

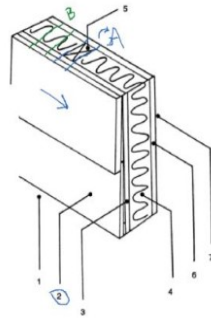
Week4_KKAZAN

16 Aralık 2019 Pazartesi
14:43

QUESTION 1:

Determine the overall unit thermal resistance (the R- value) and the overall heat transfer coefficient (the U -factor) of a frame wall that is built around 38mm 90 mm wood studs with a center to centre distance of 400 mm. 13 mm gypsum and the outside with 13 mm plywood and 13mm 200mm wood bevel lapped siding. The insulated cavity constitutes 75 of the heat transmission area , while the studs, plates , and skills constitute 21 percent. The headers constitute 4 percent of area , and they can be treated as studs. Also , determine the rate of heat loss through the walls of a house whose perimeter 50 m and wall height is 2.5 m in las vegas , nevada whose winter desing temperature is -2 c . Take the indoor design temperature to be 22 c and assume 20 percent of the area is occpied by glazing.

	wood	insulation
Outside air	0.03	0.03
wood bevel 1.	0.14	0.14
Plywood (13 mm)	0.11	0.11
Urethane rigif foam	no	$0.98 \times 90 / 25 = 3.52$
Wood studs	0.63	no
Gypsum board	0.079	0.079
İnside surface	0.12	0.12
R' (sum)	1.109°C/W	3.999°C/W



$$R_{\text{withwood}} = 0.03 + 0.14 + 0.11 + 0.63 + 0.079 + 0.12 = 1.109 \text{ m}^2\text{C/W}$$

$$R_{\text{withins}} = 0.03 + 0.14 + 0.11 + 3.52 + 0.079 + 0.12 = 3.999 \text{ m}^2\text{C/W}$$

Overall unit thermal resistance ;

$$R_{\text{value}} = 1 / U_{\text{total}} = 1 / 0,4129 \text{ Wm}^2/\text{°C} = 2,421 \text{ m}^2\text{.°C/W}$$

The rate of heat loss through the walls

$$\begin{aligned} Q_{\text{total}} &= U_{\text{total}} \times A_{\text{total}} \times \Delta T \\ &= 0,4129 \text{ Wm}^2/\text{°C} \times 50 \times 2,5 \times 0,8 \times 24 = 2.400 \text{ 990,96W} \end{aligned}$$

QUESTION 2:

In 2 pages you should write a summary (in your own word!, in your own words !!) of what you have learnt in this session radiation and radiative heat transfer