Quinn Building Products
U-Value Calculator

QUINN BUILDING PRODUCTS

U-Value

0.17

W/m ^{2}·K

Email my U-Value

Construction Type: Floors | Walls | Pitched Roof | Flat Roof

Construction Type Layer 2: Dormer walls

Insulation Solution: Timber frame wall with weatherboards (Quinn Thern

Stud Depth: 100 mm

Insulation Thickness: 60mm

25mm 40mm 60mm 70mm 80mm 110mm 140mm

Insulation between studs: 60mm

25mm 40mm 65mm 100mm 125mm 150mm

Timber frame wall with weatherboards (Quinn Therm QW)

1. Weatherboarding
2. Vapour open membrane
3. Quinn Therm QW PIR boards between studs
4. Plasterboard
5. Quinn Therm PIR boards across studs

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Project Information

Reference
Date 1 April 2020

Construction Type

Element : Flat roof - Timber frame wall with weatherboards (Quinn Therm QW)
Internal surface emissivity : High External surface emissivity : High

	Thickness (mm)	Thermal Conductivity (W/mK)	Thermal Resistance (m²K/W)	Pitch (º)	Bridge details Air gaps (Level, Delta U")
Outside surface resistance	-	-	0.130		
Weatherboarding	-	-	0.000		
Cavity ventilated space between battens	25.0	-	0.000		
Breather membrane	-	-	-		
Plywood	12.0	-	0.071		
Quinn Therm QW between 0mm studs (15% bridgin - BRE443 lower fraction)	60.0	0.022	2.727		15.000% Timber (60.0mm) L:0 0.000W/m²K
Cavity between studs - low emissivity	-60.0	-	0.665		15.000% Timber (-60.0mm)
Quinn Therm QW over studs	60.0	0.022	2.727		L:0 0.000W/m²K
Joints taped to create VCL + Air Leakage Barrier	-	-	-		
GTEC Standard Board	12.5	0.250	0.050		
Inside surface resistance	-	-	0.130		

U-value = 0.17W/m²K

U-value, Combined Method : 0.173W/m²K (upper/lower limit 5.806 / 5.728m²K/W, dUf 0.0000, dUg 0.0000, dUp0.0000, dUr0.0
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)

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Detailed U-value Calculation Results

Construction includes 2 bridged layers

Non-bridged layers

Outside surface resistance	0.130 m²K/W
Plywood	0.071 m²K/W
Quinn Therm QW over studs	2.727 m²K/W
GTEC Standard Board	0.050 m²K/W
Inside surface resistance	0.130 m²K/W
Resistance of non-bridged layers, R_{NB} =	3.108 m²K/W

Bridged layers

Quinn Therm QW between 0mm studs (15% bridging - BRE443 lower fraction) (L1) bridged by Timber (B1)
Cavity between studs - low emissivity (L2) bridged by Timber (B2)

Path 1 - Quinn Ther
Path 2 - Timber / C
Path 3 - Quinn Ther
Path 4 - Timber / T

Resistance and fraction of heat flow paths

$R_{P1} = R_{NB} + R_{L1} = 3.108 + 3.392 = 6.500$ m²K/W $F_{P1} = 72.250\%$
$R_{P2} = R_{NB} + R_{L2} = 3.108 + 1.127 = 4.234$ m²K/W $F_{P2} = 12.750\%$
$R_{P3} = R_{NB} + R_{L3} = 3.108 + 2.266 = 5.374$ m²K/W $F_{P3} = 12.750\%$
$R_{P4} = R_{NB} + R_{L4} = 3.108 + 0.000 = 3.108$ m²K/W $F_{P4} = 2.250\%$

Upper resistance limit

$R_{upper} = 1 / ((F_{P1}/R_{P1}) + (F_{P2}/R_{P2}) + (F_{P3}/R_{P3}) + (F_{P4}/R_{P4}))$
$R_{upper} = 1 / ((0.722/6.500) + (0.128/4.234) + (0.128/5.374) + (0.023/3.108)) = 5.806$m²K/W

Lower resistance limit

$R_{lower} = R_{NB} + 1 / ((F_{L1}/R_{L1}) + (F_{B1}/R_{B1})) + 1 / ((F_{L2}/R_{L2}) + (F_{B2}/R_{B2}))$
$R_{lower} = 3.108 + 1 / ((0.850/2.727) + (0.150/0.462)) + 1 / ((0.850/0.665) + (0.150/-0.462)) = 5.728$m²K/W

Total resistance of roof

$R_T = (R_{upper} + R_{lower}) / 2 = (5.806 + 5.728) / 2 = 5.77$ m²K/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) = 0.17 W/m²K

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