Demre Ertem Weekly Submission 1

8 Ekim 2019 Salı 23:48

Heat conduction is the movement of a substance by the collision of heat molecules. Heat flows in only one direction from the warmer to the cooler object until they become at the same temperature.
Consider a heat transfer along the wall with a thickness of L along the wall, where the wall becomes the outer wall (T2) at higher temperature (T1) in the room. The heat transfer is x leading and perpendicular to the temperature difference plane. The most important phase is a conductivity of the matter(k). Then, the area of the wall affects the result. In another way, resistance can be calculated while using thickness of the wall, conductive coefficient and area of the wall.

Question;

k = 0.78 W/mC
A = 20 m^2
ΔT = 25 C
L = 0.4m
Q = ?

First method;

$$\dot{Q} = kA\frac{\Delta T}{L} = 0.78 * 20 * \frac{25}{0.4} = 975\ W$$

Second method;

$$R_{wall} = \frac{L}{kA} = \frac{0.4}{0.78 * 20} = 0.0256\ °C/W$$

$$\dot{Q} = \frac{\Delta T}{R_{Wall}} = \frac{25}{0.0256} = 976{,}56\ W$$

The only difference is rounding of the resistance.