

Documentation of the component

15. May 2026

Thermal transmittance (U-value) according to BS EN ISO 6946

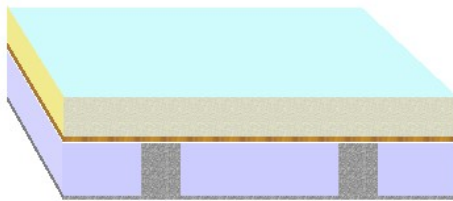
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Source: **Projects - Main Constructions**

Component: **Flat - Warm - 150 PIR - 0.14 - Concrete** info@energydigest.co.uk | 01206 670 278

OUTSIDE

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



INSIDE

Assignment: Flat roof

	Manufacturer	Name	Thickness [m], number	Lambda [W/(mK)]	Q	R [m²K/W]
	Rse					0.0400
☒	1	EDPM	0.0012	0.170	E	0.0071
☒	2	Polyisocyanurate (PIR) - General Purpose	0.1500	0.022	E	6.8182
	Air gaps	Level 0: dU" = 0.00 W/(m²K)				
☒	3	BS EN 12524 Plywood [500 kg/m³]	0.0220	0.130	D	0.1692
☒	4	Inhomogeneous material layer	0.2000	ø 1.400		0.1429
	4a	Unventilated air layer: 200 mm	80.00 %	1.250	E	-
	4b	Concrete, High density	20.00 %	2.000	D	-
☒	5	BS EN 12524 Gypsum plasterboard	0.0125	0.250	D	0.0500
	Rsi					0.1000
0.3857						

$$R_T = (R_T' + R_T'')/2 = 7.33 \text{ m}^2\text{K/W}$$

Correction to U-value for	according to	delta U [W/(m²K)]
Air gaps	BS EN ISO 6946 Annex F	0.0000
		0.0000

$$U = 1/R_T + \Sigma \Delta U = 0.14 \text{ W/(m}^2\text{K)}$$

- 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.
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$$U = \boxed{0.14 \text{ W/(m}^2\text{K)}} \quad R_T = \boxed{7.33 \text{ m}^2\text{K/W}}$$

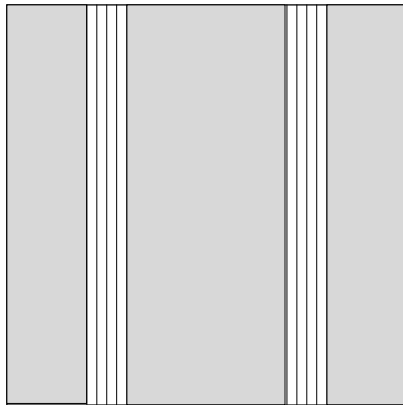
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Draft of the component (portion in %):
20.00 10.00 40.00 10.00 20.00



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

A	 20.00 + 40.00 + 20.00 consisting of material layers: 1, 2, 3, 4a, 5	= 80.00%
B	 10.00 + 10.00 consisting of material layers: 1, 2, 3, 4b, 5	= 20.00%

Upper limit of the thermal transfer resistance R

$$U_A [W/(m^2K)] = \frac{1}{(\sum R_{i,A}) + R_{si} + R_{se}} = \frac{1}{7.20 + 0.1 + 0.04} = 0.14$$

$$U_B [W/(m^2K)] = \frac{1}{(\sum R_{i,B}) + R_{si} + R_{se}} = \frac{1}{7.14 + 0.1 + 0.04} = 0.14$$

$$R_T' = \frac{1}{A * U_A + B * U_B} = 7.33 \text{ m}^2\text{K/W}$$

Lower limit of the thermal transfer resistance R

$R_{se} [m^2K/W]$		= 0.04
$R_1'' [m^2K/W] = d_1 / \lambda_1 =$	0.0012 / 0.170	= 0.01
$R_2'' [m^2K/W] = d_2 / \lambda_2 =$	0.1500 / 0.022	= 6.82
$R_3'' [m^2K/W] = d_3 / \lambda_3 =$	0.0220 / 0.130	= 0.17
$R_4'' [m^2K/W] = d_4 / (\lambda_{4a} * A + \lambda_{4b} * B) =$	0.2000 / (1.250 * 80.00% + 2.000 * 20.00%)	= 0.14
$R_5'' [m^2K/W] = d_5 / \lambda_5 =$	0.0125 / 0.250	= 0.05
$R_{si} [m^2K/W]$		= 0.1

$$R_T'' = \sum R_i'' + R_{si} + R_{se} = 7.33 \text{ m}^2\text{K/W}$$

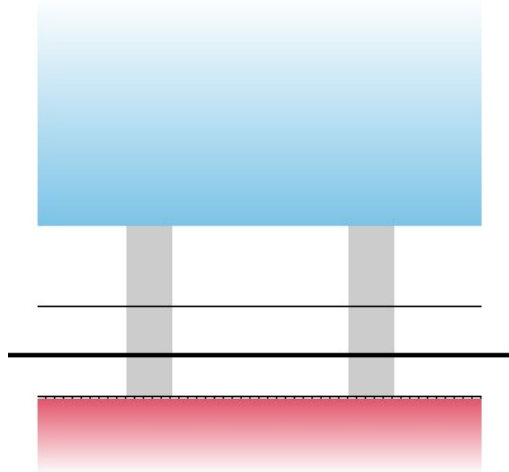
Documentation of the component
Heat capacity

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OUTSIDE



INSIDE

The list of materials shown below may differ from those in the U-value calculation printout. Only material layers which are used in the heat capacity calculation are listed.

Single material layers shown in the U-value calculation printout may be separated to meet the exclusion criteria:

- A .. The total thickness of the layers exceed 0.1 m.
- B .. The mid point in the construction is reached.

For insulation layers the following criteria applies:

- C .. An insulating layer is reached (defined as $\lambda \leq 0.08 \text{ W/(mK)}$).

Name	Thickness [m]	lambda [W/(mK)]	Q	Thermal capacity [kJ/(kgK)]	Q	Density [kg/m³]	Q	Thermal mass kJ/(m²K)	Criteria Exclusion
End of calculation - Cold									
1 EDPM	0.0012	0.170	E	2.20	E	920.0	E	2.4	A, -, C
2 Polyisocyanurate (PIR) - General Purpose	0.1500	0.022	E	0.92	E	32.0	E	0.0	A, -, C
3 Plywood [500 kg/m³]	0.0220	0.130	D	1.60	D	500.0	D	17.6	A, -, -
4 Inhomogeneous material layer consisting of:	0.1125							54.1	A, -, -
4a Unventilated air layer: 200 mm, upwards heat flow	80.00%	1.250	E	1.01	E	1.2	E	0.1	A, -, -
4b Concrete, High density	20.00%	2.000	D	1.00	D	2400.0	D	54.0	A, -, -
4 Inhomogeneous material layer consisting of:	0.0875							42.1	-, -, -
4a Unventilated air layer: 200 mm, upwards heat flow	80.00%	1.250	E	1.01	E	1.2	E	0.1	-, -, -
4b Concrete, High density	20.00%	2.000	D	1.00	D	2400.0	D	42.0	-, -, -
5 Gypsum plasterboard	0.0125	0.250	D	1.00	D	900.0	D	11.3	-, -, -
Start of calculation - Warm									
	0.3857							53.3	

Heat capacity = 53.3 kJ/(m²K)

The following exclusion criteria apply:

- A .. The total thickness of the layers exceed 0.1 m.
- C .. An insulating layer is reached (defined as $\lambda \leq 0.08 \text{ W/(mK)}$).

Q .. The physical values of the building materials has been graded by their level of quality. These 5 levels are the following

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