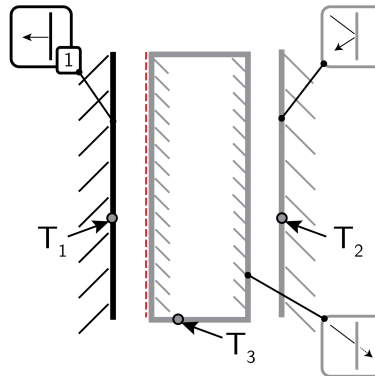


Surface Brightness 09

Determine the surface brightness $\dot{Q}_{3,\text{left}}$. Use surface brightnesses whenever possible.



Definition of the surface brightness:

$$\dot{Q}_{3,\text{left}} = \dot{Q}_{3,\text{left},\epsilon} + \dot{Q}_{3,\text{left},\rho} + \dot{Q}_{3,\text{left},\tau}$$

Defining the emitted, reflected and transmitted radiation:

The emitted radiation of a black body radiator can be stated as:

$$\dot{Q}_{3,\text{left},\epsilon} = \epsilon_3 \sigma A_3 T_3^4$$

The transmitted radiation can be expressed by the transmission coefficient and the radiation being transferred toward the back of the body:

$$\dot{Q}_{3,\text{left},\tau} = \tau_3 \Phi_{23} \dot{Q}_2$$

Inserting and rewriting:

$$\rightarrow \dot{Q}_{3,\text{left}} = \epsilon_3 \sigma A_3 T_3^4 + \tau_3 \dot{Q}_2$$