

» Heating Microscope with Automatic Image Analysis Tube Furnaces

The Hesse Instruments heating microscope is a complete testing system designed to easily determine the high-temperature characteristics of a wide range of materials. Its method of measurement is based on thermo-optical analysis.

Automatic contour recognition and evaluation of the silhouettes of a test object are used to identify its characteristic temperatures according to DIN 51730, ISO

540 and CEN/TS 15404 and 15370-1. Characteristic points – and a sintering temperature as well – are calculated using fixed algorithms. The method is based on quantitative analysis of the test object height and width (optical dilatometry).

Thanks to the automatic software evaluation, precise and reproducible results are obtained independently of the person who performed the measurements.

Design and Properties

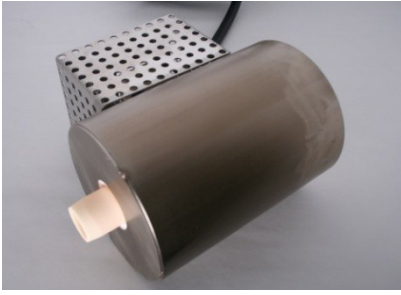
The electrically heated tube furnaces are suitable for examining test objects in the direct beam path. Their design is compact and functional with an exchangeable working tube of dense sintered alumina which is enclosed by a spiral heating element, insulated by ceramic fibers.

Molybdenum disilicide heating elements are extremely long-living: During operation a flexible glassy SiO_2 layer forms on the MoSi_2 surface. This layer effectively protects the heating element from further corrosion by oxidation. (In contrast, SiC heating elements form a rigid crystalline SiO_2 layer which is not able to stop a continuous oxidation of silicon carbide.)

Two furnace models are available to meet different requirements regarding maximum temperatures or heating rates.

The furnace temperature is measured close to the heating element. To exactly determine the sample temperature, an additional thermo couple is positioned within the sample holder right below the test object.

Temperature values in the below table are related to furnace temperatures; the same applies for parameter settings in the software. As a matter of fact, the determination of characteristic temperatures is based on the exactly measured sample temperatures.



Defined furnace atmospheres can be realized with all furnace models

- ... oxidizing atmosphere (air) with an open working tube
- ... reducing or inert atmospheres: gases with gas flow rates of 2 ... 4 l/min or a moderate vacuum

To meet requirements beyond these, Hesse Instruments will custom-design equipment solutions.

Technical Data

Furnace 1750/80 HT-19

Furnace 1600/80 HT-16

| | | |
|----------------------------------|--|--|
| Furnace model | EMO-1750/80 | EMO-1600/80 |
| Heating element | Molybdenum disilicide (MoSi ₂) | Molybdenum disilicide (MoSi ₂) |
| Maximum furnace temperature | 1750°C | 1600°C |
| Sample temperature up to approx. | 1650°C | 1500°C |
| Maximum heating rates | ≤ 80 K/min up to 1400°C ≤ 50 K/min up to 1550°C ≤ 10 K/min above 1550°C | ≤ 80 K/min up to 1400°C ≤ 50 K/min above 1400°C |
| Working tube | 99,7 % Al ₂ O ₃ , exchangeable | 99,7 % Al ₂ O ₃ , exchangeable |
| Inner diameter | 20 mm | 20 mm |
| Length | 180 mm | 180 mm |
| Dimensions of furnace | | |
| Diameter | 100 mm | 100 mm |
| Length without working tube | 140 mm | 140 mm |
| Length incl. working tube | 180 mm | 180 mm |
| Heating current (maximum) | 30 A | 25 A |
| Power requirements, max. | 1000 W | 1000 W |
| Warranty | Warranty claims due to defects shall be time-barred by the statute of limitations 12 months from the date of delivery. This shall also apply to heating elements, furnace insulation or alumina working tubes, insofar as these claims are due to manufacturing defects. Product- and application-specific aging processes and/or reduced product- and application-specific durability and function times shall not constitute any defect in this context. | |
| Function times for warranty | 6 months (max. 900 hours of cyclic operation) | 12 months (max. 1800 hours of cyclic operation) |

Specifications subject to change without notice. Information version: October 2009



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