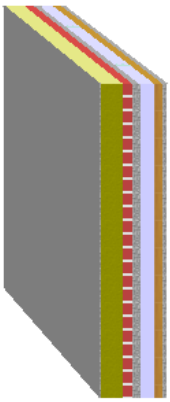
Documentation of the component — 20. October 2011
Thermal transmittance (U-value) according to BS EN ISO 6946 —
Source: **own catalogue - Own**
Component: **Typical Cussins Property**

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 Mineral Fibre	0.080	0.037	E	2.16
		Fixings	Plastic insulation anchors No./m²:	8/m²	0.500	D	-
		Air gaps	Level 1: dU" = 0.01 W/(m²K)				
☑	3	Own catalogue	Brick Slip Facing & Mortar inner leaf (f = 0.000 / automatic disregarding acc. BRE 4.4.3)	0.035	0.770	E	0.05
☑	4	Own catalogue	Concrete, Medium density 2000	0.032	1.350	E	0.02
☑	5	Inhomogeneous material layer	consisting of:	0.050	ø 0.775		0.06
	5a	Own catalogue	Normal cavity - 50 mm, unventilated	99.00 %	0.278	E	-
	5b	Own catalogue	Steel	01.00 %	50.000	E	-
☑	6		Woodfibre Insulation	0.030	0.040	E	0.75
		Air gaps	Level 1: dU" = 0.01 W/(m²K)				
☑	7	Own catalogue	Gypsum Plasterboard	0.013	0.250	E	0.05
		Rsi					0.13
				0.248			

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$R_T = (R_T' + R_T'')/2 = 3.34$ 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	~~0.005~~
Air gaps and fixings corrections need not be applied, as their total effect is less than 3% (Annex D BS 6946:1996).		
		0.000

$U = 1/R_T + \Sigma\Delta U = 0.30$ 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 = **0.30** W/(m²K) R_T= **3.34** m²K/W

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

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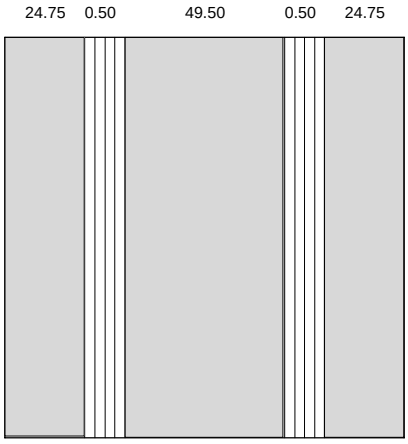
Draft of the component (portion in %):



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

A	24.75 + 49.50 + 24.75 consisting of material layers: 1, 2, 3, 4, 5a, 6, 7	= 99.00%
B	0.50 + 0.50 consisting of material layers: 1, 2, 3, 4, 5b, 6, 7	= 1.00%

Upper limit of the thermal transfer resistance R

U_A [W/(m²K)] = $\frac{1}{(\Sigma R_{i,A}) + R_{si} + R_{se}}$ = $\frac{1}{3.23 + 0.13 + 0.04}$ = 0.29

U_B [W/(m²K)] = $\frac{1}{(\Sigma R_{i,B}) + R_{si} + R_{se}}$ = $\frac{1}{3.05 + 0.13 + 0.04}$ = 0.31

$$R_T' = \frac{1}{A * U_A + B * U_B} = 3.40\ m^2K/W$$

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 =	0.080 / 0.037	= 2.16
R_3'' [m²K/W] = d_3/λ_3 =	0.035 / 0.770	= 0.05
R_4'' [m²K/W] = d_4/λ_4 =	0.032 / 1.350	= 0.02
R_5'' [m²K/W] = $d_5/(\lambda_{5a} * A + \lambda_{5b} * B)$ =	0.050 /(0.278 * 99.00% + 50.000 * 1.00%)	= 0.06
R_6'' [m²K/W] = d_6/λ_6 =	0.030 / 0.040	= 0.75
R_7'' [m²K/W] = d_7/λ_7 =	0.013 / 0.250	= 0.05
R_{si} [m²K/W]		= 0.13

$$R_T'' = \Sigma R_i'' + R_{si} + R_{se} = 3.28\ m^2K/W$$