1. SUMMARY

Convection is the heat transfer through fluids, and depends on the velocity of the liquid or gas, the difference of temperature and the type of fluid. There are 2 types of convection:

Natural convection: it is referred to the natural heat in a room, for example: it happens when a room stays warm, it happens because the warm air is lighter and it goes up, and warms the room.

Forced convection: it is referred to external forces, like wind.

To find the convection, first we need to know the thermal resistance, the temperature of the fluid (wich is homogenous in the room) and finally the temperature on the surface.

In general, for calculating the heat transfer, it is important to search for the combination of conduction and convection, and find out the worst-case scenario in the building. For that, we need to sum all the thermal resistances: Rconv1+ Rwall+ Rcond2, and the difference on the temperatures inside and outside.

We saw, in the example, that the thickness of the glass, doesn't change the fact that the room is losing heat, we saw that the resistant of the glass is pretty low, and if we increase their thickness is going to be useless. In that sense, it is better to propose a panel with 2 glasses and a gap in between, to reduce the lose heating.

2. MISTAKES

In the example B, i got confused about the conversion of the thickness of the wall. When I calculated the mm in m, I did it wrong.

3. EXERCISE

$$A = 0.8 * 1.5 = 1.2$$

$$R_{g_1} = R_{g_2} = \frac{L_g}{(K_g \times A)} = \frac{0.006}{0.78 * 1.2} = 0.0064\,°\frac{C}{W}$$

$$R_{airGap} = \frac{L_{airGap}}{(K_{airGap} \times A)} = \frac{0.013}{0.026 * 1.2} = 0.4167\ °C/W$$

$$R_{conv_1} = \frac{1}{h_1 \times A} = (\frac{1}{10 * 1.2)} = 0.0833\,°C/W$$

$$R_{conv_2} = \frac{1}{h_2 \times A} = (\frac{1}{40 * 1.2)} = 0.0208\,°\frac{C}{W}$$

$$R_{tot} = R_{conv_1} + R_{conv_2} + 2 \times R_g + R_{airGap}$$
$$= 0.0833 + 0.0208 + 2 * 0.0064 + 0.4167 = 0.5336\,°\frac{C}{W}$$
$$\dot{Q} = \frac{\Delta T}{R_{Tot}} = \frac{30}{0.5336} = 56.22\,W$$

We can see that the resistance of the glass is very low comparing it to the resistance of the air gap, so we can conclude that this gap, helps the panel in lose less heat.

In the example in class, we calculated the resistance of the gap with 10 mm space, and in this case is a 13 mm, so from that we can conclude that having more space between the glass panels, it can reduce the lose heating