KHT-014 THERMAL CONDUCTIVITY UNIT FOR LIQUIDS AND GASES

Thermal conductivity is an important property which determines heat transfer by conduction. It is essential to determine the thermal conductivity of liquids and gases, as heat transfer is influenced by their presence, although conduction heat transfer is more predominant in solids. Thermal conductivity of liquids and gases also plays a significant role in convection heat transfer problems.

The study of thermal conductivity of liquids and gases is of interest to students of several branches of Science, Engineering, and Technology, particularly those involved in Mechanical, Chemical, Automobile, and Aerospace Engineering.

The **Thermal Conductivity Unit for Liquids and Gases Model KHT-014** is designed to study steady-state one-dimensional heat conduction in liquids and gases. Provision is made to determine the thermal conductivity of fluids such as air, water, and oil.

The unit consists of concentric cylinders separated by a small annular gap. The inner cylinder is heated by an electrical heater and the outer cylinder is cooled by a water jacket. Heat transfer occurs through the annular gap containing the test fluid. The gap is selected to ensure minimum heat transfer by convection, while polished surfaces make radiation heat transfer negligible. Thus, heat transfer occurs essentially by conduction.

The apparatus is equipped with:

- Easy injection and removal arrangement for test fluids.
- Proper insulation to minimize heat losses and maintain one-dimensional heat flow.
- Thermocouples to measure temperature differences across the annular gap.
- A measurement and control panel for precise monitoring.

Note: Specifications and Photos can be altered without prior notice in our constant efforts for improvement.

Thermal Conductivity of Fluids Apparatus

The Thermal Conductivity of Fluids Apparatus is designed to demonstrate steady-state one-dimensional heat conduction through liquids and gases. It enables the determination of thermal conductivity of different fluids such as air, oil, and water. The unit is compact, well-insulated, and equipped with precise instrumentation for accurate measurement and analysis.

Experiment Capabilities

- Study of steady-state one-dimensional heat conduction through fluids.
- Determination of thermal conductivity of different fluids such as air, oil, and water.

Important Specifications

- Heater: 0–200 W, variable with thermostat, maximum temperature 90 °C
- Inner Cylinder: Aluminum, Ø 40 mm × 200 mm length
- Outer Cylinder: With cooling water jacket and flow control valve
- Annular Gap: 0.5 mm
- Test Medium Provision: Inlet and outlet with arrangements for filling and draining test fluid
- Thermocouples: 2 Nos., K-type, 0–100 °C
- Power Meter: 0–200 W
- Measurement & Control Panel: With digital display

Services Required

- Electrical supply: Single-phase, 220–240 V, 50 Hz
- Water supply

Overall Dimensions (Approx.)

- Length: 0.4 m
- Height: 0.4 m
- Width: 0.4 m

Documentation

A comprehensive manual covering theoretical background, operating procedures, maintenance guidelines, and experimental analysis will be supplied with the equipment.

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