Thermal Properties Analyzer

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Accurate readings at top speed

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TEMPOS

When it comes to measuring thermal properties, there's never been an instrument that gives accurate measurements under all conditions. Small sensors are fragile and face contact resistance. Large sensors and high-priced, steady-state methods, such as the guarded hot plate, require extremely long heat times, which drive moisture away from the sensor and alter the reading. Alternative instruments use one standard equation without making any adjustments for real-world conditions—plus they're bulky and expensive. There's simply been no convenient or affordable way to make these measurements accurately. Until now.

New technology—new possibilities

The new TEMPOS is different. We've ripped up everything in our thermal properties analyzer and reinvented it from the ground up to give you higher accuracy in much less time, at a price you can afford. How? Accurate thermal properties measurements have always been about complex mathematics. Recent scientific breakthroughs in how these complex equations are solved have enabled not only higher accuracy, but also allowed us to calibrate using significantly improved data sets—making this instrument more accurate than any other in its

class. Not only that, improved proprietary algorithms enable the TEMPOS to make these measurements with an incredible one-minute read time (versus the usual 10-15 min.).

Takes compliance to a whole new level

The ASTM 5334- and IEEE 442-compliant TEMPOS is engineered using ISO 2008 standards. It takes accurate readings of thermal conductivity, thermal resistivity, thermal diffusivity, and specific heat in many material types across multiple disciplines, from soil and concrete to food, plastics, lubricating oil, and even human tissue.

Each needle produces only a discrete amount of heat, virtually eliminating the moisture movement (or free convection in liquids) that could alter a reading. Short heating times mean you can use the TEMPOS to measure frozen materials and even fluids. No other analyzer on the market can measure frozen or wet materials accurately.

One minute changes everything

Ambient temperature changes of a thousandth of a degree per second, the sun warming the soil for example, destroy the accuracy of thermal properties calculations. Unique from all other thermal needle systems, the TEMPOS corrects for the linear temperature drift that causes erroneous readings. New proprietary algorithms allow the TEMPOS to make these measurements in as little as one minute (ten minutes for ASTM-compliance). And, these algorithms will eventually allow the TEMPOS to measure previously impossible-to-test highly porous materials such as insulation.

Simply the best

Forty years of expertise on heat and mass transfer have enabled us to engineer the most simple, easy-to-use instrument possible. Unlike competitor instruments, which use a one-sensor-fits-all type system, the TEMPOS automatically optimizes the reading for your material at the push of a button. And it’s ready to use, straight out of the box. Just insert the needle, select your material type, and start measuring. It’s that easy.

Making the impossible possible

At METER, we know thermal properties. For over four decades, thousands of scientists and engineers have relied on our thermal properties analyzer for measuring thermal properties in almost anything—and we mean anything. We’ve even partnered with NASA to measure thermal properties on Mars. Wherever you measure, and whatever you’re measuring, rely on the TEMPOS for accuracy, affordability, and simplicity that will make your thermal properties measurements easier.

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Features Specifications Support / Downloads

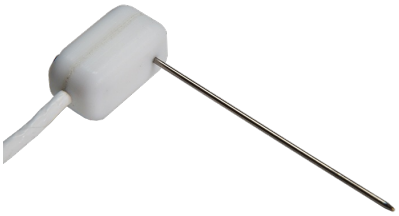
Features

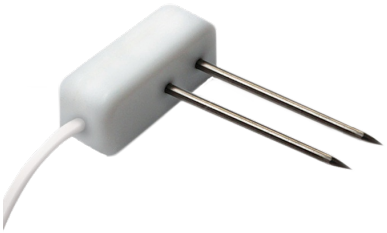
- Improved algorithms increase accuracy
- New one-minute read times
- Measure thermal diffusivity and specific heat at a fraction of the cost
- ASTM 5334- and IEEE 442-compliant
- Controlled heating ensures heat is constant
- An updated interface makes test setup easier than ever
- Navigation through menus and options is more straightforward
- Test set-up and results are displayed more clearly
- Mini USB cable makes downloading data easier
- Interactive color screen automatically identifies the sensor you have plugged in and illustrates heating
- Extended battery life lengthens use time
- New rugged, ergonomic case
- Portable: use in the field or in the lab
- Measure moist and frozen materials accurately
- Short heating times ensure no moisture movement
- Measures thermal conductivity of many fluids
- Robust sensor needles limit breakage
- Each sensor engineered for a specific material
- Automatically corrects for linear temperature drift
- Resolves temperature to ±0.001 ◦C
- Find TEMPOS accessories here

Specifications

OPERATING ENVIRONMENT (Controller)	
Range	0–50 °C
Power	5 AA batteries
Battery life	More than 250 high-power measurements
Data storage	2,048 measurements in flash memory (both raw and processed data are stored for download)
Read modes	Manual and unattended measurement modes
OPERATING ENVIRONMENT (Sensors)	
Range	–50 to 150 °C
PHYSICAL CHARACTERISTICS	

Controller	Length: 18.5 cm (7. 28 in) Width: 10 cm (3.94 in) Height: 3.5 cm (1.38 in)
Carrying case	Length: 37 cm (14.57 in) Width: 30 cm (11.81 in) Height: 10.5 cm (4.13 in)
Display size	Width 5.5 cm (2.17 in) Height 4.0 cm (1.57 in)
Sensor interface	DB-15 connector
SENSORS	
	TR-3 RK-3 KS-3 SH-3





KS-3 (6 cm [small] single needle)	**Range:** Conductivity: 0.02–2.00 W/(m • K) Resistivity: 50–5,000 °C • cm/W **Accuracy:** Conductivity: ±10% from 0.2–2.0 W/(m • K) **Size:** 1.3 mm diameter × 60 mm length
TR-3 (10 cm [large] single needle)	**Range:** Conductivity: 0.1–4.0 W/(m • K) Resistivity: 25–1,000 °C • cm/W **Accuracy:** Conductivity: ±10% from 0.1–4.0 W/(m • K) **Size:** 2.4 mm diameter × 100 mm length
SH-3 (3 cm dual-needle)	**Range:** Conductivity: 0.02–2.00 W/(m • K) Resistivity: 50–5,000 °C • cm/W Diffusivity: 0.1–1.0 mm^2/s Volumetric specific heat capacity: 0.5–4.0 MJ/m^3 **Accuracy:** Conductivity: ±10% from 0.2–2.0 W/(m • K) Diffusivity: ±10% at conductivity above 0.2 W/(m • K) ±0.02 W/(m • K) from 0.10–0.20 W/(m • K) Volumetric specific heat capacity: ±10% at conductivities above 0.1 W/(m • K) **Size:** 1.3 mm diameter × 30 mm length, 6 mm spacing

RK-3 (6 cm [thick] single needle)	**Range:** Conductivity: 0.1–6.0 W/(m • K) Resistivity: 17–1,000 °C • cm/W **Accuracy:** Conductivity: ±10% from 0.1–6.0 W/(m • K) **Size:** 3.9 mm diameter × 60 mm length
COMPLIANCE	
	Manufactured under ISO 9001:2015 EN 61326-1:2013 EN 55022/CISPR 22

Support

Have a question or problem? Our support team can help.

We manufacture, test, calibrate, and repair every instrument in-house. Our scientists and technicians use the instruments every day in our product testing lab. No matter what your question is, we have someone who can help you answer it.

Email US: sales.environment@metergroup.com
Email Europe: sales.environment@metergroup.de
Phone US: +1 509-332-5600
Phone Europe: +49 89 12 66 52 0
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