

# Determination of Thermal Conductivity

with the

## Measuring System Lambda

### Characteristics

- For fluid, powder, gel and nano fluid
- Determination of thermal conductivity and diffusivity based on ASTM D2717
- -30 °C ... 190 °C (-22 °F ... +374 °F), no external cryostat required
- Down to -50°C (-58 °F) with pre-cooler
- Ambient pressure or pressurised up to 35 bar (507.6 psi)
- Sample volumes of min. 50ml
- Fully automated measurements via PC

The Measuring System Lambda with the thermostating unit LabTemp 30190 enables you to measure the thermal conductivity of fluids, powders, gels and nano particles based on ASTM D2717.

**New: Low temperature down to -50°C/-58°F**  
Our Measuring System Lambda is now extendable with a cooling-water pre-cooler for temperatures down to -50 °C (-58 °F) - a cost-effective alternative to cryostats with the same capacity.



### No external cryostat required

In a wide temperature range of -30°C to 190°C (-22°F...+374°F) no additional cryostat or special cooling liquids are required. The temperature range is covered by use of thermoelectric modules with tap water as cooling medium. This is an advantage especially in temperatures below 0°C (32°F) and above 100°C (212°F), because no change of cooling liquid is needed.

A cooling water supply of 800 ml/min at a water temperature of +8°C (+47°F) is sufficient to reach the minimal temperature of -30°C (-22 °F). At a higher throughput or lower water temperature the minimum

temperature can even be lower than that.

The thermal conductivity is measured directly in the sample. The homogeneous temperature control excludes convectational influences.

### Short measuring times

Due to the very high speed of the thermoelectric heating/cooling and the extreme temperature homogeneity of the LabTemp 30190 short measuring times are achieved, thereby the measuring frequency is increased significantly.

Only small volumes of sample app. 50ml are sufficient to execute reliable measurements.

### Ambient or pressurised

The Lambda Measuring Site can be used for unpressurised, pressurised measurements up to 35 bar (507.6 psi) or in relation to an inert gas flushing.

The measuring principle with an instationary heat wire allows for precise measurement of heat conductivity as well as the determination of thermal diffusivity. If the viscosity of the sample is known the specific heat capacity can also be determined.

### More comfort with software *LamWin*

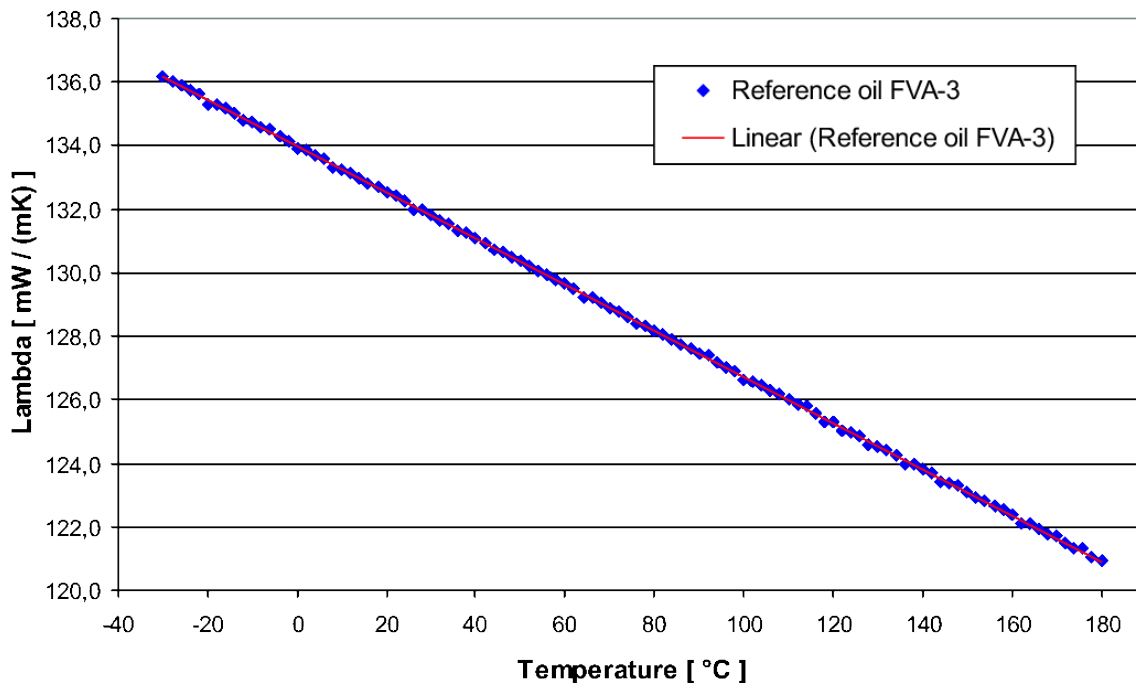
The control software *LamWin* enables fast, automated measurements via PC. Measured

data are visualised graphically and tabularly and can be converted to an Excel-compatible format.

Five measuring modes are possible: single or continuous measuring, time interval, constant temperature, temperature ramp.

### Calibration Thermometer

With the certified calibration thermometer provided by PSL the LabTemp 30190 can be automatically calibrated. This ensures permanent reliable measuring results. The elaborate maintenance service can be omitted and maintenance costs are lowered.



Measurement example for thermal conductivity vs. temperature

### Specifications:

Media:	Fluids, nano fluids, powders, gels
Standard:	Based on ASTM D 2717
Temperature range:	-30 °C ... +190 °C (-22 °F ... +374 °F), down to -50 °C (-58 °F) with precooler
Resolution / Accuracy:	0.1 °C / 0.1 °C
Measuring range:	10 mW / mK ... 1,000 mW / mK
Reproducibility:	1 %
Pressure range:	Ambient or up to 35 bar (507.6 psi)
Cooling/heating power (LabTemp):	Cooling max. 320 W, heating max. 1,400 W
Counter cooling (LabTemp):	Tap water, temperature +3 °C ... +25 °C (+37 °F ... +86 °F), flow rate 300 ml/min ... 800 ml/min
Power consumption:	LabTemp: 1,900 W, Lambda: 10 W
Voltage input:	85 ... 264 V~ (47 ... 63 Hz) - wide range
Weight:	Lambda: 3 kg, LabTemp: 10 kg
Dimensions (WxDxH):	Lambda: 26 cm x 38 cm x 16 cm, LabTemp: 26 cm x 38 cm x 16 cm



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