P2.3.2

Pojemność cieplna

P2.3.2.1
Wyznaczanie ciepła właściwego ciał stałych

Determining the specific heat of solids (P2.3.2.1_a)

Cat. No.	Description	P2.3.2.1 (a)
384 161	Cover for dewar vessel	1
386 48	Dewar vessel calorimeter	1
382 34	Thermometer, -10 ... +110 °C/0.2 K	1
384 34	Heating apparatus	1
384 35	Copper shot, 200 g	1
384 36	Glass shot, 100 g	1
315 76	Lead shot, 200 g, Ø = 3 mm	1
315 23	School and laboratory balance 610 Tare	1
303 28	Steam generator	1
664 104	Beaker, 400 ml, squat	1
667 194	Silicone tubing, 7 x 1.5 mm, 1 m	1
300 02	Stand base, V-shape, 20 cm	1
300 42	Stand rod 47 cm, 12 mm Ø	1
301 01	Leybold multiclamp	1
666 555	Universal clamp, 0 ... 80 mm	1
667 614	Heat protective gloves	1

When a body is heated or cooled, the absorbed heat capacity ΔQ is proportional to the change in temperature $\Delta\vartheta$ and to the mass m of the body:

$$\Delta Q = c \cdot m \cdot \Delta\vartheta$$

The proportionality factor c, the specific heat capacity of the body, is a quantity which depends on the respective material.

To determine the specific heat capacity in experiment P2.3.2.1, various materials in particle form are weighed, heated in steam to the temperature ϑ_1 and poured into a weighed-out quantity of water with the temperature ϑ_2. After careful stirring, heat exchange ensures that the particles and the water have the same temperature ϑ_m. The heat quantity released by the particles:

$$\Delta Q_1 = c_1 \cdot m_1 \cdot (\vartheta_1 \cdot \vartheta_m)$$

m_1: mass of particles

c_1: specific heat capacity of particles

is equal to the quantity absorbed by the water

$$\Delta Q_2 = c_2 \cdot m_2 \cdot (\vartheta_m \cdot \vartheta_2)$$

m_2: mass of water

The specific heat capacity of water c_2 is assumed as a given. The temperature ϑ_1 corresponds to the temperature of the steam. Therefore, the specific heat quantity c_1 can be calculated from the measurement quantities ϑ_2, ϑ_m, m_1 and m_2.