

Quinn Building Products

U-Value Calculator

QUINN BUILDING PRODUCTS

U-Value

0.13

W/m²·K

Email my U-Value

Construction Type:

Floors

Walls

Pitched Roof

Flat Roof

Insulation Solution:

Flat roof: timber deck insulated between & below joists (+)

Rafter Dimensions:

47

mm

175

mm

600mm

Insulation under joists:



Insulation between joists:



Whilst the information and/or specification contained here 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.



Flat roof: timber deck insulated between & below joists (Quinn Therm QR)

1. Plasterboard
2. AVCL
3. Quinn Therm QR PIR insulation boards
4. Quinn Therm QR PIR insulation boards
5. Roof joists
6. Vented airspace between Quinn Therm and timber deck
7. Timber deck
8. Waterproofing layer

QUINN Building Products

235 Ballyconnell Rd

Derrylin

Co. Fermanagh. BT92 9GP

Project Information

Reference

Date 2 April 2020

Construction Type

Element : Flat roof - Flat roof: timber deck insulated between below joists (Quinn Therm QR)

Internal surface emissivity : High External surface emissivity : High

	Thickness (mm)	Thermal Conductivity (W/mK)	Thermal Resistance (m ² K/W)	Pitch (°)	Bridge details Air gaps (Level, Delta U")
Outside surface resistance	-	-	0.040		
Roofing membrane	-	-	-		
Plywood deck	-	-	0.000		
Vented cavity	50.0	-	0.000		
Quinn Therm QR between joists @ 600 centres	90.0	0.022	4.091		7.833% Timber (90.0mm) L:0 0.000W/m ² K L:0 0.000W/m ² K
Quinn Therm QR under joists	90.0	0.022	4.091		
Joints taped to create VCL + Air Leakage Barrier	-	-	-		
GTEC Standard Board	12.5	0.250	0.050		
Inside surface resistance	-	-	0.100		

U-value = 0.13W/m²K

U-value, Combined Method : 0.132W/m²K (upper/lower limit 7.946 / 7.236m²K/W, dUf 0.0000, dUg 0.0000, dUp0.0000, dUr0.0000, dUrc1 0.0000, dUrc2 0.0000)

Correction factors

Air gaps, Delta Ug = 0.000W/m²K

(Based on the combined method for determining U-values of structures containing repeating thermal bridges)

Detailed U-value Calculation Results

Construction includes 1 bridged layer

Non-bridged layers

Outside surface resistance	0.040 m ² K/W
Quinn Therm QR under joists	4.091 m ² K/W
GTEC Standard Board	0.050 m ² K/W
Inside surface resistance	0.100 m ² K/W
<u>Resistance of non-bridged layers, R_{NB} =</u>	<u>4.281 m²K/W</u>

Bridged layer

Quinn Therm QR between joists @ 600 centres (L1) bridged by Timber (B1)

Path 1 - Quinn Ther

Path 2 - Timber

Resistance and fraction of heat flow paths

$$R_{P1} = R_{NB} + R_{L1} = 4.281 + 4.091 = 8.372 \text{ m}^2\text{K/W} \quad F_{P1} = 92.167\%$$

$$R_{P2} = R_{NB} + R_{L2} = 4.281 + 0.692 = 4.973 \text{ m}^2\text{K/W} \quad F_{P2} = 7.833\%$$

Upper resistance limit

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

$$R_{upper} = 1 / ((0.922/8.372) + (0.078/4.973)) = 7.946 \text{ m}^2\text{K/W}$$

Lower resistance limit

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

$$R_{lower} = 4.281 + 1 / ((0.922/4.091) + (0.078/0.692)) = 7.236 \text{ m}^2\text{K/W}$$

Total resistance of roof

$$R_T = (R_{upper} + R_{lower}) / 2 = (7.946 + 7.236) / 2 = 7.59 \text{ m}^2\text{K/W}$$

Correction for air gaps, Delta Ug = 0.0000W/m²K

(Delta Uf + Delta Ug + Delta Up + Delta Ur) is less than 3% of (1 / Rt) so U = (1 / Rt) + (Delta Ur) + (Delta Urc) = 0.13 W/m²K