

FISCHERSCOPE® HM2000 S

Cost-effective Nanoindentation Measuring System
with Measuring Head HT2000 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:

- 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 HT2000 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
- Single step indentation process with fully automated surface detection
- 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 means the creep behaviour of materials can be determined precisely with measuring times up to several hours.

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

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|---------------|-----------------------------------------------------------------------------------------------------------------------------|
| 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 |

Measuring Head HT2000

| | |
|----------------------------|-----------------------------------------------------------|
| 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 µm |
| Noise floor | < 175 µm |

Indenters

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|--------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Design | Standard: Vickers Optional: Berkovich, Knoop, hard metal spheres Ø 0.4 mm or Ø 2.0 mm, Special shapes on request |
| Approach speed of the indenter | ≤ 0.7 µm/sec |
| Maximum indentation depth | 500 µm |

Sample Stage

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|---------------|-------------|
| Design | Stand |
| Specimen size | Min. Ø 6 mm |

Options

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|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 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 caused by air flows, e.g. air conditioning. Door can be mounted on left or right side. |



Electrical Data

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|-------------------------------|------------------------------------|
| 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

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

Environmental Conditions

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|-------------------------------|--------------------------------|
| 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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