# Week2_suluderya

14 Ekim 2019 00:19

**1- write a summary (in your own words) about the convective heat transfer (half a page) and explain why increasing the thickness of a single pane glass does not increase the total resistane**

**Heat transfer** is energy transmission resulting from the temperature difference. There is three types of trasfer. Convection, conduction and diffusion. Convection is a kind of heat transfer which occurs between solid, moving fluid. It is kind of movement of molecules. Also there are two type of convection heat transfer ; naturel, forced. Naturel convection's main support point is; while the heated fluid rises up, the cold fluid settles. For example, the hot air rising up from the radiator surface. Forced convection occurs when the fluid movement has an external effect (such as a pump or fan).

Increasing the thickness of a single pane glass does not increase the total resistance, because when single glass is used, solar heat and light are utilized, but no insulation is provided. Increasing the thickness of a single glass does not provide insulation as desired. So thickening of the single layer of glass does not work because the cold air from outside passes through the same ratio and the resistance of the single layer of glass is much smaller than the resistance between the air and the glass. Due to the low u value, it cannot prevent the escape of heat. Temperature differences may occur within the living space.

**2- write an explanation about what mistakes you made in the class that resulted in wrong answers**

When the calculation of total resistance of the double pane window, it was misunderstood that the air did not move and how only convection occurred. Due to the correct information, the problem was solved again.

**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 !**

**Q:** Consider a 0.8-m-high and 1.5-m-wide double-pane window consisting of two 6-mm-thick layers of glass ( k=0.78 W/m.°$C$) separated by a 13-mm-wide stagnant air space (k=0.026 W/m.°$C$).

Take the convection heat transfer coefficients on the inner and outer surface of the window to be h1: 10W/m². °$C$ and h2:
40W/m² . °$C$ which includes the effects of radiation.

A = 0.8m * 1.5m
= 1.2m²

$R_{conv1} = \frac{1}{h1\ .\ A} = \frac{1}{\frac{10W}{m^2}.\ ^\circ C\ *\ 1,2} \approx 0.0833\ ^\circ\frac{C}{W}$

$R_{conv2} = \frac{1}{h2\ .\ A} = \frac{1}{\frac{40W}{m^2}.\ ^\circ C\ *\ 1,2} \approx 0.0208\ ^\circ\frac{C}{W}$

$R_{g1} = R_{g2} = \frac{Lg}{Kg\ *A} = \frac{0.006}{0.78\ *1.2} = 0.0064\ ^\circ\frac{C}{W}$

$R_a = \frac{La}{Ka\ *A} = \frac{0.013}{0.78\ *1.2} = 0.4167\ ^\circ\frac{C}{W}$

$R_{tot} = R_{conv1} + R_{conv2} + R_{g1} + R_{g2} + R_a$

$R_{tot}$ = 0.0833+ 0.0208 $+0.0064 + 0.0064 + \ 0.4167$

$R_{tot}$ = 0.5333 $^\circ \frac{C}{W}$

$\dot{Q} = \frac{\Delta T}{Rtot} \ =$ 20°C–(–10°C) / 0.5333 $^\circ \frac{C}{W}$

$\dot{Q} = \ 56.\ 2535\ W$