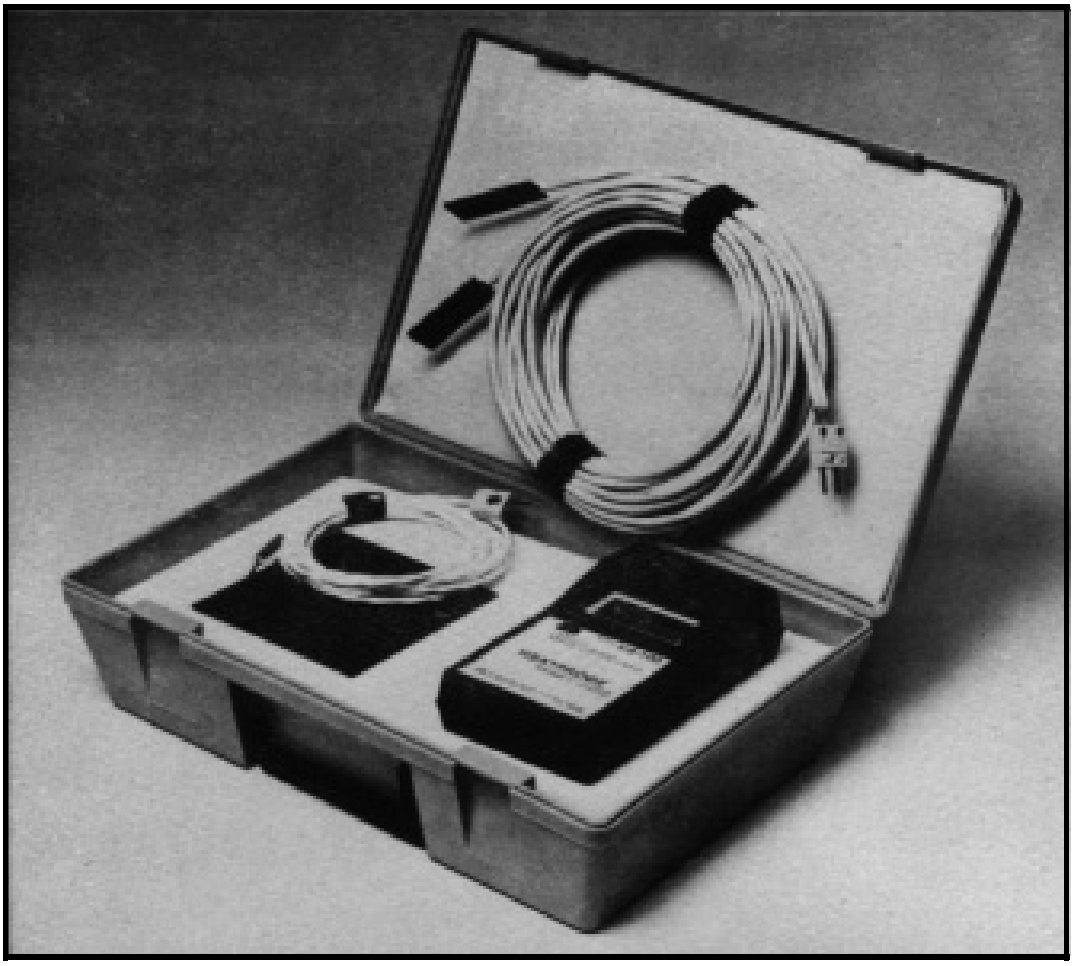
The HEATPROBE makes possible the field measurement of heat flow:



Model HB-100 Heatprobe Shown With Optional “K” Factor Attachment

- Industrial/Residential Heat Loss Surveys
- Building Insulation Conformance Tests
- Refrigerator Insulation Testing
- Boiler/Steam Pipe Heat Loss Measurements
- ”K” Factor Determinations

INTERNATIONAL
THERMAL
INSTRUMENT
COMPANY

APPLICATION

The Model HB-100 Heatprobe is a solid state, thermoelectrically powered, digital readout, heat flux measuring system. The unit is capable of directly measuring heat fluxes from 0.1 watts/meter^2 to 1350 watts/meter^2; it can therefore detect and respond to the entire practical range of heat fluxes normally encountered in the field or laboratory.

Measurements may be made of the total heat flow either to, or from any solid surface to which the transducer may be attached (Fig. 1). When the transducer attains thermal equilibrium with the heat transfer surface and its surroundings, the digital readout indicates the steady state heat flow in terms of watts/meter^2. Transient heat flow fluctuations having periods of five seconds or more may also be followed.

The "K" factors of walls or other insulated barriers may be measured with the Model HB-100. The readout is also designed to measure temperatures of both surfaces of a wall or barrier; the readout automatically computes the resulting surface temperature difference. With the measured heat flux and temperature difference, the "K" factor can be determined.

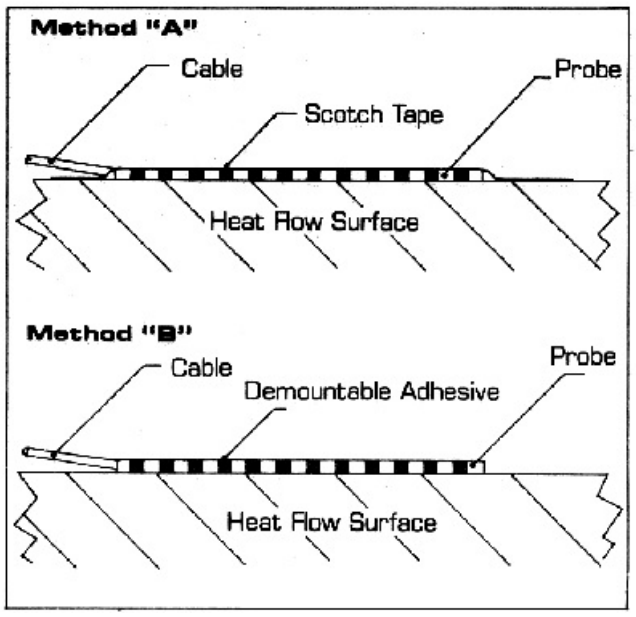


Figure 1 Probe Attachment

PRINCIPLE

The flow of heat from, or to the surface whose heat flow rate is to be measured creates a small temperature difference between the upper and lower surfaces of the transducer. These surfaces are in thermal contact with a special, miniature, high temperature thermopile which generates a direct current signal from the temperature difference. The signal is directly proportional to the heat flux through the transducer. The hundreds of thermoelectric elements in each transducer yield multi-millivolt signals which may also be measured separately by a portable potentiometer, or recorder. The thermal resistance introduced by the transducer is normally negligible for most practical applications.

CALIBRATION

Each Heatprobe transducer is individually calibrated at a base temperature of 75°F. An absolute calibration technique is used to determine the transducer constant to the required accuracy. (ASTM C177-76, mod.)

OPERATION

The increasing emphasis on energy conservation has prompted renewed interest in the heat transport characteristics of both commercial and residential buildings. To satisfy the requirement for quantitatively establishing relative heat losses through structural components, a portable system for directly measuring heat losses is necessary. In addition to adequate sensitivity and accuracy, the system should rapidly respond in order that a series of surface heat loss determinations be made under a fixed set of environmental conditions. It is only under these circumstances that a true comparison can be made between the heat transfer characteristics of the various building components. The Model HB-100 has been designed to satisfy most requirements for such structural heat loss determinations.

To conduct a local heat loss survey, the heat flux probe is attached to the heat transfer surface either by means of tape, or a demountable adhesive (Fig. 1). The signal cable is conducted parallel with the surface to the readout/operator, as shown in Figure 1. The operator should minimize his thermal view of the transducer because of its sensitivity to body heat. Measurements can be taken as soon as the transducer reaches thermal equilibrium. Air currents may cause minor fluctuations, however, these can be averaged out over several minutes.

To determine the thermal conductance of a wall or barrier, the temperature sensors are attached opposite each other on both sides of the barrier through which a steady flow of heat exists. The

Heat flux probe is attached to the interior wall

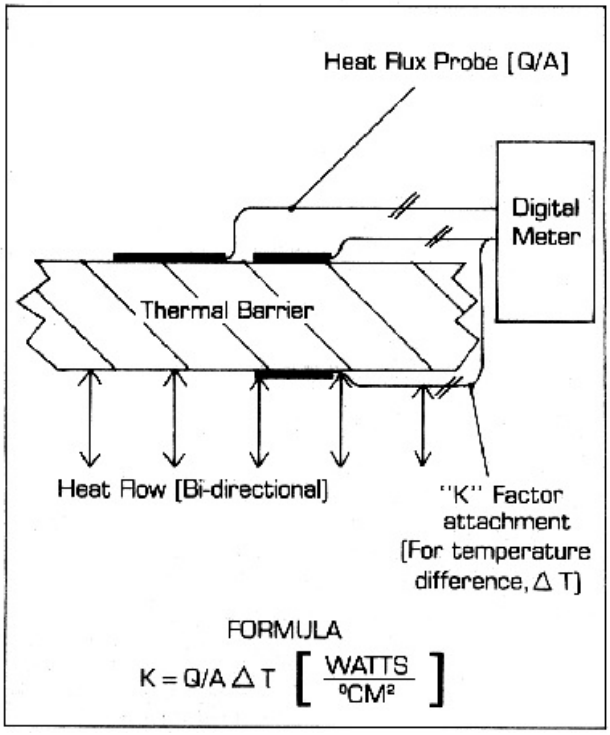


Figure 3 "K" Factor Test Arrangement

surface immediately adjacent to the temperature sensor (Fig. 3). Heat flux and temperature difference data are read out consecutively on the digital meter. The thermal conductance of heavily insulated walls which undergo temperature transients may also be measured by means of periodic averaging over several transients.

SPECIFICATIONS

Range (heat flux):
+/- 0 to 1999 Watts/Sq. Meter

Range (temperature):
-80°C to 300°C

Range (temp. difference):
0°C to 200°C

Temp. (Max) heat flux transducer:
300°C

Polarity:
Bi-directional (auto-indicated)

Resolution (heat flux):
1 Watt/Sq Meter

Resolution (temperature):
1°C

Accuracy (heat flux):
+/-1% of reading, or +/-1 Digit, whichever is greater

Accuracy (temperature):
+/-1% of reading (+/-1°C)

System Accuracy:
+/-5% with barrier in equilibrium for "K" Factor measurements

Heat Flux Transducer:
4"x4"x0.065"

Power Supply:
Std. 9-volt Alkaline Cell

"K" Factor Attachment (optional):
2 Temp. Sensors, 25 ft. Cable per sensor (may also be used for ambient temperature sensing)

Display:
12.7 mm LCD with Lo Battery indicator

Kit Weight (complete)
1.5 Kg.

ORDERING INFORMATION

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

OTHER ITI THERMAL INSTRUMENTS

Heat Flux Meters, Thermopiles, Thermal Conductivity Apparatus, Accelerator target Calorimeters, Radiometers, Thermal Flux Standards.