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1. COMPOSITE WALL

Thickness of the brick 16 cm

$$R_{total} = R_{conv1} + R_f + R_p + \frac{1}{R_{p1}} + \frac{1}{R_b} + \frac{1}{R_{p2}} + R_p + R_{conv2}$$

$$R_{total} = 0.4 + 4.61 + 0.36 + \frac{1}{48.48} + \frac{1}{1.01} + \frac{1}{48.48} + 0.36 + 0.1$$

$$\boldsymbol{R_{total} = 6.86\frac{C}{W}}$$

$$Q = \frac{T_1 - T_2}{R_{total}}$$

$$Q = \frac{20C - (-10C)}{6.86\frac{C}{W}}$$

$$\boldsymbol{Q = 4.37\ W}$$

$$R_{conv1} = 0{,}4\frac{C}{W}$$
$$R_f = 4{,}61\frac{C}{W}$$
$$R_p = 0{,}36\frac{C}{W}$$
$$R_{p1} = 48{,}48\frac{C}{W}$$
$$R_b = 1{,}01\frac{C}{W}$$
$$R_{conv2} = 0{,}1\frac{C}{W}$$

2. COMPOSITE WALL

Thickness of the brick 32 cm

$$R_{total} = R_{conv1} + R_f + R_p + \frac{1}{R_{p1}} + \frac{1}{R_b} + \frac{1}{R_{p2}} + R_p + R_{conv2}$$

$$R_{total} = 0.4 + 4.61 + 0.36 + \frac{1}{96.96} + \frac{1}{2.02} + \frac{1}{96.96} + 0.36 + 0.1$$

$$\boldsymbol{R_{total} = 6.34\frac{C}{W}}$$

$$Q = \frac{T_1 - T_2}{R_{total}}$$

$$Q = \frac{20C - (-10C)}{6.34\frac{C}{W}}$$

$$\boldsymbol{Q = 4.73\ W}$$

$$R_{conv1} = 0{,}4\frac{C}{W}$$
$$R_f = 4{,}61\frac{C}{W}$$
$$R_p = 0{,}36\frac{C}{W}$$
$$R_{p1} = 96{,}96\frac{C}{W}$$
$$R_b = 2{,}02\frac{C}{W}$$
$$R_{conv2} = 0{,}1\frac{C}{W}$$

Increasing by the double the thickness of the brick, decrease the total resistance of the wall but not significantly. The resistance of the brick and the plaster in the section rise to the double, however, as it is inversely proportional to the total resistance, the amount decreases comparing with the initial exercise.

3. SIMPLIFIED WALL CALCULATION

	WOOD	INSULATION
OUTSIDE AIR WINTER	$0{,}030\frac{m^2C}{W}$	$0{,}030\frac{m^2C}{W}$
WOOD BEVEL	$0{,}14\frac{m^2C}{W}$	$0{,}14\frac{m^2C}{W}$
PLYWOOD (13 MM)	$0{,}011\frac{m^2C}{W}$	$0{,}011\frac{m^2C}{W}$
URETHANE RIGID FOAM (90 MM) INSULATION	-	$3{,}52\frac{m^2C}{W}$
WOOD STUD	$0{,}63\frac{m^2C}{W}$	-
GYPSUM BOARD	$0{,}079\frac{m^2C}{W}$	$0{,}079\frac{m^2C}{W}$
INSIDE AIR	$0{,}12\frac{m^2C}{W}$	$0{,}12\frac{m^2C}{W}$
RVALUE	$\boldsymbol{1{,}01\frac{m^2C}{W}}$	$\boldsymbol{3{,}9\frac{m^2C}{W}}$