1. Answer

$R_{1conv} = 1 / h_1 A_1 = 0.4$ °C/W

$R_{foam} = L_{foam} / k_{foam} A_1 = 4.6$ °C/W

$R_{plaster\ up} = R_{plaster\ down} = L_{plaster} / k_{plaster} A_{plaster} = 96{,}9$ °C/W

$R_{brick} = L_{brick} / k_{brick} A_{brick} = 2$ °C/W

$1/ R_{tot.parallel} = (1 / R_{plaster\ up}) + (1 / R_{plaster\ down}) + (1 / R_{brick}) = 0{,}5$ W/°C

$R_{tot.parallel} = 1{,}9$ °C/W

$R_{plaster\ left} = R_{plaster\ right} = L_{plaster} / k_{plaster} A_{plaster} = 0{,}3$ °C/W

$R_{2conv} = 1 / h_2 A_1 = 0{,}1$ °C/W

$R_{wall\ tot} = R_{1conv} + R_{foam} + R_{plaster\ left} + R_{tot\ parallel} + R_{plaster\ right} + R_{2\ conv} = 7{,}7$ °C/W

$Q_{dot} = (T_1 – T_\infty) / R_{wall\ tot} = 3{,}8$ W

If we compare the result with the previous one (16mm) we can observe that:
$Q_{dot} = (T_1 – T_\infty) / R_{wall\ tot(16mm)} = 4.4$ W ($R_{wall\ tot(16mm)} = 6{,}8$ °C/W)

The thermal resistance of the wall don’t increase significantly just doubling the thickness of the bricks.

2. Answer

	Wood	Insulation
Outside air	0,03	0.03
Wood Bevel (13x200mm)	0.14	0.14
Polywood (13mm)	0.11	0.11
Urethane Rigif foam insulat.(90mm)	-	3.52
Wood studs (90mm)	0.63	-
Gypsum board (13mm)	0.079	0.079
Inside surface	0.12	0.12

$R'_{wood} = 1.109$ m^2 °C / W

$R'_{insulation} = 4$ m^2 °C / W