minimal sample preparation
- In-situ zero point determination during the measurement
- Measurement of dark surfaces without sample pretreatment
- Optional: Additional stone plate with silicon damper pads to reduce influence of vibrations
- Easy operation through the WIN-HCU® Software
- Excellent temperature stability of the measuring head means the creep behaviour of materials can be determined precisely with measuring times up to several hours.
- Optional: Dynamic Mode for determining visco-elastic material properties, e.g. of lacquers and polymers

For difficult geometries, cross-sectioned samples and automated measurements, the HM2000 S can be upgraded with a programmable X/Y/Z positioning aid with an attached microscope.

General Specification

Intended use	Nanoindentation on lacquer coatings, bulk materials, electroplated coatings, hard material coatings, polymers and much more
Design	Measurement system with PC, measuring head and stand
Damper system	Stone plate with 4 damper pads
Frame Stiffness	50×10^6 N/m

Measuring Head

Hardness measurement range	0.001 – 120 000 N/mm ² : near diamond hardness
Test load range	0.1 – 2000 mN
Load resolution	≤ 150 nN
Distance resolution	< 10 μ m
Noise floor	< 175 μ m

Indenters

Design	Standard: Vickers Optional: Berkovich, Knoop, hard metal spheres $\varnothing 0.4$ mm or $\varnothing 2.0$ mm, Special shapes on request
Approach speed of the indenter	≤ 0.7 μ m/sec
Maximum indentation depth	500 μ m

Sample Stage

Design	Stand
Specimen size	Min. $\varnothing 6$ mm

Options

Dynamic Mode	Dynamic Mode for determining visco-elastic material properties, e.g. of lacquers and polymers, Frequency range 0.01 – 50 Hz
Enhanced damper system	Additional stone plate with 4 damper pads
Sample holders	Holder for cylindrical specimens

Measurement chamber S



Closed measurement chamber for reducing influences of ambient acoustic noise. Door can be mounted on left or right side.

Electrical Data

Main voltage, mains frequency	100 to 240 V \pm 10 % 47 – 63 Hz
Power consumption	max. 20 W (without evaluation PC)
Protection class	IP20

Dimensions

External dimensions (Width x depth x height)	400 mm x 520 mm x 400 mm
Weight	35 kg incl. stand

Environmental Conditions

Operating temperature	10 °C – 40 °C / 50 °F – 104 °F
Storage/Transport temperature	0 °C – 50 °C / 32 °F – 122 °F
Admissible air humidity	\leq 95 %, non-condensing

Evaluation Unit

Software	WIN-HCU®
Operating system	Windows®

Standards

CE approval	EN 61010
Standards	DIN EN ISO 14577, ASTM E 2546

Order

FISCHERSCOPE® HM2000 S	605-450
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