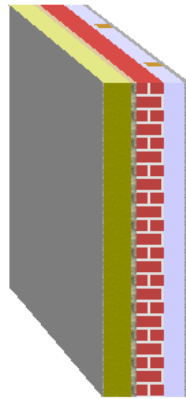


Source: **own catalogue - Own**  
Component: **Typical Atholl Property**

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	WBS Silicone Render	0.008	0.556	<b>E</b> 0.01
<input checked="" type="checkbox"/>	2	WBS	WBS Mineral Fibre	0.100	0.037	<b>E</b> 2.70
		Fixings	Plastic insulation anchors No./m²:	8/m²	0.500	<b>D</b> -
		Air gaps	Level 1: dU" = 0.01 W/(m²K)			
<input checked="" type="checkbox"/>	3	Own catalogue	Render, cement and sand	0.020	1.000	<b>E</b> 0.02
<input checked="" type="checkbox"/>	4	Own catalogue	Brick outer leaf & Mortar inner leaf (f = 0.000 / automatic disregarding acc. BRE 4.4.3)	0.102	0.770	<b>E</b> 0.13
<input checked="" type="checkbox"/>	5	Own catalogue	Normal cavity - 25 mm, unventilated	0.025	0.139	<b>E</b> 0.18
<input checked="" type="checkbox"/>	6	Inhomogeneous material layer	consisting of:	0.050	ø 0.262	0.19
	6a	Own catalogue	Normal cavity - 50 mm, unventilated	89.00 %	0.278	<b>E</b> -
	6b	BS EN 12524	Softwood Timber [500 kg/m³]	11.00 %	0.130	<b>D</b> -
<input checked="" type="checkbox"/>	7	Own catalogue	Gypsum Plasterboard	0.013	0.250	<b>E</b> 0.05
		Rsi				0.13
			<b>0.318</b>			

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

20. October 2011  
 Page 2/3

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

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

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

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

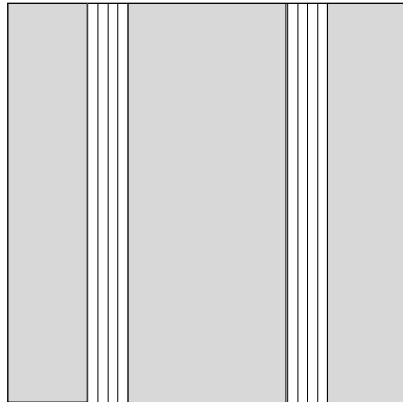
- Q .. The physical values of the building materials has been graded by their level of quality. These 5 levels are the following
- A** .. A: Data is entered and validated by the manufacturer or supplier. Data is continuously tested by 3rd party.
  - B** .. B: Data is entered and validated by the manufacturer 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.

$U_{\max} =$ 
0.35 W/(m²K)
 $U =$ 
0.29 W/(m²K)
 $R_T =$ 
3.47 m²K/W



Source of U<sub>max</sub> value: England, Wales: Approved Document L1A (2006), Table 2 - New Build Dwellings

Source: **own catalogue - Own**  
Component: **Typical Atholl 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, 5, 6a, 7	= 89.00%
B	 5.50 + 5.50 consisting of material layers: 1, 2, 3, 4, 5, 6b, 7	= 11.00%

#### Upper limit of the thermal transfer resistance R

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

$$U_B [W/(m^2K)] = \frac{1}{(\sum R_{i,B}) + R_{si} + R_{se}} = \frac{1}{3.49 + 0.13 + 0.04} = 0.27$$

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

#### 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
$R_3'' [m^2K/W] = d_3 / \lambda_3 =$	0.020 / 1.000	= 0.02
$R_4'' [m^2K/W] = d_4 / \lambda_4 =$	0.102 / 0.770	= 0.13
$R_5'' [m^2K/W] = d_5 / \lambda_5 =$	0.025 / 0.139	= 0.18
$R_6'' [m^2K/W] = d_6 / (\lambda_{6a} * A + \lambda_{6b} * B) =$	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
$R_{si} [m^2K/W]$		= 0.13

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