



# TIM Measurement System

The TIM Test System consists of three parts. The Thermal Test Frame (TTF) apparatus is the mechanical portion that applies the pressure and provides the cold plate reference temperature. The Thermal Test Modules (TTMs), a top and bottom units that plug into the TTF, provide the heat flux to the test sample and contain the sensors for temperature measurement across the integral heat flux columns and across the test sample. The Heat Flux Instrumentation (HFI) box is a stand alone unit that contains measurement and heat flux-generation electronics and the computer interface. The software that accompanies the system drives the system and collects, displays and saves the data produced by the system. A system facilities cart that provides compressed air and recirculating liquid coolant is optionally available. Measurements made in accordance with ASTM 5470.

	Specifications	Comments
<b>TIM Tester Section Module</b>		
Heater Power Capability	Up to >100W	
Sample Heat Flux Measurement Type	Heat Flux Column	
Heat Flux Cross-Section	Circular – 1.18” (30mm) dia	
Heat Flux Measurement	Temperature Differential across length of column	Two sensors placed at a precise distance (12.7mm) apart
Absolute Temperature Sensors	- Top Heat Flux Column bottom - Bottom Heat Flux Column top	Embedded 0.5mm from interface surface
Sample Size	Square or Circular	Square: 20 X 20mm Circular: 25.4mm $\phi$
Sample Force	500N (112lbs) maximum	
<b>TIM Tester Instrumentation</b>		
Heater Power Programming Range	5W to >100W	1W setting capability
Heating Duration Modes	- Fixed time in 1s to 5,000 range - Steady-State excursion limit	1s setting capability User determined
Cold Plate Temperature Range	10 to 50°C (Type-T thermocouple)	Dependent on chiller and power
Heat Flux Column Differential Temperature Measurement	0 to 10°C (thermistor)	0.01°C resolution, $\pm 0.1^\circ\text{C}$ accuracy
Test Sample Differential Temperature	0 to 10°C (thermistor)	0.01°C resolution/ $\pm 0.1^\circ\text{C}$ accuracy
Test Sample Temperature Range	20 to 80°C (thermistor)	0.01°C resolution/ $\pm 0.1^\circ\text{C}$ accuracy
Thermal Conductivity Measurement	$\leq \pm 7\%$ accuracy worst case	$\leq \pm 5\%$ accuracy typical*
Data Display	(see screen shot below)	
Data Storage	Comma delimited text file	Easily imported into Excel™ spreadsheet
Computer Requirements	<b>Customer Supplied Computer</b> - Intel P4 PC or equivalent - Windows™2000 Pro or XP Pro - 512MB RAM - 1024 X 768, hi-color display - 40MB Hard Disk space - USB port (version 2.0) - Printer (color preferred)	
Power Main Requirements	115 or 230VAC, 50/60HZ	650W

\* Requires correction for Bond Line Resistance

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Specifications subject to change without notice.

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