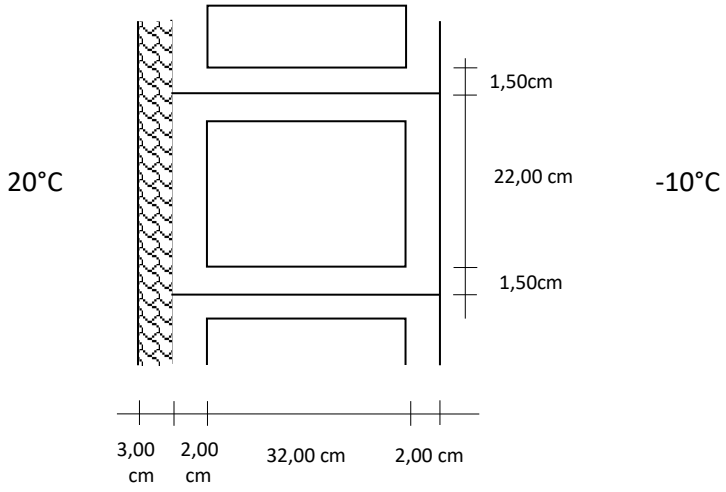
Savinetti Simone 10542075 October, the 22th



a)

$R_{conv1} = \frac{1}{K \cdot A} = \frac{1}{10\ W/m^2.°C \times 0,25m^2} = 0,4\ °C/W$

$R_{brick} = \frac{L\,f}{K \cdot A} = \frac{0,03m}{0,26W/m^2.°C \times 0,25m^2} = 4,615\ °C/W$

$R_{plaster_{sx,dx}} = \frac{L}{K \cdot A} = \frac{0,02m}{0,22W/m^2.°C \times 0,25m^2} = 0.363\ °C/W$

$R_{plaster_{top,down}} = \frac{L}{K \cdot A} = \frac{0,32m}{0,22W/m^2.°C \times 0,015m^2} = 96,96\ °C/W$

$R_{brick} = \frac{L}{K \cdot A} = \frac{0,32m}{0,72W/m^2.°C \times 0,22m^2} = 2,02\ °C/W$

$R_{conv_2} = \frac{1}{H_2 \cdot A} = \frac{1}{40W/m^2.°C \times 0,25m^2} = 0,10\ °C/W$

$\frac{1}{\mathbf{Rtot\ parall}} = 2 * \left(\frac{1}{R_{plaster\ top,down}}\right) + \frac{1}{R_{brick}} = 0,5156\ °C/W$ $\mathbf{Rtot\ parall} = \frac{1}{0,5156} = \mathbf{1.9394}$

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$Q = \frac{\Delta T}{R_{total}} = \frac{20°C - (-10°C)}{1,9394\ °C/W} = \frac{30°C}{1,9394\ °C/W} = \mathbf{15,46\ W}$

Rtotal= **Rtotal**= R_{conv_1} + Rfoam + $R_{plaster_1}$ + R tot parall+ $R_{plaster_2}$ + R_{conv_2} =
0,40 °C/W + 4,615 °C/W + 0,36 °C/W + 1,9394 °C/W + 0,36 °C/W + 0,10°C/W =
7,7744°C/W

Foam is the moast resistant material in this example.

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Q= ΔT = 20°C – (-10°C) = 30°C = **3,85 W**
Rtotal 7,855 °C/W 7,7744 °C/W

Conclusion: the heat transfer through a wall made with a 32cm brick is less than the one made with a 16cm brick.

	WOOD	INSULATION
Outside air	0,03	0,03
Wood bevel	0,14	0,14
Plywood	0,11	0,11
Urethane rigid foam	NO	0,98
Wood studs	0,63	NO
Gypsum board	0,079	0,079
Inside surface	0,12	0,12
	Rwood= 1,109 m^2.°C/W	**Rwood= 1,459 m^2.°C/W**

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Q= ΔT = 22°C – (-2°C) = 24°C = **21,64W**
Rtotal 1,109°C/W 1,109 °C/W

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Q= ΔT = 22°C – (-2°C) = 24°C = **16,44W**
Rtotal 1,459°C/W 1,459 °C/W