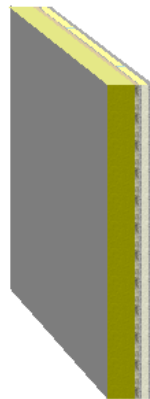


Source: **own catalogue - Own**
Component: **Typical Hawthorne - Leslie Property**

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	0.100	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	0.015	1.000	E	0.02
<input checked="" type="checkbox"/>	4		0.010	0.230	E	0.04
<input checked="" type="checkbox"/>	5	Inhomogeneous material layer	0.025	∅ 0.523		0.05
	5a	Own catalogue	99.00 %	0.023	E	-
		Air gaps	Level 1: dU" = 0.01 W/(m²K)			-
	5b	Own catalogue	01.00 %	50.000	E	-
<input checked="" type="checkbox"/>	6	Own catalogue	0.013	0.250	E	0.05
		Rsi				0.13
			0.171			

$$R_T = (R_T' + R_T'')/2 = 3.56 \text{ m}^2\text{K/W}$$

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

$$U = 1/R_T + \sum \Delta U = 0.28 \text{ W}/(\text{m}^2\text{K})$$

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.

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

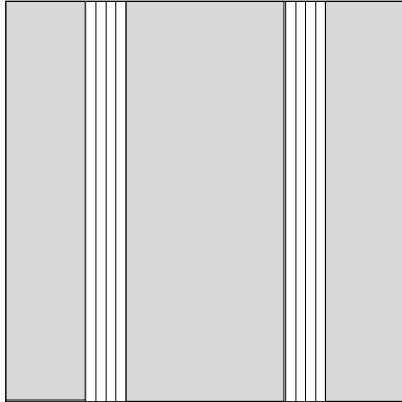
$$U = \boxed{0.28 \text{ W}/(\text{m}^2\text{K})} \quad R_T = \boxed{3.56 \text{ m}^2\text{K/W}}$$

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 Hawthorne - Leslie Property**

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

Upper limit of the thermal transfer resistance R

$$U_A [W/(m^2K)] = \frac{1}{(\sum R_{i,A}) + R_{si} + R_{se}} = \frac{1}{3.91 + 0.13 + 0.04} = 0.24$$

$$U_B [W/(m^2K)] = \frac{1}{(\sum R_{i,B}) + R_{si} + R_{se}} = \frac{1}{2.83 + 0.13 + 0.04} = 0.33$$

$$R_T' = \frac{1}{A * U_A + B * U_B} = 4.07 \text{ m}^2\text{K/W}$$

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
$R_3'' [m^2K/W] = d_3 / \lambda_3 =$	0.015 / 1.000	= 0.02
$R_4'' [m^2K/W] = d_4 / \lambda_4 =$	0.010 / 0.230	= 0.04
$R_5'' [m^2K/W] = d_5 / (\lambda_{5a} * A + \lambda_{5b} * B) =$	0.025 / (0.023 * 99.00% + 50.000 * 1.00%)	= 0.05
$R_6'' [m^2K/W] = d_6 / \lambda_6 =$	0.013 / 0.250	= 0.05
$R_{si} [m^2K/W]$		= 0.13

$$R_T'' = \sum R_i'' + R_{si} + R_{se} = 3.05 \text{ m}^2\text{K/W}$$