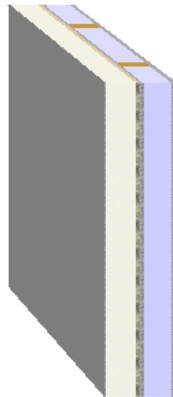


Source: **own catalogue - Own**
Component: **Typical Arcal Property**

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
<input checked="" type="checkbox"/>	1	WBS	0.008	0.556	E	0.01
<input checked="" type="checkbox"/>	2	WBS	0.110	0.038	E	2.89
		Fixings	8/m²	0.500	D	-
		Air gaps				-
		Level 1: dU" = 0.01 W/(m²K)				-
<input checked="" type="checkbox"/>	3	Own catalogue	0.015	1.000	E	0.02
<input checked="" type="checkbox"/>	4	Own catalogue	0.018	0.170	E	0.11
<input checked="" type="checkbox"/>	5	Inhomogeneous material layer	0.100	∅ 0.508		0.20
	5a	Own catalogue	89.00 %	0.555	E	-
	5b	BS EN 12524	11.00 %	0.130	D	-
<input checked="" type="checkbox"/>	6	Own catalogue	0.013	0.250	E	0.05
		Rsi				0.13
			0.264			

$$R_T = (R_T' + R_T'')/2 = 3.47 \text{ m}^2\text{K/W}$$

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	0.007
<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.

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

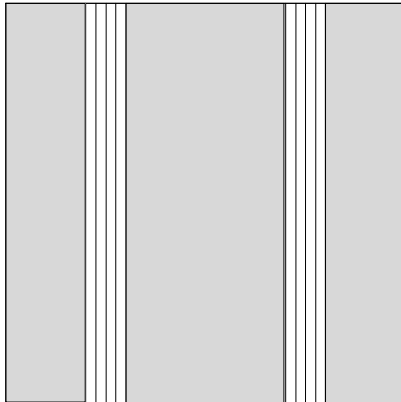
$$U = \boxed{0.29 \text{ W/(m}^2\text{K)}} \quad R_T = \boxed{3.47 \text{ m}^2\text{K/W}}$$

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



Calculated with BuildDesk 3.4.4

Source: **own catalogue - Own**
Component: **Typical Arcal Property**

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

Upper limit of the thermal transfer resistance R

$$U_A [W/(m^2K)] = \frac{1}{(\sum R_{i,A}) + R_{si} + R_{se}} = \frac{1}{3.26 + 0.13 + 0.04} = 0.29$$

$$U_B [W/(m^2K)] = \frac{1}{(\sum R_{i,B}) + R_{si} + R_{se}} = \frac{1}{3.85 + 0.13 + 0.04} = 0.25$$

$$R_T' = \frac{1}{A * U_A + B * U_B} = 3.49 \text{ m}^2\text{K/W}$$

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
$R_2'' [m^2K/W] = d_2 / \lambda_2 =$	0.110 / 0.038	= 2.89
$R_3'' [m^2K/W] = d_3 / \lambda_3 =$	0.015 / 1.000	= 0.02
$R_4'' [m^2K/W] = d_4 / \lambda_4 =$	0.018 / 0.170	= 0.11
$R_5'' [m^2K/W] = d_5 / (\lambda_{5a} * A + \lambda_{5b} * B) =$	0.100 / (0.555 * 89.00% + 0.130 * 11.00%)	= 0.20
$R_6'' [m^2K/W] = d_6 / \lambda_6 =$	0.013 / 0.250	= 0.05
$R_{si} [m^2K/W]$		= 0.13

$$R_T'' = \sum R_i'' + R_{si} + R_{se} = 3.45 \text{ m}^2\text{K/W}$$