

Task1 → Summary

Radiative heat transfer: anything with a temperature higher than zero radiates heat

Emissivity: the ability to send heat is emissivity which for a blackbody is 1 and for a shiny mirror is 0

Absorptivity: the degree which any object can absorb energy which here means the amount of heat they can absorb

Reflectivity: the amount of energy that the surface can reflect and not absorb

The view factor : a part of the radiation that leaves from surface A and reaches surface B and it is based on the area of the surfaces

Net heat exchange between two black surfaces: black bodies absorb all the energy emitted to their surface and when two black bodies have a temperature higher than zero the only difference between them is the area and temperature

E black object = σT^4

So $Q_{1 \text{ to } 2} = Q_{\text{emitted by 1 and captured by 2}} - Q_{\text{emitted by 2 and captured by 1}}$

$Q_{\text{emitted by 1 and captured by 2}} = A_1 \times F_{12} \times E_1$

$Q_{\text{emitted by 2 and captured by 1}} = A_2 \times F_{21} \times E_2$

$Q_{1 \text{ to } 2} = A_1 \times F_{12} \times \sigma (T_1^4 - T_2^4)$

Net heat exchange between two grey surfaces

Compared to black bodies, gray surfaces have reflectivity. So in addition to the emitted radiations/absorbed radiations, we have the reflective radiations. We calculate the difference between the radiations leaving S_1 and captured by S_2 , called J , and the radiations incident on S_1 , called G_1 . $J = \text{Radiation emitted by the surface} + \text{Radiation reflected by the surface}$ $J = \epsilon \cdot \sigma \cdot T^4 + \rho \cdot G$
 $Q = A \cdot (J - G)$

Radiative heat resistance

Is a measure to see how much of the energy is converted to radiation

TASK2

$$\dot{Q}_{12} = A * (5.670 * 10^{-8} * (800^4 - 500^4)) / ((1/0.1) + (1/0.1) - 1) = A * 19680,57 / 19 = 1035,82 * A \text{ [W]}$$

Relation between the amount of energy gets affected directly with the emissivity

So if we decrease it the whole energy moved goes lower and vice versa