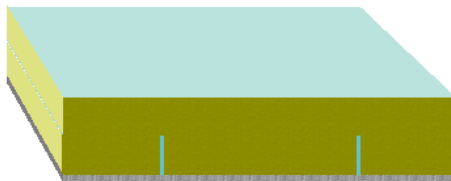


Documentation of the component
 Thermal transmittance (U-value) according to Digest 465
 Source: **own catalogue - Pitched roofs**
 Component: **NCAF12541 227 Shepherds Bush Rd Roof 02 V3**

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OUTSIDE

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



INSIDE

Assignment: Roof with a pitch $\geq 70^\circ$

	Manufacturer	Name	Thickness [m], number	Lambda [W/(mK)]	Q	R [m²K/W]	
	Rse					0.0400	
	1	Own catalogue	VM ZINC Panel (Standing Seam) 600mm CC	0.0007	160.000		0.0000
	2	Own catalogue	Breather membrane for VM Zinc	0.0002	0.100		0.0020
	3	Own catalogue	Hardrock Multi-Fix (DD)	0.1450	0.039		3.7179
	Fixings	Ejot Roofing Fixing 17 W/mK No./m²:	8/m²	17.000		-	
	Fixings	equivalent diameter: 0.008 m					
	Air gaps	Level 0: dU" = 0.00 W/(m²K)					
	4	BS EN 12524	Steel	0.0007	50.000		0.0000
	5	Light steel-frame	consisting of:	0.1500	ø 0.182		0.8246
	5a	U-rock 2022	NyRock Frame Slab 032	99.70 %	0.032		-
	Air gaps	Level 0: dU" = 0.00 W/(m²K)					
	5b	BS EN 12524	Steel	00.30 %	50.000		-
	6	BS EN 12524	Polyethylene 0.15 mm	0.0002	0.170		0.0009
	7	BS EN 12524	Gypsum plasterboard	0.0125	0.250		0.0500
	8	BS EN 12524	Gypsum plasterboard	0.0125	0.250		0.0500
	Rsi					0.1300	
			0.3218				

$$R_T = p \cdot R_T' + (1-p) \cdot R_T'' = 6.75 \text{ m}^2\text{K/W}$$

Correction to U-value for	according to	delta U [W/(m²K)]
Mechanical fasteners	Digest 465	0.0229
Air gaps	BS EN ISO 6946 Annex F	0.0000
		0.0229

$$U = 1/R_T + \Sigma \Delta U = 0.17 \text{ W/(m}^2\text{K)}$$

- 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.

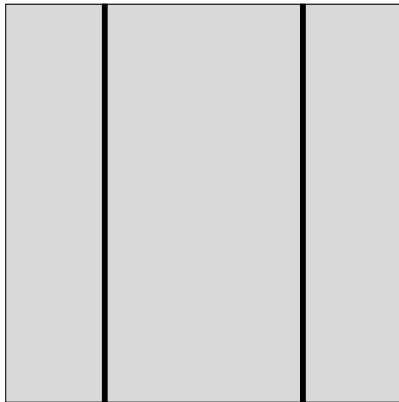
$$U = \boxed{0.17 \text{ W/(m}^2\text{K)}} \quad R_T = \boxed{6.75 \text{ m}^2\text{K/W}}$$

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Steel percentage: 0.30 %

Light steel-frame sections
 The portion is given in %.



A		consisting of material layers: 1, 2, 3, 4, 5a, 6, 7, 8	= 99.70%
B		consisting of material layers: 1, 2, 3, 4, 5b, 6, 7, 8	= 0.30%

Upper limit of the thermal transfer resistance R

$$U_A [W/(m^2K)] = \frac{1}{(\sum R_{i,A}) + R_{si} + R_{se}} = \frac{1}{8.51 + 0.13 + 0.04} = 0.12$$

$$U_B [W/(m^2K)] = \frac{1}{(\sum R_{i,B}) + R_{si} + R_{se}} = \frac{1}{3.82 + 0.13 + 0.04} = 0.25$$

$$R_T' = \frac{1}{A * U_A + B * U_B} = 8.65 \text{ m}^2\text{K/W}$$

Lower limit of the thermal transfer resistance R

$R_{se} [m^2K/W]$		= 0.04
$R_1'' [m^2K/W] = d_1 / \lambda_{1.1}$	0.0007 / 160.000	= 0.00
$R_2'' [m^2K/W] = d_2 / \lambda_{2.2}$	0.0002 / 0.100	= 0.00
$R_3'' [m^2K/W] = d_3 / \lambda_{3.3}$	0.1450 / 0.039	= 3.72
$R_4'' [m^2K/W] = d_4 / \lambda_{4.4}$	0.0007 / 50.000	= 0.00
$R_5'' [m^2K/W] = d_5 / (\lambda_{5a} * A + \lambda_{5b} * B) =$	0.1500 / (0.032 * 99.70% + 50.000 * 0.30%)	= 0.82
$R_6'' [m^2K/W] = d_6 / \lambda_{6.6}$	0.0002 / 0.170	= 0.00
$R_7'' [m^2K/W] = d_7 / \lambda_{7.7}$	0.0125 / 0.250	= 0.05
$R_8'' [m^2K/W] = d_8 / \lambda_{8.8}$	0.0125 / 0.250	= 0.05
$R_{si} [m^2K/W]$		= 0.13

$$R_T'' = \sum R_i'' + R_{si} + R_{se} = 4.82 \text{ m}^2\text{K/W}$$

Kind of frame: Hybrid frame
 Flange width: known not to exceed 50 mm
 Stud spacing s [m]: 0.600
 Stud depth d [m]: 0.150
 Web thickness t [m]: 0.00180
 Steel percentage [%]: 0.30

Weight factor p

Formula: $p = 0.8 * (R_T''/R_T') + 0.32 - 0.2 * (0.6/s) - 0.04 * (d/0.1) = 0.505$

$$R_T = p * R_T' + (1-p) * R_T'' = 6.75 \text{ m}^2\text{K/W}$$

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Component: **NCAF12541 227 Shepherds Bush Rd Roof 02 V3**

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

For insulation layers the following criteria applies:

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

Heat capacity = 22.8 kJ/(m²K)

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 1 to 5.

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