MIKE WYE

Documentation of the component
Thermal transmittance (U-value) according to BS EN ISO 6946
Source: **own catalogue - Pitched roofs**
Component: **Matthew Brownrigg - Roof**

OUTSIDE



This illustration of inhomogeneous layers is provided only to assist in visualising the arrangement.

On the basis of the given information about the inhomogeneous layers, it is not possible to estimate how and where bearing elements intersect each other. It was assumed that the layers intersect crosswise. The size of the areas was calculated corresponding to their percentage of the whole area.

INSIDE

Assignment: Pitched roof < 70°, with insulation between rafters

		Manufacturer	Name	Thickness [m], number	Lambda [W/(mK)]	Q	R [m²K/W]
		Rse					0.1000
☐	1	Own catalogue	Tiles (roofing), Slate	0.0200	1.600	E	~~0.0125~~
☐	2	Inhomogeneous material layer	consisting of:	0.0250	ø 0.016		~~1.5385~~
	2a	BS EN ISO 6946	Well ventilated air layer	87.50 %	0.000	D	-
	2b	BS EN 12524	Softwood Timber [500 kg/m³]	12.50 %	0.130	D	-
☐	3	Inhomogeneous material layer	consisting of:	0.0250	ø 0.016		~~1.5385~~
	3a	BS EN ISO 6946	Well ventilated air layer	87.50 %	0.000	D	-
	3b	BS EN 12524	Softwood Timber [500 kg/m³]	12.50 %	0.130	D	-
☑	4	BS EN 12524	Breather membrane	0.0001	0.170	D	0.0006
☑	5	Inhomogeneous material layer	consisting of:	0.0500	ø 0.048		1.0471
	5a	0. Air gaps	Flex Level 1: dU'' = 0.01 W/(m²K)	87.50 %	0.036	E	-
	5b	BS EN 12524	Softwood Timber [500 kg/m³]	12.50 %	0.130	D	-
☑	6	Steico	Special Dry	0.0600	0.040	E	1.5000
☑	7	Secil	Isovit LIME	0.0060	0.450	E	0.0133
☑	8	Secil	Reabilita CAL AC	0.0020	0.450	E	0.0044
		Rsi					0.1000
				0.1881			

☐ was not taken into consideration in the calculation

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$R_T = (R_T' + R_T'')/2 = 2.85$ m²K/W

Correction to U-value for	according to	delta U [W/(m²K)]
Air gaps	BS EN ISO 6946 Annex F	~~0.0014~~

Air gaps and fixings corrections need not be applied, as their total effect is less than 3% (Annex D BS 6946:1996).

0.0000

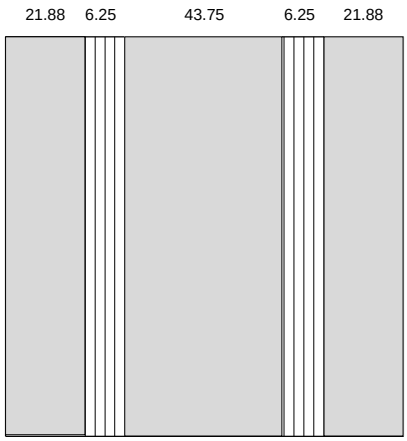
$U = 1/R_T + \Sigma\Delta U = 0.35$ W/(m²K)

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 = **0.35** W/(m²K) R_T= **2.85** m²K/W

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Draft of the component (portion in %):



The inhomogeneous layer consists of two zones (A, B).
The portion is given in %.

A	21.88 + 43.75 + 21.88 consisting of material layers: 4, 5a, 6, 7, 8	= 87.50%
B	6.25 + 6.25 consisting of material layers: 4, 5b, 6, 7, 8	= 12.50%

Upper limit of the thermal transfer resistance R

U_A [W/(m²K)] = $\frac{1}{(\Sigma R_{i,A}) + R_{si} + R_{se}}$ = $\frac{1}{2.91 + 0.1 + 0.1}$ = 0.32

U_B [W/(m²K)] = $\frac{1}{(\Sigma R_{i,B}) + R_{si} + R_{se}}$ = $\frac{1}{1.90 + 0.1 + 0.1}$ = 0.48

$$R_T' = \frac{1}{A * U_A + B * U_B} = 2.93\ m^2K/W$$

Lower limit of the thermal transfer resistance R

R_{se} [m²K/W]		= 0.1
R_4'' [m²K/W] = d_4/λ_4 =	0.0001 / 0.170	= 0.00
R_5'' [m²K/W] = $d_5/(\lambda_{5a} * A + \lambda_{5b} * B)$ =	0.0500 /(0.036 * 87.50% + 0.130 * 12.50%)	= 1.05
R_6'' [m²K/W] = d_6/λ_6 =	0.0600 / 0.040	= 1.50
R_7'' [m²K/W] = d_7/λ_7 =	0.0060 / 0.450	= 0.01
R_8'' [m²K/W] = d_8/λ_8 =	0.0020 / 0.450	= 0.00
R_{si} [m²K/W]		= 0.1

$$R_T'' = \Sigma R_i'' + R_{si} + R_{se} = 2.77\ m^2K/W$$