lunes, 14 de octubre de 2019 3:10 p.m.

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1 Write a summary about the convective heat transfer (half a page) and explain why increasing the thickness of a single pane glass does not increase the total resistance

Convective heat transfer

- Convection is one of the ways of conducting heat and it happens through the transport of the heat particles from high temperature areas to low temperature ones and viceversa, making an equilibrium among them. Taking as an example, the kitchen: a pot with boiling water where the water that touches the bottom of the pot, rises and generates a flow of heat with the water on top for it to heat up.

But convection can also happen in certain surfaces in which the temperature difference creates a flow of heat that allows its transfer. Taking a wall for instance where the outside temperature and direct contact with the sun makes the rate of heat conduction possible with the inside of the building. This circumstance depends on the wall area and its thickness and of course the termal properties of the material.

Newton's law of cooling states that the amount of heat that is lost from one surface is equally proportional to the temperature difference existing between the surface and whats around it.

Increasing thickness of a single pane glass

- Increasing the thickness of a single pane glass wont affect the heat transfer because the thermal conductivity of the material is already stated and will remain as given. To have a significant change of resistance the glass would need to be way more thicker and still the difference wouldnt be relevant. A double pane window is more efficient due to the air gap between them.

2 Write an explanation about what mistakes you made in the class that resulted in wrong answers

▪ One of the mistakes I made during the class exercises was due to not converting the (ex. L=8mm) into meters (0.008m)

▪ Another mistake was due to not multiplying by 2 the glasses in the second example.

3 Solve the same problem as that of double pane window with with the air-gap thickness of 13 mm and glass thickness of 6 mm. Commment on your results and explain why we have an optimal range for the air-gap's distance.

$$R_{Total} = \frac{1}{h1A} + \frac{L}{kA} + \frac{1}{h2A}$$

$$= \frac{1}{10(1.2)} + \frac{0.006}{0.78(1.2)} + \frac{0.013}{0.026(1.2)} + \frac{1}{40(1.2)}$$

$$= 0.0833 + 0.0064(2) + 0.4166 + 0.0208$$

$$= 0.5335 \,^{\circ}\frac{C}{W}$$

$$\dot{Q} = \frac{T \infty 1 - T \infty}{R_{Total}}$$

$$= \frac{20-(-10°C)}{0.5335°C/W}$$

$$= \frac{30°C}{0.5335°C/W}$$

$$= 56.232\ W$$

▪ Its optimal because of the low W rate.