

# Quinn Building Products

## U-Value Calculator

QUINN BUILDING PRODUCTS

U-Value  
**0.18**  
W/m<sup>2</sup>·K

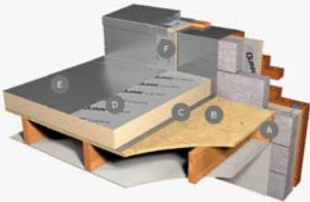
Email my U-Value

Construction Type:	Floors	Walls	Pitched Roof	Flat Roof
Insulation Solution:	Flat roof: timber deck (Quinn Therm QRFR-DPFR)			
Rafter Dimensions:	47mm	175mm	400mm	
Waterproof Membrane:	Single ply membrane			

Insulation Thickness:

25mm 35mm 45mm 60mm 75mm 90mm 110mm 120mm 125mm 140mm

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Flat roof: timber deck (Quinn Therm QRFR-DPFR)

- 1. Roof joists
- 2. Timber deck
- 3. AVCL
- 4. Quinn Therm QRFR-FFR PIR insulation boards
- 5. Waterproofing layer
- 6. Quinn Therm QRFR-FFR PIR insulation boards

## QUINN Building Products

235 Ballyconnell Rd

Derrylin

Co. Fermanagh. BT92 9GP

### Project Information

Reference

Date 16 April 2020

### Construction Type

Element : Flat roof - Flat roof: timber deck (Quinn Therm QRFR-DPFR)

Internal surface emissivity : High External surface emissivity : High

	Thickness (mm)	Thermal Conductivity (W/mK)	Thermal Resistance (m <sup>2</sup> K/W)	Pitch (°)	Bridge details Air gaps (Level, Delta U")
Outside surface resistance	-	-	0.040		
Single Ply W.P. Membrane. Fully mech fixed with thermally broken tube fixings	1.5	0.214	0.007		
Quinn Therm QRFR-DPFR	120.0	0.024	5.000		L:0 0.000W/m <sup>2</sup> K
VCL as BS6229:2003	-	-	-		
Plywood deck	19.0	0.170	0.112		
Cavity between joists	175.0	-	0.160		11.750% Timber (175.0mm)
GTEC Standard Board	12.5	0.250	0.050		
Inside surface resistance	-	-	0.100		

### U-value = 0.18W/m<sup>2</sup>K

U-value, Combined Method : 0.181W/m<sup>2</sup>K (upper/lower limit 5.586 / 5.487m<sup>2</sup>K/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/m<sup>2</sup>K

(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 m²K/W
Single Ply W.P. Membrane. Fully mech fixed with thermally broken tube fixings	0.007 m²K/W
Quinn Therm QRFR-DPFR	5.000 m²K/W
Plywood deck	0.112 m²K/W
GTEC Standard Board	0.050 m²K/W
Inside surface resistance	0.100 m²K/W
Resistance of non-bridged layers, $R_{NB}$ =	<u>5.309 m²K/W</u>

### Bridged layer

Cavity between joists (L1) bridged by Timber (B1)

Path 1 - Cavity bet

Path 2 - Timber

### Resistance and fraction of heat flow paths

$$R_{P1} = R_{NB} + R_{L1} = 5.309 + 0.160 = 5.469 \text{ m}^2\text{K/W} \quad F_{P1} = 88.250\%$$

$$R_{P2} = R_{NB} + R_{L2} = 5.309 + 1.346 = 6.655 \text{ m}^2\text{K/W} \quad F_{P2} = 11.750\%$$

### Upper resistance limit

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

$$R_{upper} = 1 / ( (0.882/5.469) + (0.118/6.655) ) = 5.586 \text{ m}^2\text{K/W}$$

### Lower resistance limit

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

$$R_{lower} = 5.309 + 1 / ( (0.882/0.160) + (0.118/1.346) ) = 5.487 \text{ m}^2\text{K/W}$$

### Total resistance of roof

$$R_T = ( R_{upper} + R_{lower} ) / 2 = (5.586 + 5.487) / 2 = 5.54 \text{ m}^2\text{K/W}$$

Correction for air gaps,  $\Delta U_g = 0.0000 \text{ W/m}^2\text{K}$

$(\Delta U_f + \Delta U_g + \Delta U_p + \Delta U_r)$  is less than 3% of  $(1 / R_T)$  so  $U = (1 / R_T) + (\Delta U_r) + (\Delta U_{rc}) = 0.18 \text{ W/m}^2\text{K}$