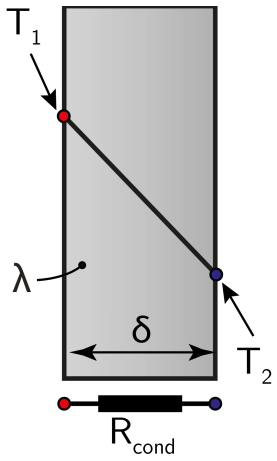
Conduction - Thermal Resistance 01

Define the heat transfer resistance R_{cond} for a wall with cross-section area A.



The standard expression for thermal resistance is:

$$R_{\text{cond}} = \frac{\Delta T}{\dot{Q}_{\text{cond}}}$$

The temperature difference can be expressed as:

$$\Delta T = T_1 - T_2$$

Where the rate of heat transfer for a plane wall can be stated as follows:

$$\dot{Q}_{\text{cond}} = -\lambda A \frac{\partial T}{\partial x} = \lambda A \frac{T_1 - T_2}{\delta}$$

Substitution yields:

$$\rightarrow R_{\text{cond}} = \frac{\delta}{\lambda A}$$