Quinn Building Products

U-Value Calculator

QUINN BUILDING PRODUCTS

U-Value

0.13

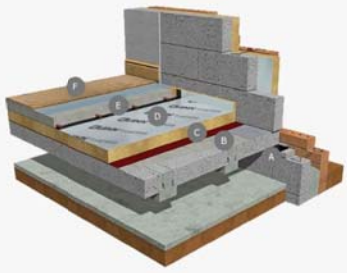
W/m 2·K

Email my U-Value

Construction Type:	Floors | Walls | Pitched Roof | Flat Roof
Construction Type Layer 2:	Ground floor
Insulation Solution:	Suspended beam and block floor (Quinn Therm QF)
PA Ratios: ?	0.5

Insulation Thickness: 140mm

20mm 30mm 50mm 70mm 80mm 100mm 120mm 130mm 150mm



Suspended beam and block floor (Quinn Therm QF)

1. Slip block
2. Beam and block floor
3. Radon barrier / DPM on levelling screed
4. Quinn Therm QF PIR insulation boards
5. Screed with U / F heating pipes on separating layer
6. Timber flooring on polyethylene slip sheet

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.

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Project Information

Reference
Date 2 April 2020

Construction Type

Element : Suspended ground floor - Suspended beam and block floor (Quinn Therm QF)
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")
Inside surface	-	-	0.170		
Floor screed	50.0	1.401	0.036		
Polythene, 500 gauge (0.12mm) (BS5250)	-	-	-		
Quinn Therm QF	140.0	0.022	6.364		L:0 0.000W/m²K
Bridged floor deck Dense Concrete Blocks	100.0	-	0.088		12.000% Concrete beams (100.0mm)
Void - ventilated	-	-	0.000		
Deck underside surface resistance			0.170		

Ground Floor Details

Floor type	: Beam & Block floor		
Calculation method	: EN ISO 13370:2007		
P/A	: 0.500	Characteristic dimension, B'	: 4.000
Thermal conductivity of ground:	: 1.500 W/mK	Width of walls, w:	: 0.300 m
Height of floor above ground, h:	: 0.300 m	U-value of sub-floor walls, Uw:	: 1.700 W/m²K
Average wind speed, V:	: 5.000 m/s	Wind shielding factor, fw:	: 0.050
Ventilation opening area, E:	: 0.0015 m²/m	Subfloor ground resistance, Rs	: 0.170 m²K/W
Resistance of insulation on ground, Rg	: 0.000 m²K/W	External surface resistance, Rse	0.170 m²K/W
Description	: Dense Concrete Blocks		
Screed depth	: 50mm	Screed conductivity	: 1.401W/mK
Block thickness	: 100mm	Block conductivity	: 1.130W/mK
Block width	: 440mm		
Beam web width	: 60mm	Beam conductivity	: 1.130W/mK
Edge insulation position	: None		

U-value = 0.13W/m²K

U-value, Combined Method : 0.128W/m²K (upper/lower limit 6.828 / 6.828m²K/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

Calculation of U-value for floor deck (Uf)

Construction includes 1 bridged layer

Non-bridged layers

Inside surface	0.170 m²K/W
Floor screed	0.036 m²K/W
Quinn Therm QF	6.364 m²K/W
Deck underside surface resistance	0.170 m²K/W
Resistance of non-bridged layers, R_{NB} =	6.739 m²K/W

Bridged layer

Bridged floor deck Dense Concrete Blocks (L1) bridged by Concrete beams (B1)

Path 1 - Bridged fl
Path 2 - Concrete b

Resistance and fraction of heat flow paths

$R_{P1} = R_{NB} + R_{L1}$ = 6.739 + 0.088 = 6.828 m²K/W F_{P1} = 88.000%
$R_{P2} = R_{NB} + R_{L2}$ = 6.739 + 0.088 = 6.828 m²K/W F_{P2} = 12.000%

Upper resistance limit

$R_{upper} = 1 / ((F_{P1}/R_{P1}) + (F_{P2}/R_{P2}))$
R_{upper} = 1 / ((0.880/6.828) + (0.120/6.828)) = 6.828m²K/W

Lower resistance limit

$R_{lower} = R_{NB} + 1 / ((F_{L1}/R_{L1}) + (F_{B1}/R_{B1}))$
R_{lower} = 6.739 + 1 / ((0.880/0.088) + (0.120/0.088)) = 6.828m²K/W

Total resistance of suspended ground floor

$R_F = (R_{upper} + R_{lower}) / 2$ = (6.828 + 6.828) / 2 = 6.83 m²K/W
U_f = 0.146 m²K/W

Calculation of U-value for ground (Ug)

Equivalent thickness of ground, dg = 0.300 + 1.500(0.170 + 0.000 + 0.170) = 0.810m

Ug = ((2 x 1.500) / ((Pi x 4.000) + 0.810)) x ln(((Pi x 4.000) / 0.810) + 1) = 0.629

Calculation of U-value for sub-floor void (Ux)

Ux = (2 x (0.300 x 1.700 / 4.000)) + (1450 x (0.002 x 5.000 x 0.050 / 4.000)) = 0.391

Floor U-value, U:

1 / U = (1 / 0.146) + (1 / (0.629 + 0.391)) = 7.808
U = 0.128 W/m²K

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

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