Haas

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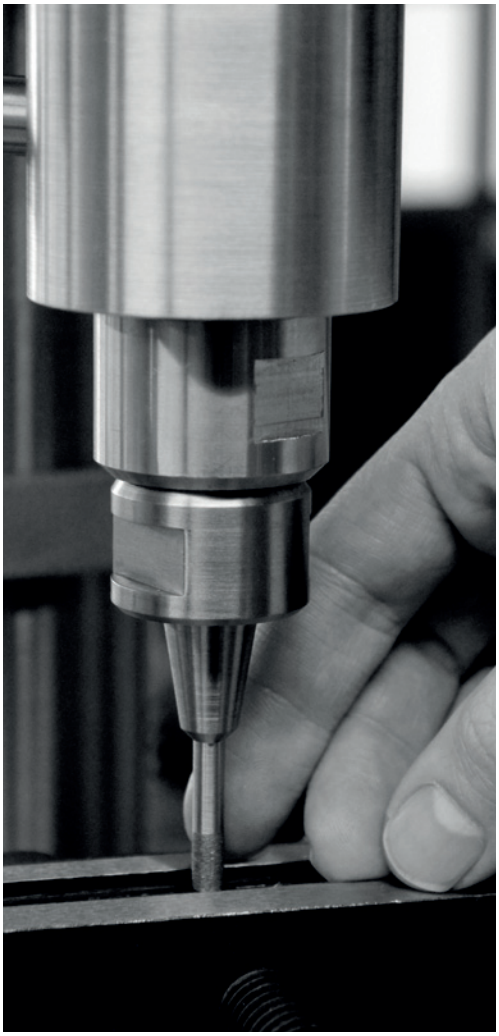
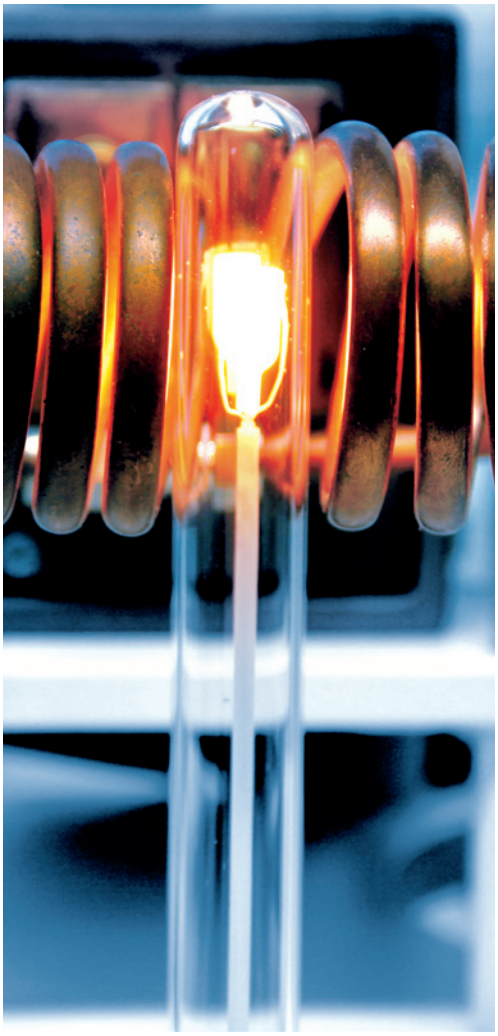
THERMAL CONDUCTIVITY ANALYZER

Heat Flow Meter
HFM 200
HFM 300
HFM 600

Pobierz naszą wizytówkę:

www.haas.com.pl





German engineering

The strive for the best due diligence and accountability is part of our DNA. Our history is affected by German engineering and strict quality control.

Innovation

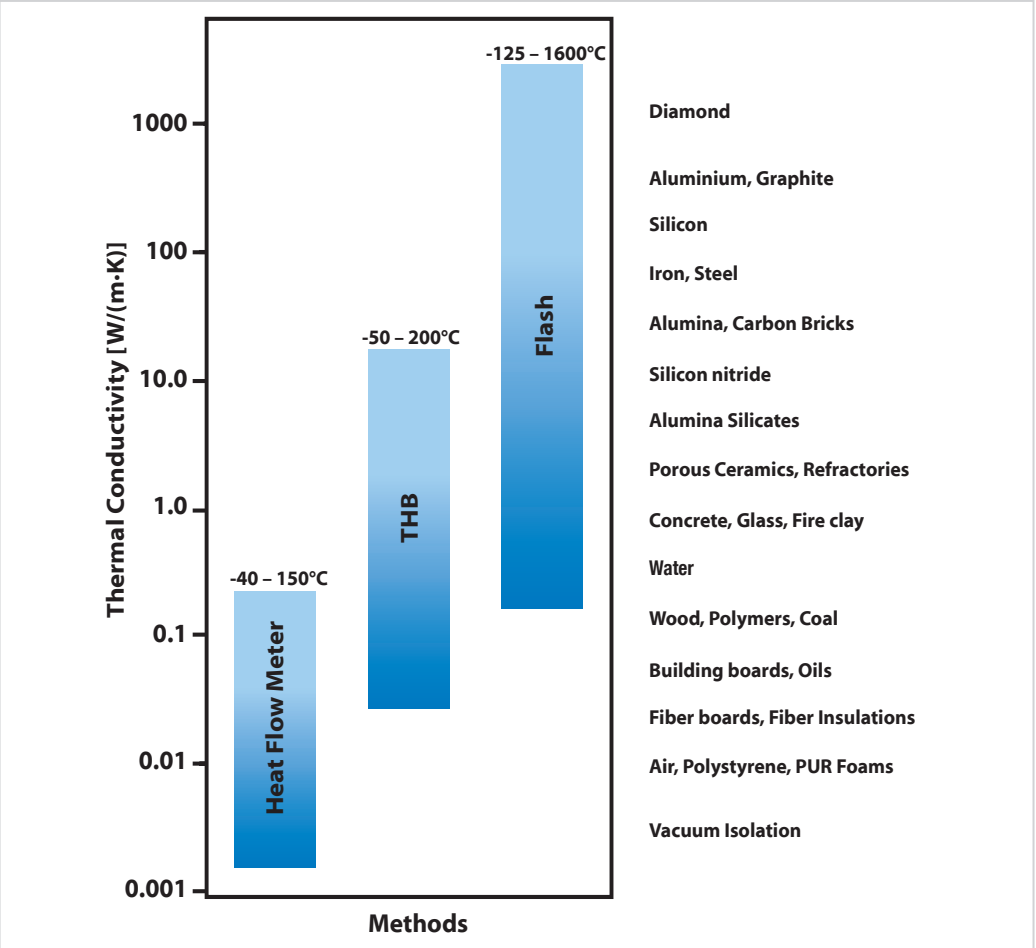
We want to deliver the latest and best technology for our customers. LINSEIS continues to innovate and enhance our existing thermal analyzers. Our goal is constantly develop new technologies to enable continued discovery in Science.

INTRODUCTION

An insulating material is a material with low thermal conductivity, which in the construction industry, equipment manufacturing, or the production of refrigerators, freezers, etc. is used for thermal insulation.

The physical properties to determine the effectiveness of insulation material are the thermal conductivity, the heat transfer coefficient.

The performance of an insolation material component is given by its heat transfer coefficent DELTA. This value can be determined with a HFM where a square specimen (200x200mm, 300x300mm or 600x600mm) is located between a hot and a cold plate (temperature gradient). The heat transfer coeffcient can be calculated from the measured heat flow through the sample divided by the cross-section area and the applied temperature difference. For a homogeneous material the thermal conductivity lambda is given by the quotient of DELTA divided by the sample thickness.



LINSEIS offers a complete range of thermal conductivity analyzers, ranging from Laser Flash and Xenon Flash Thermal constant Analyzers (small samples, liquids, powders, pasts, multilayer samples, broad measuring range and temperature) to Heat Flow Meters (Building and Insulation material) and a Transient Hot Bridge Analyzer (Solids, Liquids, Powders, Pasts and Gasses).

Furthermore Dilatometers (DIL L76 and L75) for length and density change and Differential Scanning Calorimeters DSC for determination of Specific Heat Cp are available.

THE INSTRUMENTS

This Heat Flow Meter provides a rapid and easy to use instrument to determine the thermal conductivity properties of low thermal conductive insulation materials and other materials with a high level of accuracy. The instrument´s design is based on ASTM C518, JIS A1412, ISO 8301 and DIN 12667. The principle of measurement is to position a sample between a hot and a cold plate, and to measure the heat flow.

Service and Maintenance

The robust system design and the unique "zero maintenance" peltier heating and cooling cycle ensure a minimum of upholding cost.

Test Cycles

The double heat flux sensor configuration ensures shortest possible measurement cycles. A typical measurement for most samples can take as little as 15 minutes until the temperature stabilizes.

Sample Thickness

The instrument has two built in linear potentiometer, offering automated highest precision sample thickness determination.

Two heat flux sensors then measure the heat flow, which is precisely defined between the hot and cold plate.

HFM 600

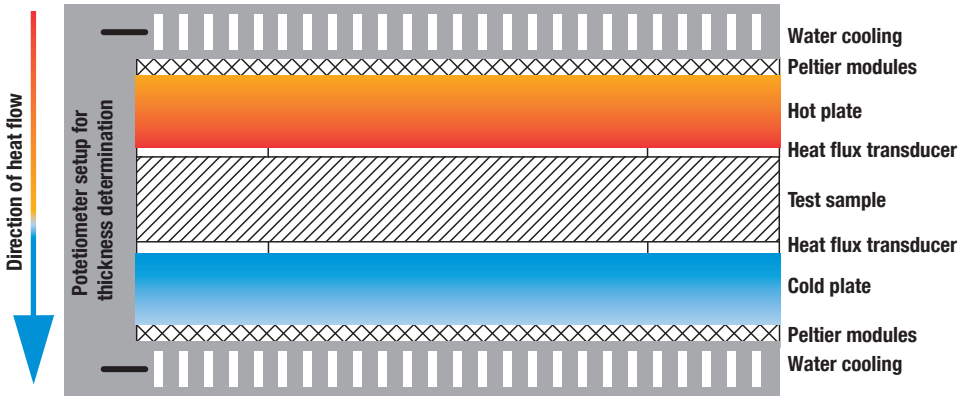
HFM 300

SYSTEM DESIGN

The LINSEIS Heat Flow Meter is a robust and reliable instrument. Its unique design enables highly accurate measurements within minutes. The intelligent peltier heating and cooling technology for the model 200, 300 and 600 allows highest precision temperature control, and in addition reduces maintenance and downtimes significantly. The system provides an excellent long term stability enabling precise long term aging studies. Fast measurement cycles as little as 15 minutes can be achieved, resulting in a high sampling rate. To enable these fast and precise sampling intervals the instrument uses a dual sensor arrangement. Integrated potentiometers for length measurements (µm-resolution) provide immediate sample thickness data.

Instrument Features

- Highest precision and accuracy
- Very robust design
- Very easy handling
- Fast sampling (approx. 15min for QC)
- Automated operation
- Measurement range extension to 2.5 W/mK
- Up to 99 measurement points
- No PC required



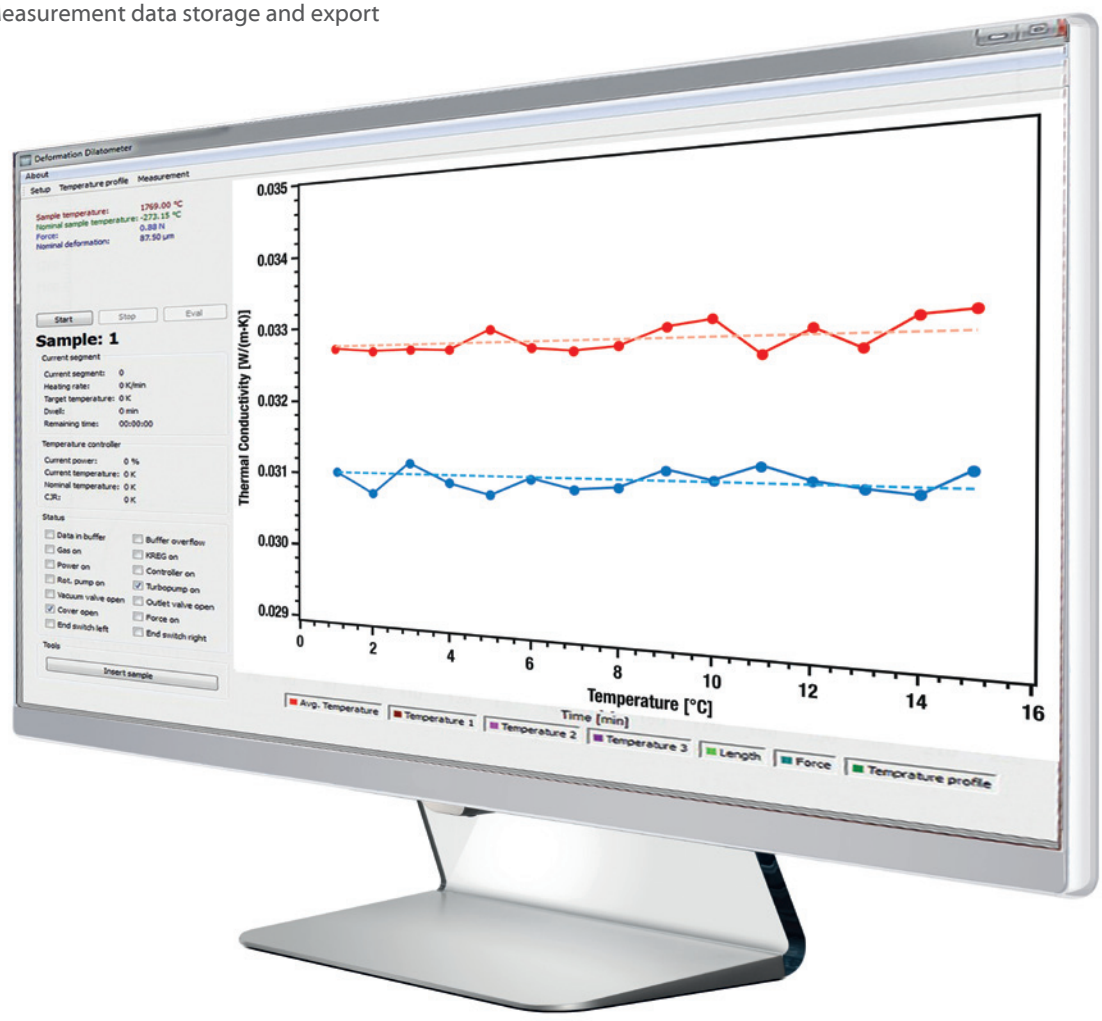
SOFTWARE

The instrument can be operated through the touch screen front panel. Optional software, free of charge, is available. This powerfull software package enables convenient temperature programming, data storage and instrument control.

- Report printing, layout can be customized
- Multi language software versions
- Instrument monitoring (plate temperature, thermal conductivity results and output signal monitoring)
- Software help functions
- Optional user login and data monitoring

Key features:

- Easy measurement parameter input
- Measurement data storage and export



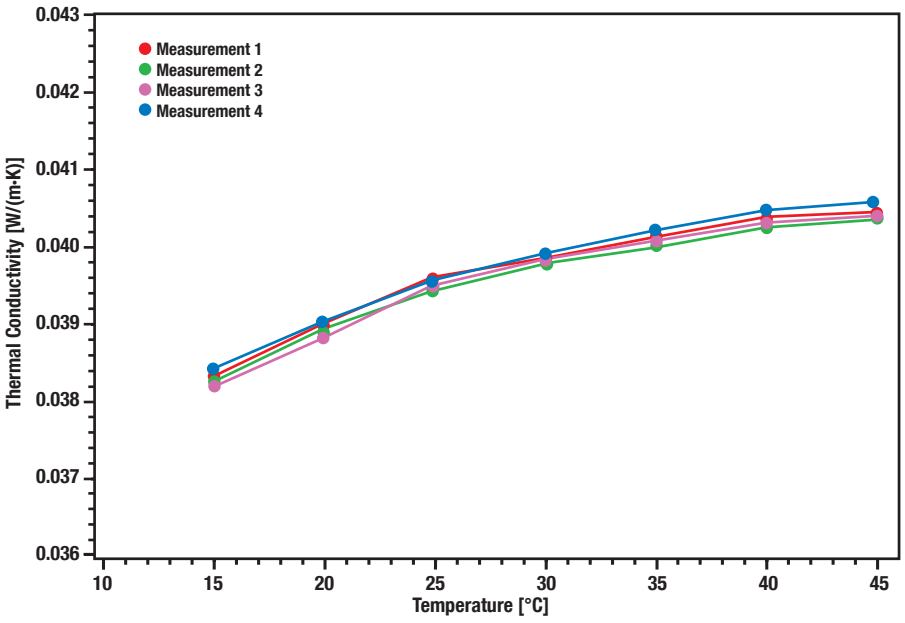
SPECIFICATIONS

	HFM 200	HFM 300	HFM 600
Temperature range (plates)	0 to 90°C -20 up to 90°C -40 up to 90°C	0 to 90°C -20 up to 90°C -35 up to 90°C	-20 to 70°C
Cooling system	External chiller or active refrigerating chiller	External chiller or active refrigerating chiller	External chiller or active refrigerating chiller
Temperature control (plate)	Peltier	Peltier	Peltier
Measurement data points	99	99	99
Sample size	205 x 205 x 105 mm^3	305 x 305 x 105 mm^3	600 x 600 x 200 mm^3
Thermal resistance measuring range	0.2 to 8.0 m^2 K/W with Extension* 0.036 to 8.0 m^2 K/W	0.2 to 8.0 m^2 K/W with Extension* 0.036 to 8.0 m^2 K/W	0.2 to 8.0 m^2 K/W with Extension* 0.036 to 8.0 m^2 K/W
Thermal conductivity measuring range	0.001 to 0.5 W/m·K with Extension* 0.001 to 2.5 W/m·K	0.001 to 0.5 W/m·K with Extension* 0.001 to 2.5 W/m·K	0.001 to 0.5 W/m·K with Extension* 0.001 to 2.5 W/m·K
Reproducibility	0.25%	0.25%	0.25%
Accuracy	+/- 1 to 3%	+/- 1 to 3%	+/- 1 to 3%
Variable contact pressure*	0 - 25 kPa	0 - 25 kPa	0 - 25 kPa

*optional

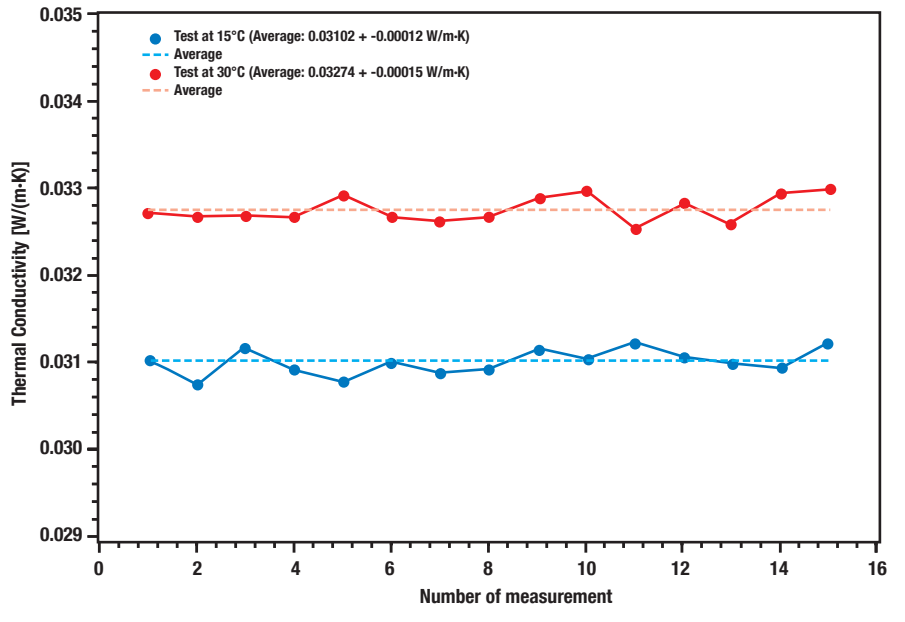
APPLICATIONS

Elastomer Foam



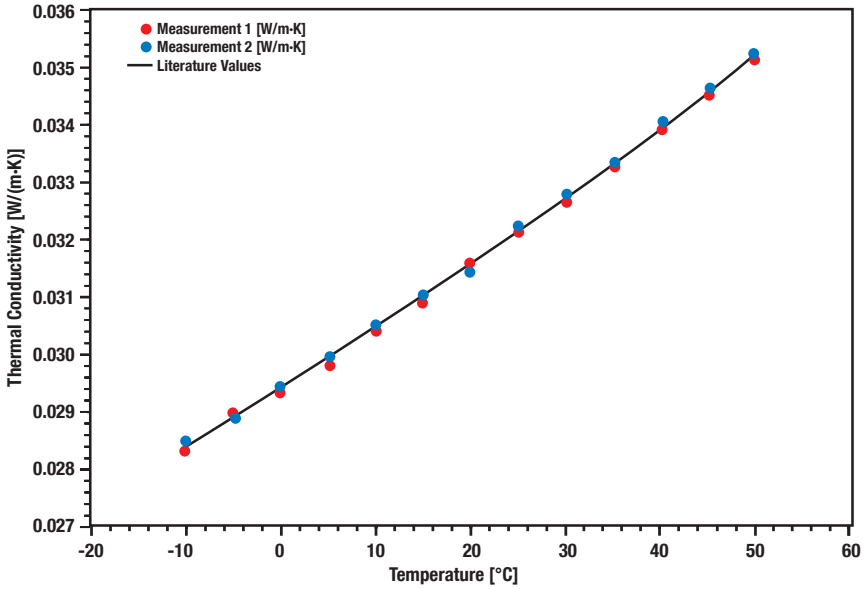
The present measurement clearly demonstrates the outstanding reproducibility of the LINSEIS HFM series. A reproducibility of 0.25% was achieved. The graph display four measurements of an Elastomer Foam in the temperature range 15 to 40°C. The sample was removed and placed into the instrument again after each measurement.

IRMM-440certified reference material



Repeatability:
15 Measurement of the IRMM-440certified reference material (Resin bonded glass fibreboard) with a thermal conductivity of 0.03274 +-0.00015 at 30°C and 0.03102 + -0.00012 W/m·K at 15°C.

Glass wool specimen



Precision:
The graph shows two measurements of the same glass wool specimen at several temperatures. The black line shows the thermal conductivity according the manufactorer information.

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