

Source: **own catalogue - Own**
Component: **Typical Hawksley Bungalow**

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	0.038	E	2.63
		Fixings	8/m²	0.500	D	-
		Air gaps	Level 1: dU" = 0.01 W/(m²K)			-
<input checked="" type="checkbox"/>	3	Own catalogue	0.005	160.000	E	0.00
<input checked="" type="checkbox"/>	4	Inhomogeneous material layer	0.050	ø 0.544		0.09
	4a	Glass Fibre Insulation	99.00 %	0.044	E	-
	4b	Own catalogue	01.00 %	50.000	E	-
<input checked="" type="checkbox"/>	5	Own catalogue	0.013	0.250	E	0.05
		Rsi				0.13
						0.176

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

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	0.006
<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

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

- 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.

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

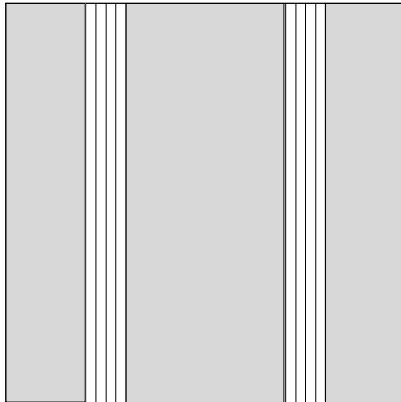
$$U = \boxed{0.29 \text{ W}/(\text{m}^2\text{K})} \quad R_T = \boxed{3.47 \text{ m}^2\text{K/W}}$$

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



Calculated with BuildDesk 3.4.4

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Draft of the component (portion in %):
24.75 0.50 49.50 0.50 24.75



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

Upper limit of the thermal transfer resistance R

$$U_A [W/(m^2K)] = \frac{1}{(\sum R_{i,A}) + R_{si} + R_{se}} = \frac{1}{3.83 + 0.13 + 0.04} = 0.25$$

$$U_B [W/(m^2K)] = \frac{1}{(\sum R_{i,B}) + R_{si} + R_{se}} = \frac{1}{2.70 + 0.13 + 0.04} = 0.35$$

$$R_T' = \frac{1}{A * U_A + B * U_B} = 3.99 \text{ m}^2\text{K/W}$$

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 / 0.038	= 2.63
$R_3'' [m^2K/W] = d_3 / \lambda_3 =$	0.005 / 160.000	= 0.00
$R_4'' [m^2K/W] = d_4 / (\lambda_{4a} * A + \lambda_{4b} * B) =$	0.050 / (0.044 * 99.00% + 50.000 * 1.00%)	= 0.09
$R_5'' [m^2K/W] = d_5 / \lambda_5 =$	0.013 / 0.250	= 0.05
$R_{si} [m^2K/W]$		= 0.13

$$R_T'' = \sum R_i'' + R_{si} + R_{se} = 2.96 \text{ m}^2\text{K/W}$$