

# Thermal Interface Material Tester (TIM Tester)

The Analysis Tech Thermal Interface Material Tester, “TIM Tester 1300”, measures bulk thermal conductivity in materials having moderate-to-high thermal conductivity and is ideally suited for measurement of thermal interface materials used in electronic packaging. The TIM Tester 1300 conforms to test method ASTM D-5470 but also utilizes thermal structure analysis to enhance the speed and accuracy of the measurement.



TIM Tester requires a recirculating chiller for water-coolant flow, compressed “shop” air, and a Pentium-based PC computer running the Windows XP operating system. Test control and data collection are performed by the (included) WinTIM software using a USB port connection to the TIM Tester. Both the coolant and compressed air are provided with quick disconnects for convenience. AC power is normally 120VAC, 60 Hz unless otherwise specified.



All test parameters and measurement procedures are under automated software control using a convenient graphical-user-interface. Contact pressure and all aspects of specimen temperature and heating power are automatically controlled for the ultimate in operator convenience. Test data is presented simply and clearly with convenient thermal data plotting versus thickness or pressure. Plotting techniques facilitate the determination of surface-contact thermal resistances. Sample thickness is measured **during** testing which is commonly known as "in situ thickness measurement". Alternatively, the user can enter pretest measured or nominal sample thickness. In "automatic duration control mode" the software will dynamically finish a test when sufficient testing time has elapsed. Alternatively, the user can select "fixed duration" testing that will maintain steady-state testing for the specified duration.

The capability to convenient in-house instrument calibrations has been designed into the TIM Tester 1300 both in hardware and software. Operation of the TIM tester requires a source of temperature-controlled cooling water, and a source of compressed "shop" air @ 100 psi (700 kPa).

## **Thermal Interface Material Tester Features**

- Fully automatic operation under WinTIM Software
- Selectable "fixed-parallel" or "floating non-parallel" test surfaces
- Thickness measurement of sample "as-tested" / "in-situ"
- Selectable sample-temperature controls and sequential batch mode
- Automatic pressure control and sequential batch mode
- User selectable test unit selection:
  - English: watt, K, inch, psi
  - Metric: watt, K, cm, kilopascal
- Continuous Fail-safe Error Detection:
  - Low coolant flow
  - Low air pressure supply
  - Over-temperature
- Operator mechanical press-safety
- Convenient USB interface to PC computer
- Sturdy, heavy-duty construction
- In-house calibration procedures

### **TIM Tester Accessories:**

- **TIM Turnkey Accessory Package:**
  - Re-circulating precision-temperature chiller with serial control module and cables
  - Calibration package: Tc Calibrator and TIM calibrator unit
  - Coolant hoses with drip-less quick connectors
  - Compressed air tubing and air filter
  - Note: package does not include PC computer
- Options for "fluidic/semi-liquid" samples
- PC Computer

# TIM Tester 1300 Specifications

Sample Size	Diameter: 1.0" - 1.3" (25 - 33 mm) Thickness: 0.0" - 1.0" (0 - 25mm)
Sample Resistance Range	0.05 °C/W - 5.0 °C/W
Sample Temperature Range	10 °C - 75 °C +/- 2°C
Contact Pressure Range	Model 1300A: 10 – 75 psi (70 – 560 kPa) Model 1300B: 20 – 385 psi (140 – 2700 kPa) Model 1300C: 40 – 550 psi (280 – 3800 kPa)
Contact Pressure Accuracy	+/- 1.5% full span
In-Situ Sample Thickness Measurement	0.0" - 0.125" (0.0 - 3.2 mm) Extended: 0.100" - 0.500" (2.5 - 7.5 mm)
In-Situ Sample Thickness Measurement Accuracy	Typical: +/- 0.001" (0.025 mm) Maximum: +/- 0.002" (0.050 mm) Extended: +/- 0.003" (0.075 mm)
Supply Voltage	100/115/220/230 VAC 50/60 Hz 115 VAC, 60 Hz standard
Dimensions (including test stage)	22.5" H x 16.5" W x 17" D
Coolant Supply Requirements	Flow Rate: 1.5 gal/min (6 liter/min) Pressure Limit: 20 psi (140 kPa) Temperature Control: +/- .2°C max.
Compressed Air Supply	Pressure Minimum: 100 psi (700 kPa) Particulate Filtration: 5 micron
Weight	50 lbs (23 kg)
Shipping Weight	85 lbs (39 kg)

## Ordering Information

Order numbers: Model 1300A, Model 1300B, Model 1300C. Standard delivery: 5 weeks. Ex Works Specify AC Line voltage. Custom orders welcome.

# TIM Accessory Package

## Accessory Package for Turnkey Operation

The TIM Tester requires a number of external facilities for operation. These include temperature controlled coolant flow, filtered compressed air, calibration equipment (if in-house calibrations are desired), and a PC computer running Windows® XP. Although some users may choose to provide or acquire these items independently, a package of these accessories is offered to provide convenient turnkey operation. This package includes:

- Re-circulating, temperature-controlled chiller with serial communication control
- Coolant hoses with drip-free quick-connects and 2 meter hose set
- Calibration hardware including TIM Calibrator and Thermocouple Calibrator
- Compressed air filter, fittings, and tubing
- **Optional:** PC computer w/ LCD monitor

The re-circulating chiller provides precision temperature-control at sufficient flow rate and pressure for peak performance of the TIM Tester. The computer/chiller serial communication link allows WinTIM to control the sample temperature for ASTM D5470 compliance. The flexible coolant hoses with double ended "drip-free" quick-connects can be connected and disconnected quickly and conveniently.

The recommended bi-annual instrument calibration can be conveniently be performed "in-lab" without ever removing the TIM Tester from the lab using the TIM Calibrator and TC Calibrator. The TIM Calibrator is a unique unit that connects to the rear panel of the TIM Tester and provides calibration signals that can be measured with a calibrated lab-voltmeter (not included) in conjunction with WinTIM Software. The TC Calibrator provides automatic calibration of the TIM thermocouple ports in conjunction with WinTIM Software.

The accessory package includes a compressed air filter with a selection of quick-connect air fittings and flexible air tubing for connection of the TIM Tester to the facility compressed air supply. The compressed air provided to the TIM Tester must be filtered to within 5 microns. The use of the laboratory compressed air supply that is not sufficiently free from dust and particulates may cause failure of the TIM Tester internal pressure regulator. The filter included in the Accessory Package provides necessary filtering to ensure long-term reliability.