



Features

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 the heat transfer is influenced by the presence of liquids and gases, although conduction heat transfer process is more predominant in solids. Also, thermal conductivity of liquids and gases play an important role in convection heat transfer problems. Study of thermal conductivity of liquids and gases is of interest to the students of several branches of science, engineering and technology involved in heat transfer studies such as mechanical, chemical, automobile and aerospace engineering.

Note: Specifications are subject to change.

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Tesca Thermal Conductivity Unit for Liquids and Gases has been 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 the heater and the outer cylinder is cooled using water jacket. Heat is transferred between inner and outer cylinders through the annular gap containing the test fluid. The annular gap has been selected to ensure minimum heat transfer by convection and radiation heat transfer is made negligible by using polished surfaces. Thus, the heat transfer takes place basically by conduction through the annular gap containing the test fluid. Arrangement is made for easy injection and removal of the test fluid. The unit is well insulated to minimize heat losses and to ensure one dimensional heat transfer through the annular gap. Thermocouples are provided to measure temperature drop across the annular gap. Measurement and control panel is provided.

Experiments

1. Study of steady state one dimensional heat conduction through liquids and gases.
2. Determination of thermal conductivity of different fluids such as air, oil, water etc.,

Important specifications

1. Heater, 0-200W variable, with thermostat, max. temp. 900C.
2. Inner cylinder, Aluminium, 40mm diameter, 200mm long.
3. Outer cylinder with cooling water jacket and flow control valve.
4. Annular gap: 0.5mm.
5. Test medium inlet and exit, with provision for filling and removal of test fluid.
6. Thermocouples, 2 Nos., K-type, 0-1000C.
7. Power meter, 0-200W.
8. Measurement and control panel with digital display.

Services required

1. Electric supply, single phase, 220 – 240V, 50Hz.
2. Water supply

Overall dimensions (approx.)

Length: 0.4m, Height: 0.4m, Width: 0.4m.
The manual describing the theoretical and practical aspects of the apparatus, operation and maintenance will be supplied with the equipment.