

Heat transfer
Heat radiationAbsorption of heat radiation -
Measurement with Sensor-CASSY and CASSY-Display**Object of the experiment**

1. Investigating the absorption of heat radiation by a black and a metallic-lustrous surface

Setup**Measuring example**

Measuring time: 120 s

Radiation probe	Temperature ϑ_0 in °C	Temperature ϑ in °C	Temperature increase $\Delta\vartheta$ in °C
Metallic-lustrous	26.5	27.6	1.1
black	26.5	37.2	10.7

Evaluation

At equal heat irradiation, the increase in temperature observed at the black radiation probe is greater than that observed at the metallic-lustrous one.

That means the black probe absorbs heat radiation better.

From the metallic-lustrous probe most of the heat radiation is reflected.

Apparatus

1 Radiation probes, pair	384 531
2 Temperature probe, NiCr-Ni, 1.5 mm	666 193
2 Temperature box, NiCr-Ni/NTC	524 045
1 Sensor-CASSY 2	524 013
1 CASSY-Display USB	524 020USB
1 Butane gas burner	666 711
1 Butane cartridge, 190 g, set of 3	666 712ET3
1 Stand base, V-shape, small	300 02
1 Stand rod, 75 cm, 12 mm diam.	300 43
2 Leybold multiclips	301 01
2 Stand rods with bore holes	590 13
4 Clip plugs, large	591 21

Remark:

Instead of the cartridge burner other heat sources (incandescent and halogen lamps or infrared lamps) can be used.

Carrying out the experiment

- Wait until the temperatures are equilibrated.
- Read the initial temperature ϑ_0 for the two radiation probes from the display, and take it down.
- Place the cartridge burner in front of the radiation probes so that it is at a distance of approx. 15 cm from each probe.
- Observe the temperature display, and read the temperature for each radiation probe after 120 s.