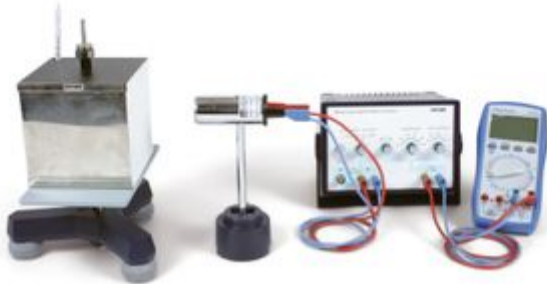


Emittance of hot bodies (Leslie cube)

Article no: P2350400



Principle

Thermal radiation can be measured at all surfaces as long as their temperature differs from that of the surrounding. Therefore it applies that the hotter an object is, the more radiation it emits. Also the surface colour influences the behaviour: dark surfaces emit more thermal radiation than light ones. An example for application of this effect is a heat sink which is often coated with a black layer to emit more thermal radiation.

Benefits

- Simple set-up
- Affordable experiment
- For both demonstration and student experiments

Tasks

1. Measurement of the room temperature T_0 (in Kelvin) before starting the experiment.
2. Determination and comparison of the emittance for all four sides of the Leslie cube at a constant high temperature. Therefore, the thermal radiation of a cube filled with boiling water is measured with a Moll-type thermopile.
3. Determination and comparison of the emittance for all four sides of the Leslie cube depending on the temperature.
4. Plotting the thermoelectric voltage V_{th} as a function of the absolute temperature T or rather $T^4 - T_0^4$ for each side of the cube and validation of Kirchhoff's law of thermal radiation for the used Leslie cube with the collected data.

Learning objectives

- Thermal radiation and emittance
- Kirchhoff's law of thermal radiation
- Leslie's cube
- Black and grey body

Scope of delivery

Tripod base PHYWE	02002-55	1
Barrel base expert	02004-00	1

Table top on rod	08060-00	1
Thermopile, Moll type	08480-00	1
Shielding tube, for 08480-00	08480-01	1
Immersion heater,1000W,220-250V	04020-93	1
PHYWE Universal measuring amplifier	13626-93	1
Connecting cord, 32 A, 500 mm, red	07362-01	2
Connecting cord, 32 A, 500 mm, blue	07362-04	2
Leslie radiation cube	04556-00	1
Students thermometer,-10...+110°C, l = 180 mm	38005-02	1
Funnel, glass, top dia. 50 mm	34457-00	1
Beaker, Duran®, high-form	36010-00	1
PHYWE Digital multimeter, 600V AC/DC, 10A AC/DC, 20 MΩ, 200 μF, 20 kHz, -20°C...760°C	07122-00	1