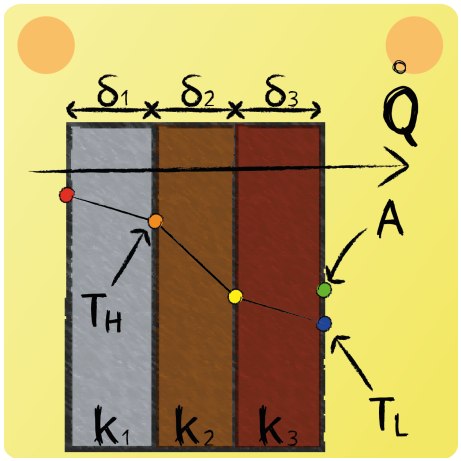
Lecture 02 - Conduction 05

Select the right relationship for the sketched situation.



Heat conduction through a multi-layer wall:

$$\dot{Q} = \frac{T_{\mathrm{H}} - T_{\mathrm{L}}}{R_{\mathrm{Total}}}$$

In the sketched situation, the thermal resistance is described by layers 2 and 3, as these 2 are located in between the specified temperatures.
As they are connected in series:

$$R_{\mathrm{Total}} = R_{\mathrm{layer},2} + R_{\mathrm{layer},3}$$

Where:

$$R_{\mathrm{layer},2} = \frac{\delta_2}{k_2 A}$$

$$R_{\mathrm{layer},3} = \frac{\delta_3}{k_3 A}$$

And thus:

$$\dot{Q} = \frac{T_{\mathrm{H}} - T_{\mathrm{L}}}{\frac{\delta_2}{k_2 A} + \frac{\delta_3}{k_3 A}}$$

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