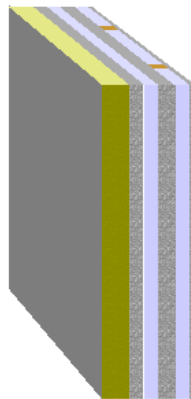


Source: **own catalogue**
Component: **New external wall**

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
<input checked="" type="checkbox"/>	1	WBS	0.008	0.556	E	0.01
<input checked="" type="checkbox"/>	2	WBS	0.100	0.037	E	2.70
		Fixings	8/m²	0.500	D	-
		Air gaps				
		Level 1: dU" = 0.01 W/(m²K)				
<input checked="" type="checkbox"/>	3	Own catalogue	0.052	0.833	E	0.06
<input checked="" type="checkbox"/>	4	Own catalogue	0.050	0.278	E	0.18
<input checked="" type="checkbox"/>	5	Own catalogue	0.065	0.833	E	0.08
<input checked="" type="checkbox"/>	6	Inhomogeneous material layer consisting of:	0.050	∅ 0.262		0.19
	6a	Own catalogue	89.00 %	0.278	E	-
	6b	BS EN 12524	11.00 %	0.130	D	-
<input checked="" type="checkbox"/>	7	Own catalogue	0.013	0.250	E	0.05
<input checked="" type="checkbox"/>	8	Own catalogue	0.003	0.382	E	0.01
		Rsi				0.13
			0.341			

Documentation of the component
Thermal transmittance (U-value) according to BS EN ISO 6946

26. September 2011
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Source: **own catalogue**

Component: **New external wall**

$$R_T = (R_T' + R_T'')/2 = 3.46 \text{ m}^2\text{K/W}$$

Correction to U-value for	according to	delta U [W/(m ² K)]
Mechanical fasteners	BS EN ISO 6946 Annex D	0.000
Air gaps	BS EN ISO 6946 Annex D	0.006
<i>Air gaps and fixings corrections need not be applied, as their total effect is less than 3% (Annex D BS 6946:1996).</i>		0.000

$$U = 1/R_T + \Sigma\Delta U = 0.29 \text{ W/(m}^2\text{K)}$$

- 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.

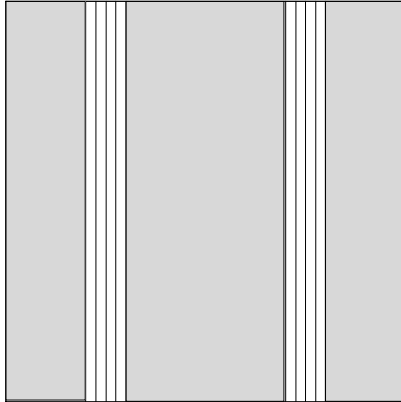
$$U_{\max} = \boxed{0.35 \text{ W/(m}^2\text{K)}}$$

$$U = \boxed{0.29 \text{ W/(m}^2\text{K)}} \quad R_T = \boxed{3.46 \text{ m}^2\text{K/W}}$$



Source of U_{max} value: England, Wales: Approved Document L1A (2006), Table 2 - New Build Dwellings

Source: **own catalogue**
Component: **New external wall**

Draft of the component (portion in %):
22.25 5.50 44.50 5.50 22.25



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

$$U_A [W/(m^2K)] = \frac{1}{(\sum R_{i,A}) + R_{si} + R_{se}} = \frac{1}{3.28 + 0.13 + 0.04} = 0.29$$

$$U_B [W/(m^2K)] = \frac{1}{(\sum R_{i,B}) + R_{si} + R_{se}} = \frac{1}{3.48 + 0.13 + 0.04} = 0.27$$

$$R_T' = \frac{1}{A * U_A + B * U_B} = 3.47 \text{ m}^2\text{K/W}$$

Lower limit of the thermal transfer resistance R

$R_{se} [m^2K/W]$		= 0.04
$R_1'' [m^2K/W] = d_1 / \lambda_1 =$	0.008 / 0.556	= 0.01
$R_2'' [m^2K/W] = d_2 / \lambda_2 =$	0.100 / 0.037	= 2.70
$R_3'' [m^2K/W] = d_3 / \lambda_3 =$	0.052 / 0.833	= 0.06
$R_4'' [m^2K/W] = d_4 / \lambda_4 =$	0.050 / 0.278	= 0.18
$R_5'' [m^2K/W] = d_5 / \lambda_5 =$	0.065 / 0.833	= 0.08
$R_6'' [m^2K/W] = d_6 / (\lambda_{6a} * A + \lambda_{6b} * B) =$	0.050 / (0.278 * 89.00% + 0.130 * 11.00%)	= 0.19
$R_7'' [m^2K/W] = d_7 / \lambda_7 =$	0.013 / 0.250	= 0.05
$R_8'' [m^2K/W] = d_8 / \lambda_8 =$	0.003 / 0.382	= 0.01
$R_{si} [m^2K/W]$		= 0.13

$$R_T'' = \sum R_i'' + R_{si} + R_{se} = 3.46 \text{ m}^2\text{K/W}$$