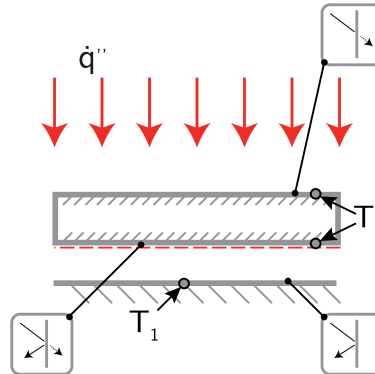


# Surface Brightness 30

Determine the surface brightness  $\dot{Q}_{2,\text{bottom}}$ . Use surface brightnesses whenever possible.



**Definition of the surface brightness:**

$$\dot{Q}_{2,\text{bottom}} = \dot{Q}_{2,\text{bottom},\epsilon} + \dot{Q}_{2,\text{bottom},\rho} + \dot{Q}_{2,\text{bottom},\tau}$$

**Defining the emitted, reflected and transmitted radiation:**

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

$$\dot{Q}_{2,\text{bottom},\epsilon} = \epsilon_{2b} \sigma A_2 T_2^4$$

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

$$\dot{Q}_{2,\text{bottom},\rho} = \rho_{2b} \Phi_{12} \dot{Q}_1$$

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

$$\dot{Q}_{2,\text{bottom},\tau} = \tau_{2t} \dot{Q} = \tau_{2t} \dot{q}'' A_2$$

**Inserting and rewriting:**

$$\Rightarrow \dot{Q}_{2,\text{bottom}} = \epsilon_{2b} \sigma A_2 T_2^4 + \rho_{2b} \dot{Q}_1 + \tau_{2t} \dot{q}'' A_2$$