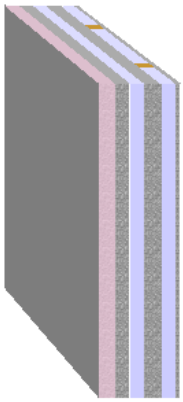
Documentation of the component 26. September 2011
Thermal transmittance (U-value) according to BS EN ISO 6946
Source: **own catalogue**
Component: **New external wall**

OUTSIDE INSIDE



This illustration of inhomogeneous layers is provided only to assist in visualising the arrangement.

Assignment: External wall

		Manufacturer	Name	Thickness [m], number	Lambda [W/(mK)]	Q	R [m²K/W]
		Rse					0.04
☑	1	WBS	WBS Silicone Render	0.008	0.556	E	0.01
☑	2	WBS	WBS Phenolic Insulation Board (45+)	0.060	0.020	E	3.00
		Fixings	Plastic insulation anchors No./m²:	8/m²	0.500	D	-
		Air gaps	Level 1: dU" = 0.01 W/(m²K)				
☑	3	Own catalogue	Concrete Panel	0.052	0.833	E	0.06
☑	4	Own catalogue	Normal cavity - 50 mm, unventilated	0.050	0.278	E	0.18
☑	5	Own catalogue	Concrete Panel	0.065	0.833	E	0.08
☑	6	Inhomogeneous material layer	consisting of:	0.050	ø 0.262		0.19
	6a	Own catalogue	Normal cavity - 50 mm, unventilated	89.00 %	0.278	E	-
	6b	BS EN 12524	Softwood Timber [500 kg/m³]	11.00 %	0.130	D	-
☑	7	Own catalogue	Gypsum Plasterboard	0.013	0.250	E	0.05
☑	8	Own catalogue	Gypsum plastering	0.003	0.382	E	0.01
		Rsi					0.13
				0.301			

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$R_T = (R_T' + R_T'')/2 = 3.76$ m²K/W

Correction to U-value for	according to	delta U [W/(m²K)]
Mechanical fasteners	BS EN ISO 6946 Annex D	~~0.000~~
Air gaps	BS EN ISO 6946 Annex D	~~0.006~~
Air gaps and fixings corrections need not be applied, as their total effect is less than 3% (Annex D BS 6946:1996).		
		0.000

$U = 1/R_T + \Sigma\Delta U = 0.27$ W/(m²K)

Q .. The physical values of the building materials has been graded by their level of quality. These 5 levels are the following
A .. A: Data is entered and validated by the manufacturer or supplier. Data is continuously tested by 3rd party.
B .. B: Data is entered and validated by the manufacturer or supplier. Data is certified by 3rd party
C .. C: Data is entered and validated by the manufacturer or supplier.
D .. D: Information is entered by BuildDesk without special agreement with the manufacturer, supplier or others.
E .. E: Information is entered by the user of the BuildDesk software without special agreement with the manufacturer, supplier or others.

U_{max} = **0.35** W/(m²K) U = **0.27** W/(m²K) R_T= **3.76** m²K/W

Source of Umax value: England, Wales: Approved Document L1A (2006), Table 2 - New Build Dwellings

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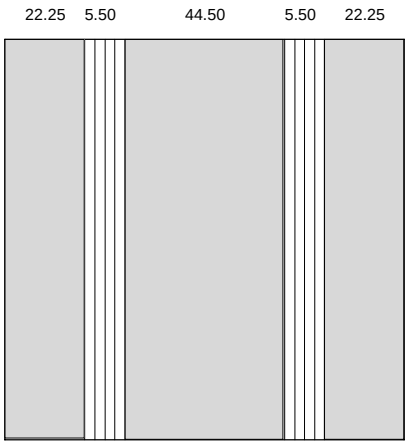
Draft of the component (portion in %):



The inhomogeneous layer consists of two zones (A, B).
The portion is given in %.

A	22.25 + 44.50 + 22.25 consisting of material layers: 1, 2, 3, 4, 5, 6a, 7, 8	= 89.00%
B	5.50 + 5.50 consisting of material layers: 1, 2, 3, 4, 5, 6b, 7, 8	= 11.00%

Upper limit of the thermal transfer resistance R

$$U_A\ [W/(m^2K)] = \frac{1}{(\Sigma R_{i,A}) + R_{si} + R_{se}} = \frac{1}{3.57 + 0.13 + 0.04} = 0.27$$

$$U_B\ [W/(m^2K)] = \frac{1}{(\Sigma R_{i,B}) + R_{si} + R_{se}} = \frac{1}{3.78 + 0.13 + 0.04} = 0.25$$

$$R_T' = \frac{1}{A * U_A + B * U_B} = 3.77\ m^2K/W$$

Lower limit of the thermal transfer resistance R

R_{se} [m²K/W]		= 0.04
R_1'' [m²K/W] = d_1/λ_1 =	0.008 / 0.556	= 0.01
R_2'' [m²K/W] = d_2/λ'_2 =	0.060 / 0.020	= 3.00
R_3'' [m²K/W] = d_3/λ_3 =	0.052 / 0.833	= 0.06
R_4'' [m²K/W] = d_4/λ_4 =	0.050 / 0.278	= 0.18
R_5'' [m²K/W] = d_5/λ_5 =	0.065 / 0.833	= 0.08
R_6'' [m²K/W] = $d_6/(\lambda_{6a} * A + \lambda_{6b} * B)$ =	0.050 /(0.278 * 89.00% + 0.130 * 11.00%)	= 0.19
R_7'' [m²K/W] = d_7/λ_7 =	0.013 / 0.250	= 0.05
R_8'' [m²K/W] = d_8/λ_8 =	0.003 / 0.382	= 0.01
R_{si} [m²K/W]		= 0.13

$$R_T'' = \Sigma R_i'' + R_{si} + R_{se} = 3.76\ m^2K/W$$