

PRODUCT OVERVIEW

The RTC-1000 is an advanced laboratory-grade instrument for measuring the shear-dependent thermal conductivity and viscosity of liquids, nanofluids, slurries, colloidal suspensions, and molten polymers. Unlike typical static-measurement instruments, the RTC-1000 can quantify the thermal behavior of a flowing fluid, to more accurately simulate real-world processes.

Non-Newtonian fluids, in particular, can exhibit significant variations in thermal conductivity when subjected to shear forces in flowing or agitated systems. Without appropriate instrumentation, these changes in thermal behavior can go unrecognized, or at best remain only poorly understood. To meet this need, the RTC-1000 generates multi-point measurements of thermal conductivity over a broad range of applied shear rates.

The instrument utilizes a concentric cylinder arrangement where the test fluid is placed in the annular space. The thermal conductivity is measured through measurement of the heat flux while the temperature across the gap is control precisely. The viscosity of the fluid is linked to the rotational resistance of the outer cylinder.



FEATURES

- Dynamic, shear-dependent thermal conductivity measurement (viscosity and thermal diffusivity options available)
- Programmable shear rates, with step, ramp, and hold functions
- Closed-loop, hands-off control of system temperatures and rotational speeds
- Minimized heat leakage for higher accuracy and more rapid measurement
- Precision micro-stepper motor for tighter control of applied shear rate
- PC-based software with graphical user interface and real-time data logging
- Rugged, industrial-grade controls
- Easy installation and removal of sample cup for refilling and cleaning
- Modular design for easy maintenance



POTENTIAL APPLICATIONS

- Industrial polymer processing
- Advanced fluid dynamics and industrial process research
- Quality control and process optimization
- Nanofluidics for power electronics cooling
- Colloidal suspensions, dilatant, pseudoplastic, rheopectic, and thixotropic non-Newtonian fluids studies

TECHNICAL SPECIFICATIONS*

Dimensions	8"W x 11"H x 21"D Instrument head 21"W x 17.5"H x 14.25"D Chiller and controls
Weight	15 lb Instrument head 35 lb Chiller and controls
Enclosure	Painted steel
Measurement type	Heated, rotating cup and bob (couette flow)
Minimum shear rate	1 s ⁻¹ (down to 0.1 s ⁻¹ available upon request)
Maximum shear rate	100 s ⁻¹ (higher shear rates available upon request)
Measurement range	0.015–1.0 W/m-K
Resolution	0.001 W/m-K
Accuracy	± 5% of reading
Power input	120VAC, 8 Amps
Operating environment	5°C to 45°C (40°F to 115°F)
User interface	PC-based, graphical
Data logging	PC-based data logging software records real-time thermal conductivity and time Export to Excel spreadsheet
Warm-up time	Approximately 15 minutes

* Specifications subject to change