Description

LaTIMA is a measurement system for thermal conductivity measurements of solid strip-shaped material samples with mid-ranged to high thermal conductivity. TIMAwave is an add-on to the LaTIMA system for thermal diffusivity measurements of solid strip-shaped samples.

Technical Specification

System

System type	Benchtop material characterization system	
Footprint (w × d)	42.3 × 48.3	cm²
Height	75.2	cm
Weight	41	kg
Power supply	100 … 230	VAC
	50 … 60	Hz
	450	W

Measurement type	LaTIMA: Thermal steady-state characterization TIMAwave: Ångström's method	
	Thermal conductivity	W/(m·K)
	Thermal diffusivity	mm²/s

Sample properties (strip-shaped, see also Table "recommended sample geometry")

	min	max	
Sample width	3	12	mm
Sample length	10	40	mm
Sample thickness	0.02	3	mm

Measurement conditions

Sample temperature	20 … 120	°C

Measurement accuracy

Thermal conductivity	± 10	%
Thermal diffusivity	± 10	%
Temperature	±2 °C or ±2 %, whichever is greater	

Measurement precision

Thermal conductivity	± 10	%
Thermal diffusivity	± 10	%
Temperature (Thermal sensitivity NETD)	80	mK

Measurement resolution

Thermal conductivity	± 10	W/(m·K)
Thermal diffusivity	± 10	mm²/s

Key features

- Compact and all-in-one
- Swiftly exchangeable reference bodies
- High precision temperature monitoring
- Ease of use, optimized for user experience

Key output material and compound properties

- Thermal conductivity
- Thermal diffusivity

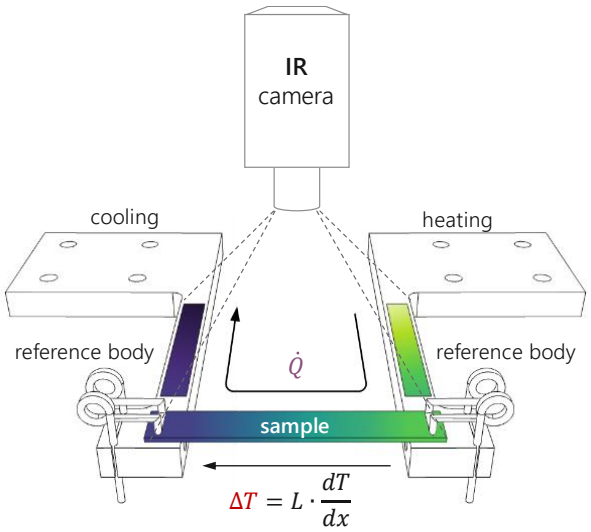
Key testing schemes

- Temperature dependency

Scope of samples

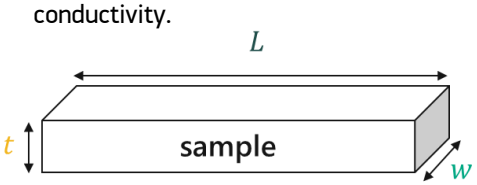
- Metals
- Alloys
- Semiconductors
- Ceramics
- Sintered materials

The principle of LaTIMA



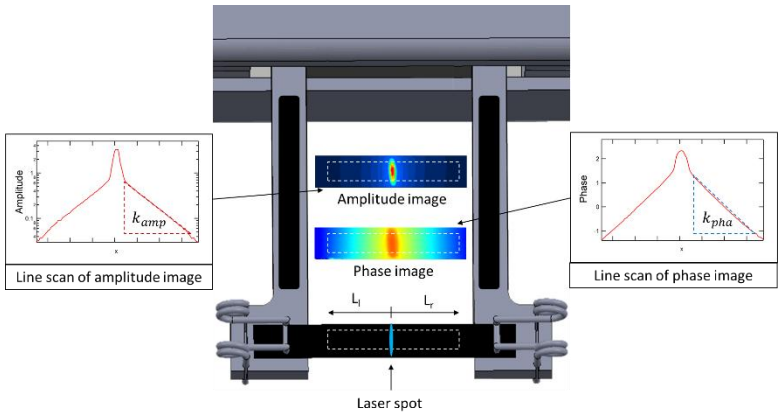
Samples are measured between two metal reference bodies that are known in geometry and physical properties. Measuring both temperature gradient ΔT over and heat flow Q through the sample returns its thermal conductivity.

Repeating such measurement for multiple sample thicknesses allows to calculate the following linear fit to receive the sample's bulk thermal conductivity.



$$\lambda = \frac{L \cdot \dot{Q}}{w \cdot t \cdot \Delta T}$$

The principle of TIMAwave



TIMAwave is based on the principle of Ångström's method, a well-known method for the determination of the thermal diffusivity of solid materials. It is a transient method which is based on the damping of one-dimensional thermal waves which are excited using a laser diode to propagate through the sample.

Recommended sample geometry

Thermal conductivity of sample [W/(m·K)]	Minimum sample thickness (mm) for sample width = 4 mm	Minimum sample thickness (mm) for sample width = 10 mm
30	0.893	0.357
50	0.536	0.214
80	0.335	0.134
100	0.268	0.107
200	0.134	0.054
300	0.089	0.036
400	0.067	0.027
500	0.054	0.021
600	0.045	0.018
800	0.033	0.013
1000	0.027	0.011
1400	0.019	0.008
2000	0.013	0.005