

Calculations

Construction type

Floors

Walls

Pitched
Roof

Flat Roof

Roof Type

warm flat roofing

Waterproofing Type

grp (glass reinforced plastic)

Deck Type

timber deck with plasterboard ceiling

Insulation Thickness

-

110mm

120mm

125mm

+

☐

Tick here if you would like to receive the BIM Object for this construction build-up. [?](#)

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An 18mm plywood or OSB layer is required over the insulation and under the GRP. Please check this with the GRP manufacturer/supplier. Calculations assume the use of metal screw fixings.



U-value

0.18

W/m²·K

0.12



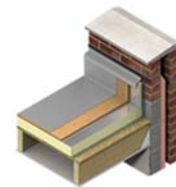
0.23

[Click here to view construction build-up](#) ▼

Construction build-up includes:

3mm skim coated 12.5mm
plasterboard
50x150mm timber joists at 600mm
centres
18mm plywood deck
vapour control layer
Kingspan Thermaroof TR26 LPC/FM
18mm plywood/OSB
GRP waterproofing.

[See website for more details](#)



Kingspan Thermaroof TR26 LPC/FM [?](#)

Project ID : Online
Structure element : Flat roof
Description : Flat roof - insulation / membrane fixed with metal fasteners
File reference : 1E129M53FD.FCF

Calculated 'U' value = 0.18W/m²K (Calculated in accordance with BS EN ISO 6946:2007)

Condensation risk has been assessed up to and including Level 4 Humidity Class (dwellings with high occupancy) within UK worst case environmental conditions.

Element Description	Element Thickness (mm)	Thermal Conductivity (W/mK)	Thermal Resistance (m²K/W)	Vapour Resistivity (MNs/gm)	Vapour Resistance (MNs/g)	Mean T (K)	Delta T (K)
Outside surface resistance	-	-	0.040	-	-	78.26	0.10
POLYESTER GRP 1mm	1.0	0.350	0.003	100000	100.00	78.31	0.01
PLYWOOD OR OSB DECKING	18.0	0.140	0.129	520.00	9.36	78.47	0.31
KINGSPAN THERMAROOF TR26 LPC / FM	120.0	0.022	5.455	-	100.00	85.29	3.33
1000 GAUGE 0.25mm POLYTHENE VAPOUR CONTROL LAYER	0.3	-	0.001	-	500.00	91.96	0.00
PLYWOOD DECKING	18.0	0.140	0.129	520.00	9.36	92.12	0.31
TIMBER JOIST CAVITY; U/V. 8.8% roof timber - 47mm @ 600mm ctrs + 1% for noggins + loft hatches (150.0mm)	150.0	-	0.175	-	0.05	92.49	0.43
PLASTERBOARD	12.5	0.190	0.066	50.00	0.63	92.78	0.16
PLASTER SKIM	3.0	0.180	0.017	60.00	0.18	92.89	0.04
Inside surface resistance	-	-	0.100	-	-	93.03	0.24

Detailed U-value Calculation Results

Construction includes 1 bridged layer.

Non-bridged layers

Outside surface resistance	0.040 m²K/W
POLYESTER GRP 1mm	0.003 m²K/W
PLYWOOD OR OSB DECKING	0.129 m²K/W
KINGSPAN THERMAROOF TR26 LPC / FM	5.455 m²K/W
1000 GAUGE 0.25mm POLYTHENE VAPOUR CONTROL LAYER	0.001 m²K/W
PLYWOOD DECKING	0.129 m²K/W
PLASTERBOARD	0.066 m²K/W
PLASTER SKIM	0.017 m²K/W
Inside surface resistance	0.100 m²K/W
Resistance of non-bridged layers, R _{NB} =	<u>5.938 m²K/W</u>

Not all insulation thicknesses shown may currently be stocked, so please check with Kingspan Insulation Customer Service Department on 01544 388601.

Whilst the information and/or specification contained herein is to the best of our knowledge true and accurate we specifically exclude any liability for errors, omissions or otherwise arising therefrom. Details, practices, principles, values and calculations should be verified as to accuracy and suitability for the required purpose for use.

Detailed U-value Calculation Results (continued)

Resistance of heat flow paths

$$R_{P1} = R_{NB} + R_{L1} = 5.938 + 0.175 = 6.113 \text{ m}^2\text{K/W} \quad F_{P1} = 91.167\%$$

$$R_{P2} = R_{NB} + R_{L2} = 5.938 + 1.154 = 7.092 \text{ m}^2\text{K/W} \quad F_{P2} = 8.833\%$$

Fraction of face area of materials

TIMBER JOIST CAVITY; U/V., $F_{L1} = 91.2\%$ roof timber - 47mm @ 600mm ctrs + 1% for noggins + loft hatches, $F_{B1} = 8.8\%$

Upper resistance limit

$$R_{upper} = 1 / ((F_{P1}/R_{P1}) + (F_{P2}/R_{P2}))$$

$$R_{upper} = 1 / ((0.912/6.113) + (0.088/7.092)) = 6.188 \text{ m}^2\text{K/W}$$

Lower resistance limit

$$R_{lower} = R_{NB} + 1 / ((F_{L1}/R_{L1}) + (F_{B1}/R_{B1}))$$

$$R_{lower} = 5.938 + 1 / ((0.9117/0.1751) + (0.0883/1.1538)) = 6.127 \text{ m}^2\text{K/W}$$

Total resistance of roof

$$R_T = (R_{upper} + R_{lower}) / 2 = (6.188 + 6.127) / 2 = 6.158 \text{ m}^2\text{K/W}$$

(Correction for mechanical fasteners, $\Delta U_f = 0.0200 \text{ W/m}^2\text{K}$ | Correction for air gaps, $\Delta U_g = 0.0000 \text{ W/m}^2\text{K}$)

(Roofs - insulation fixed with nails or screws

Table 4 of Approved Document L1 & L2 default figure)

$$U = (1 / R_T) + (\Delta U_f + \Delta U_g) = (1/6.158) + 0.0200 + 0.0000 = 0.18 \text{ W/m}^2\text{K}$$

For further information on the specified products, e.g. literature or specification clauses, please follows the links below:-[Thermarroof TR26 LPC / FM](#)