

MP-1 | Advanced

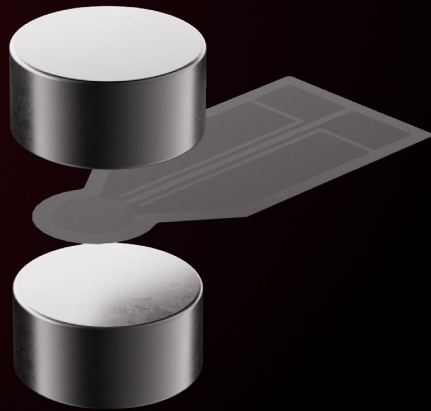
Absolute thermal conductivity, thermal diffusivity, specific heat, and thermal effusivity of solids, liquids, pastes, and powders.

ISO 22007-2, ISO 22007-7, GB/T 32064, ASTM D7896, ASTM D5334, IEEE 442, ASTM D5930.



METHODS

Transient Plane Source (TPS) Sensor



Solids



Pastes



Powders

The TPS sensor designed for solids, pastes, and powders is comprised of a double-spiral of nickel encapsulated between layers of insulation (Kapton or Mica). Standard operation of this sensor (two-sided) is placed between two pieces of the same sample.

Our proprietary TPS calculation model measures the contact resistance between the sensor and sample, as well as the thermal conductivity, thermal diffusivity, volumetric specific heat, and thermal effusivity of the sample*.

Transient Hot Wire (THW) Sensor



Liquids



PCMs

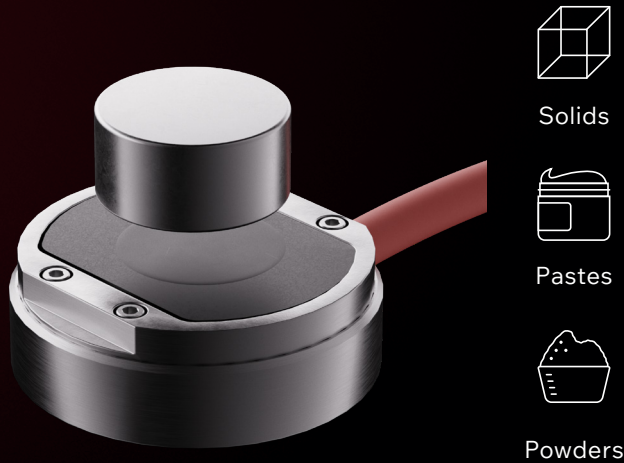
The THW sensor designed for liquids and phase change materials (PCMs) consists of a replaceable thin heating wire secured to a specially designed sensor and sample cell.

This allows back pressurizing liquids to measure thermal conductivity, thermal diffusivity, and volumetric specific heat past boiling temperatures. Measurements are done at short test times (1 second) to limit convective effects on samples with a wide range of viscosities.

*Modules available on pages 5 and 6

METHODS

Modified Transient Plane Source (MTPS) Sensor



The MTPS sensor is configured for asymmetric (single-sided) testing, ideal when only one piece of sample is available. The sensor (ISO 22007-7) follows the same principles of operation as the TPS method.

This sensor can be used with the Bulk, Anisotropic, Slab, and 1-D TPS modules.

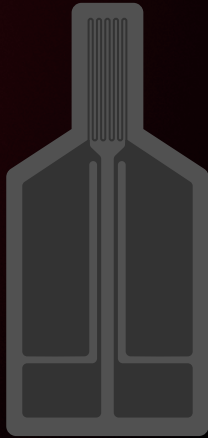
MTPS Sensor Construction



The MTPS sensor is an elegant construction of rugged components to equip users with the ability to use it in the lab or on the production floor.

METHODS

Transient Hot Strip (THS) Sensor



Solids

The THS sensor shares the same theory and sample configuration as the TPS sensor, with the unique ability to measure complex shapes.

Results include thermal conductivity, thermal diffusivity, and volumetric specific heat of the sample. Bulk, Anisotropic, and Slab modules available.

Transient Line Source (TLS) Sensor



Soil



Pastes

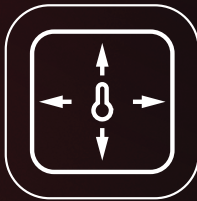


Polymers

The TLS sensor designed for soil, pastes, and polymers. The sensor is completely inserted into the sample to be tested. Heat is delivered to the sample using a constant current source, and the temperature rise is recorded over a defined period of time.

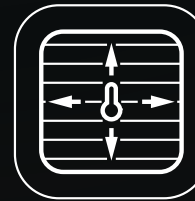
The slope from the plot of temperature rise versus logarithm of adjusted time is used in the calculation of thermal conductivity.

TPS 3-DIMENSIONAL MODULES



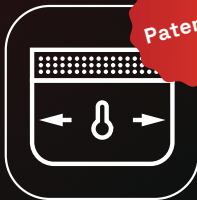
Standard

Bulk thermal conductivity, thermal diffusivity, volumetric specific heat, and thermal effusivity. Symmetric and asymmetric.



Anisotropic

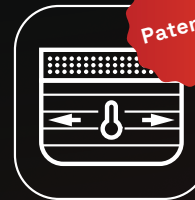
Anisotropic in-plane and out-of-plane thermal conductivity and thermal diffusivity. Symmetric and asymmetric.



Patented

Slab

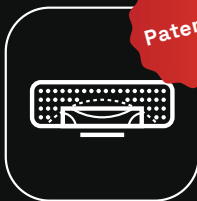
Isolated in-plane thermal conductivity, thermal diffusivity, and volumetric specific heat of sheets. Symmetric and asymmetric.



Patented

Slab Anisotropic

Anisotropic in-plane and out-of-plane thermal conductivity, thermal diffusivity, and volumetric specific heat for sheets. Symmetric and asymmetric.



Patented

Finite

The Finite module expands TPS measurements to small cylindrical samples. Correcting for heat loss due to sample boundary conditions, accurate thermal conductivity, thermal diffusivity, volumetric specific heat, and thermal effusivity for isotropic and anisotropic samples is determined. Symmetric and asymmetric.



Thin-film

Thermal conductivity of thin-films and coatings according to ISO 22007-2.

TPS 1-DIMENSIONAL MODULES



Standard

Isolated out-of-plane thermal conductivity and thermal diffusivity for elongated shapes, rods, and bars. Symmetric and asymmetric.



Proprietary

Slab

Isolated out-of-plane thermal conductivity, thermal diffusivity, and volumetric specific heat for short rods and bars. Symmetric and asymmetric.



Patented

TR Thin-Film

Thermal resistance and thermal conductivity of free standing thin-films, adhesives, and coatings. Symmetric only.



Patented

TR Contact Resistance

Thermal contact resistance between two objects, similar or dissimilar objects, including effects of surface finish, pressure, and temperature. Symmetric and asymmetric.

GENERAL



Specific Heat

High accuracy direct measurement of specific heat. Various cell dimensions available for improved accuracy of heterogeneous materials.

SPECIFICATIONS

Method	TPS	THW	MTPS	THS	TLS
Materials	Solids, pastes, and powders	Liquids and PCMs	Solids, pastes, and powders	Solid rectangles	Soil, pastes, and polymers
Testing modules	3-D: Bulk, Anisotropic, Slab Anisotropic, Slab, Finite, Thin-Film 1-D: Standard, 1-D Slab, TR Thin-Films, TR Contact Resistance General: Specific Heat	Bulk	3-D: Bulk, Anisotropic, Slab Anisotropic, Slab 1-D: Standard, 1-D Slab	Bulk, Anisotropic, Slab	Bulk
Thermal conductivity (W/m-K)	0.005 to 2000	0.01 to 2	0.03 to 500	0.1 to 500	0.1 to 8
Thermal diffusivity (mm ² /s)	0.01 to 1200	Up to 0.5	0.01 to 300	Up to 300	N/A
Specific heat (J/kg-K)	Up to 5	Up to 5	Up to 5	Up to 5	N/A
Thermal effusivity (W√s/m ² K)	5 to 60000	N/A	20 to 40000	20 to 40000	N/A
Sensor contact resistance (m ² K/W)	Measured	N/A	Measured	N/A	N/A
Sample size (mm mL)*	5 diameter or square	20 mL	25 diameter or square	30 x 10	50 diameter
Sample thickness (mm)*	0.01	N/A	0.1	0.1	100 length
Largest sample size (mm)	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited
Test time (seconds)	0.25 to 2560	1	0.25 to 2560	0.25 to 2560	180
Accuracy (Thermal conductivity)	3%	2%	5%	5%	5%
Repeatability (Thermal conductivity)	1%	1%	2%	2%	2%
Temperature range (°C)**	0 to 300 -160 -45 to 300 up to 750 / 1000	10 to 200 -40 to 200 -160 -40 0 to 300	0 to 100 -50 to 200	-75 to 300	-40 to 100
Sample configuration	Symmetric (Two-Sided) Asymmetric (Single-Sided)	Inserted	Asymmetric (Single-Sided)	Symmetric (Two-Sided) Asymmetric (Single-Sided)	Inserted
Standard	ISO 22007-2:2022, ISO 22007-7:2023, GB/T 32064-2015	ASTM D7896-19	ISO 22007-7:2023	N/A	ASTM D5334-22a, ASTM D5930-17, IEEE 442-2017

*Based on testing module used.

**For temperature, external control required.

iTRANSIENT

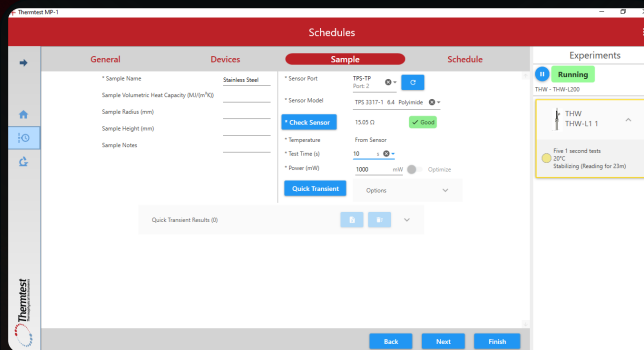
ISO 22007-2, ISO 22007-7, ASTM D7896

Our proprietary iTransient fully automates measurements while maintaining ISO and ASTM compliance. It also offers iterative parameter selection for deeper understanding of results when needed.

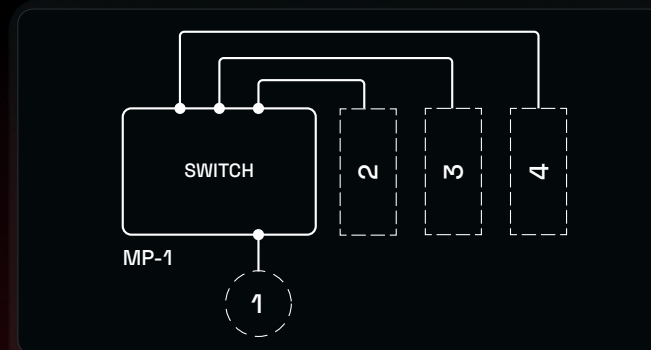
ISO 22007-2 and ISO 22007-7	iTransient	Iterative Selection
 Sensor Size Diameter selection	Automated	Calculation
 Power Minimum temperature rise	Automated	Adjust Power
 Test Time Probing depth within sample dimensions	Automated	Adjust Test Time
 Contact Resistance Remove effects	Measured	Adjust Calculation Window
ASTM D7896		
 Power Minimum temperature rise	Automated	Adjust Power
 Test Time Probing depth within sample dimensions	Automated	Adjust Test Time

SOFTWARE

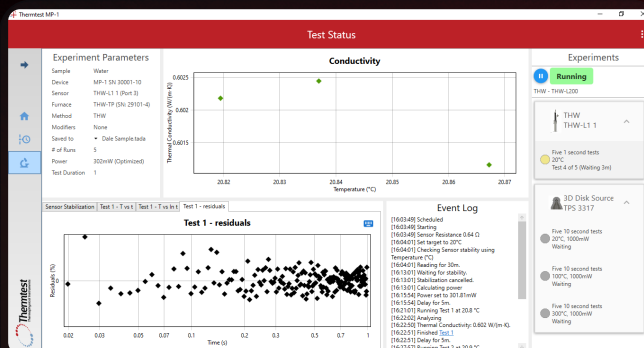
The MP-1 Data Acquisition Software (DAQ) intelligently controls the scheduling of all methods and temperature. An integrated four channel switch enables multiple optional devices, temperature platforms, and sensors to maximize convenience and capacity. The Transient Analysis (TA) software offers a wide range of analysis operations. Testing data is grouped together based on method used, making corresponding calculations easy to apply.



Data Acquisition



Integrated Switch | 4 Channels



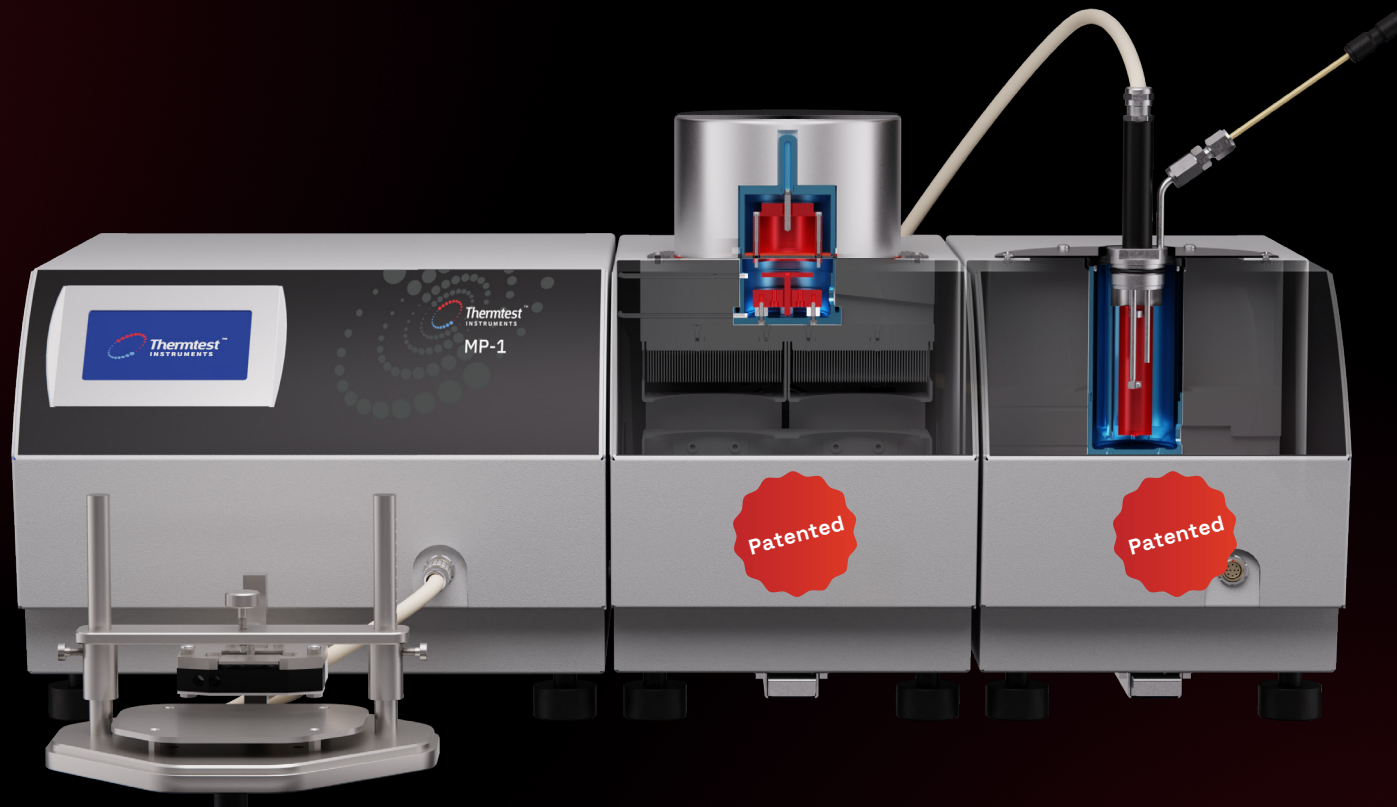
Smart Scheduling

Row	Temperature	Duration	Power	Conductivity	Diffusivity	VHC	Stats	Conductivity	Diffusivity
1	20.8	1	0.3015	0.8022	0.1397	4.31	Mean	0.8019	0.1384
2	20.8	1	0.3015	0.8012	0.1389	4.30	S.Dev.	0.000675	0.001421
3	20.8	1	0.3013	0.8024	0.1385	4.35	N/A	0.1121	1.027
				Mean	0.8019	0.1384	4.31		
				S.Dev.	0.000675	0.001421	0.04092		
				N/A	0.1121	1.027	0.9405		

Transient Analysis. Compare and Export

TEMPERATURE PLATFORM

The patented Temperature Platform (TP) enables accurate control of a wide range of temperatures. Designed with opposing hot and cold controls to ensure fast, accurate temperature management for optimal performance.



Model	TPS-TP	THW-TP
Temperature range (°C)	0 to 300 -160 -45 to 300	10 to 200 -40 to 200 -160 -40 0 to 300

MEASUREMENT PLATFORM SERIES



MP-1 | Advanced

Thermal Conductivity (W/m·K) 0.005 to 2000
 Temperature (°C) -160 to 1000
 Versatility & Expandability (methods + modules)



MP-V | Versatile

Thermal Conductivity (W/m·K) 0.01 to 500
 Temperature (°C) -75 to 300
 Versatility & Expandability (methods + modules)



MP-2 | Economical

Thermal Conductivity (W/m·K) 0.029 to 20
 Temperature (°C) 0 to 80
 Versatility & Expandability (methods)

Accurate thermophysical testing methods with intelligent design for automation of testing and analysis, while offering raw data for analysis by experts.

Properties

- Thermal conductivity
- Thermal diffusivity
- Specific heat
- Thermal effusivity
- Thermal resistance
- Thermal contact resistance

Methods

Transient Plane Source (TPS)

- ISO 22007-2, ISO 22007-7, GB/T 32064
- Solids, pastes, powders

Transient Hot Wire (THW)

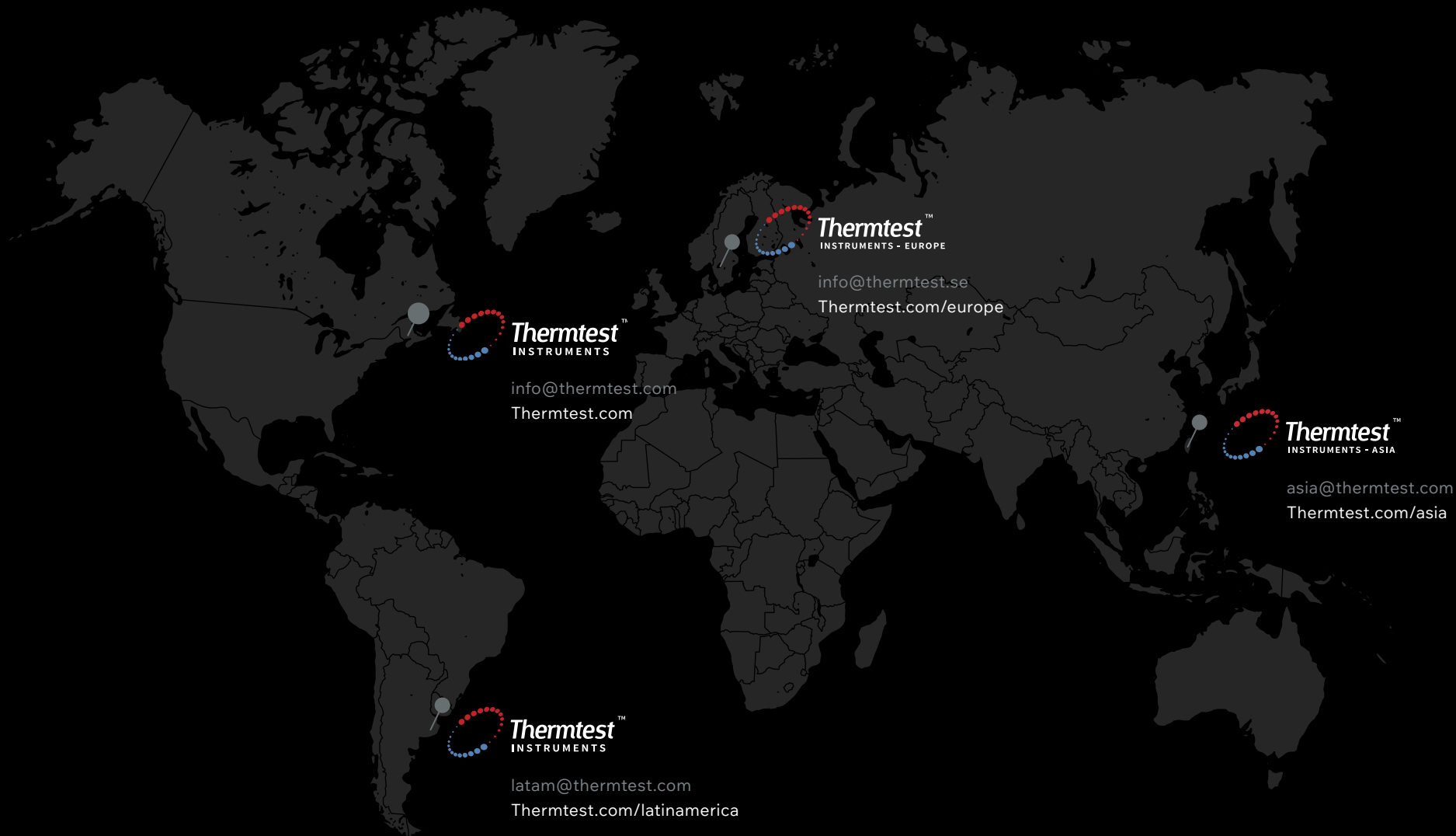
- ASTM D7896
- Liquids, PCMs

Modified Transient Plane Source (MTPS) - Absolute

- ISO 22007-7
- Solids, pastes, powders

Transient Line Source (TLS)

- ASTM D5334-22a, ASTM 5930
- Soil, polymers



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