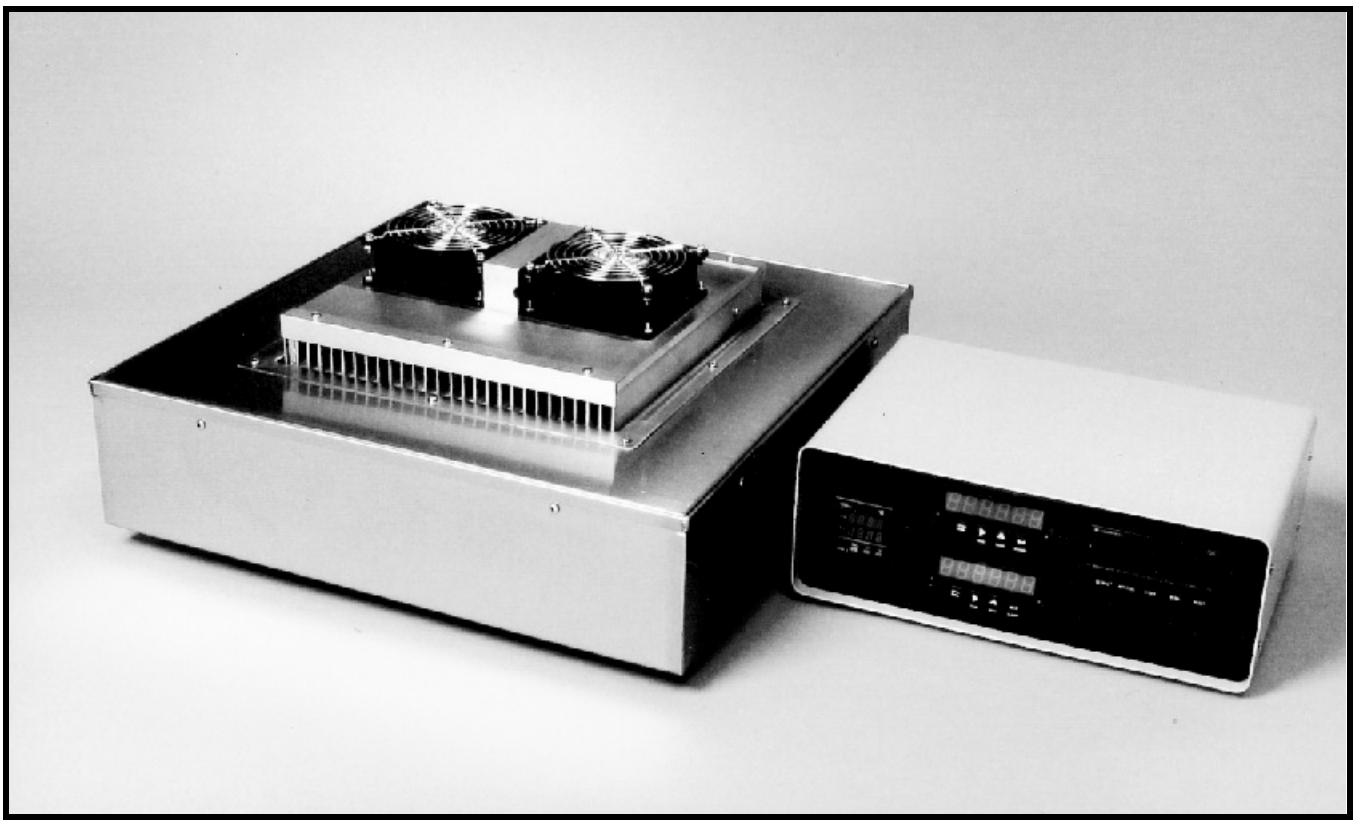
SOLID THERMAL CONDUCTIVITY CELLS



C-600-S Thermal Conductivity Cell

The model C-600-S Thermal Conductivity Cell is designed to measure the thermal conductivities of all solids within the range of 0.015 to 5 Btu/hr.ft.°F(0.025 to 8.6 W/M°C).

INTERNATIONAL
THERMAL
INSTRUMENT
COMPANY

APPLICATION

The model C-600-S Thermal Conductivity Cell is designed to measure the thermal conductivities of all solids within the range of 0.015 to 5 BTU/hr.ft.°F (0.025 to 8.6 W/M °C). The cell will accept samples varying in thickness from 0.005" to 1/2". Typical materials whose conductivities can be measures are polymers, insulations, composites, medical tissues, cloth, natural fibers (wood), rock, etc. The thermal conductivities may be determined over the temperature range of cryogenic to +600°F.

OPERATION

The specimen to be measured is inserted between the upper and lower sensing units as indicated in Fig. 1). Good thermal contact between the specimen and sensing surfaces can be achieved by means of a thermally conductive compound. The desired operating temperature is adjusted with the digital controller on the readout console.

When the cell attains thermal equilibrium, the resulting temperature difference and heat flux signals are displayed upon the digital meters. These values are substituted in Fourier's one-dimensional conduction equation to yield the thermal conductivity.

SPECIFICATIONS

Range:
0.015 to 5 BTU/hr.ft.°F (0.025 to 8.6 W/M °C)

Size:
6" Sq., Or 12" Sq.

Temperature Range:
-108°F to 600°F (-78°C to 300°C)

Transducer Accuracy:
1%

Transducer Sensitivity (Nom):
7 BTU/hr ft^2 mv. (22 W/m^{2}mv.)

System Accuracy:
5%

Thermocouple:
Copper/Constantan

Readout & Control:
Digital

Heat Sink:
Air Cooled

Cell Surfaces:
Aluminum/Copper

Dual, matched, 1% accurate heat flux transducers monitor the heat flow to and from the specimen being measured. Signals from the heat flux transducers are electronically coupled to account for most edge losses from the specimen. The differential thermocouple which measures the temperature difference has known accuracy of better than 1%. At thermal equilibrium, the cell is capable of determining the thermal conductivities within 5% of true values.

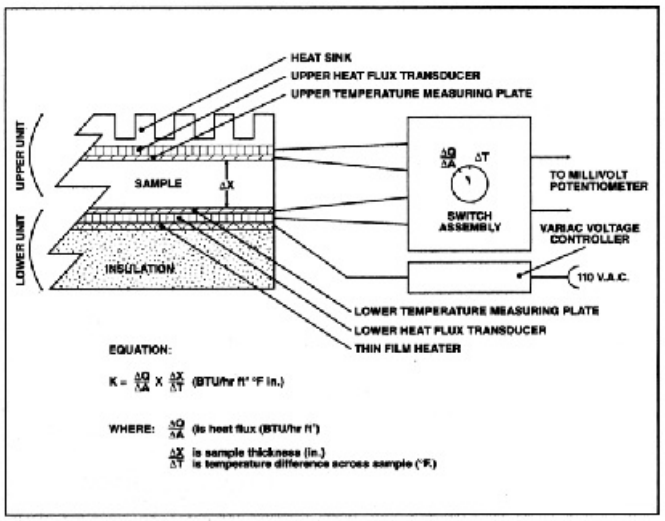


Figure 1

ORDERING INFORMATION

Delivery.....3-4 weeks, ARO
Shipping weight.....25 lbs (max.)
Terms.....Net 30 days to established customers
F.O.B.....Del Mar, California

OTHER ITI THERMAL INSTRUMENTS

Heat Flux Meters, HEAT-PROBE™, Accelerator target Calorimeters, Radiometers, Thermal Flux Standards.

Model C-2500-HTS Conductivity System

The Model C-2500-HTS Thermal Conductivity system is designed for measureing the thermal conductivities of highly conducting materials from room temperatures to 1000°F. Sample dimensions are 2 1/4" diameter, and thickness range between 0.0005" to 1.000".

SPECIFICATIONS

Conductivity Range:
0.02 to 50 BTU/hr.ft.°F

Temperature Range:
R.T. to 1000°C

Accuracy:
+/- 5%

Sensing Surfaces:
Nickle alloys/air cooling. Interface thermal resistance correction curve supplied

Calibration:
ASTM C177-76

Heat Guard:
Automatic

Readout In Following Units:
Sample Heat Flux....BTU/hr.ft.^{2} (Dual Readouts)
Sample Ambient Temperature.....°F
Sample Temperature Difference.....°F

THE HIGH TEMPERATURE, THERMAL CONDUCTIVITY MEASUREMENT TECHNIQUE

The contact(sensing) surfaces of the high temperature conductivity system are composed of traceable Alumel, whose thermoelectric and physical properties are known. A disc of Chromel, whose properties are also known as a function of temperature, is placed in thermal, and electrical contact between the Alumel surfaces. At a constant heat flow, a temperature difference will be established across the Chromel disc, consequently, a thermoelectric voltage will be generated between the Alumel surfaces. This voltage is directly related to the heat flux through the Alumel surface

Two such heat flux sensors encompass the sample to be measured, thus, the heat flux entering the sample can be averaged with the heat flux exiting the sample. The values so obtained obviate the necessity for guarded hot plates, thus yielding greater accuracy

The temperature difference across the sample is sensed with two Type "K" Chromel/Alumel thermocouple discs which provide an average value over the entire sample surface.

When measuring highly conducting samples, the interface resistances between the sample surfaces and the sensing surfaces can be greater than the innate thermal resistance of the sample. A special technique has been developed to determine the actual surface temperatures of the sample and may be applied not only to high temperature conductivity measurements, but also to low temperature measurements.

ORDERING INFORMATION

Delivery.....5-6 Weeks, ARO
Shipping Weight.....65lbs. (max.)
Terms.....Net 30 days to established customers
FOB.....Del Mar, California

OTHER ITI THERMAL INSTRUMENTS

Thermal Conductivity Apparatus, Heat Flux Meters, HEAT-PROBE™, Accelerator target Calorimeters, Radiometers, Thermal Flux Standards.