Computerized Thermal Conductivity of Solids by Guarded Hot Plate Method (Product Code: HMTC14)



Features

- Extensive range of Experiments
- Comprehensive teaching manual
- Three-year warranty
- Esthetically designed and finished Rig.
- High Quality instrumentation
- To determine thermal conductivity of Solids

Product Description

This equipment allows student to determine the thermal conductivity of a poor conducting material, like asbestos sheet by guarded hot plate method. The test specimen is placed on a flat plate heater assembly consisting of an electrically heated inner plate (main heater) surrounded by a guard heater. The guard heater is carefully controlled to maintain the same temperature on both sides of the gap separating the main and the guard heaters. This prevents lateral heat flow from the main heater and ensures that all heat energy flows in the direction of the specimen. On the opposite side of the specimen are additional flat plate heaters (the "cold" plate) that are controlled at a fixed temperature selected by the operator. For a given heat input to the main heater, the hot plate assembly rises in temperature until the system reaches equilibrium. The final hot plate temperature depends on the electrical power input, the thermal resistance of the specimen, and the temperature of the cold plate. The average thermal conductivity, k, of the specimen is determined from the Fourier heat flow equation.

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Product / Component Specification

Pipe Specification	Diameter : 100mm Material : Brass Length : 90mm
Mica heater	Diameter : 90mm
Cooling Plate diameter	100mm
Thickness of solids	40mm
Thermocouple	T type
Digital voltmeter	0-300 volts AC
Digital ammeter	0-5 Amps AC
Digital temperature	0-199.9 Deg (T Type)
Variac	0-2 Amps

Data Acquisition card

Analog Input	
Differential Channels	12
Resolution	12 bits
Sample Rate	200 Ks/s
Max Voltage	5 V
Number of Ranges	4
Simultaneous Sampling	Yes
On-Board Memory	5120 samples
Analog Output	
Channels	2
Digital I/O	
Input-Only Channels	30
Output-Only Channels	12
Timing	Software
Logic Levels	TTL
Maximum Input Range	0 V - 5V
Maximum Output Range	0 V - 3.3 V
Counter/Timers	
Counters	2
Max Source Frequency	84 MHz
Resolution	12 bits
Logic Levels	TTL
Total DC output Current on all I/O lines	130mA

Measurement of Temperatures at different points

Type Range Signal conditioning/transmitter Location	"K" 0-300°C Standalone Main Heater Top Temperature
Type Range Signal conditioning/transmitter Location	"K" 0-300°C Standalone Main Heater Bottom Temperature
Type Range Signal conditioning/transmitter Location	"K" 0-300°C Standalone Guarded Heater Top Temperature
Type Range Signal conditioning/transmitter Location	"K" 0-300°C Standalone Guarded Heater Bottom Temperature
Type Range Signal conditioning/transmitter Location	"K" 0-300°C Standalone Specimen Top Temperature
Type Range Signal conditioning/transmitter Location	"K" 0-300°C Standalone Specimen Bottom Temperature

Measurement of Voltage & Current

Type Range Signal conditioning/transmitter	Voltage Transducer 0-300V Standalone
Type Range Signal conditioning/transmitter	Current Transducer 0-10Amps Standalone

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