U-Value Calculator Results

18 August 2017

Vasiliy Nikolaev

Home Private

Dear Vasiliy Nikolaev,

Thank you for using the Kingspan Insulation U-Value Calculator.

The full specification for the construction you have selected and the result of your BBA approved calculation are on the next page.

To purchase the Kingspan Insulation suggested by the calculation please contact our sales team on 01544 388 601.

Our structural quick guides and product brochures, which can be found on our website kingspaninsulation.co.uk, provide more detailed information on construction build ups, sitework and installation guidance.

If you have further questions about your particular insulation requirements please contact our friendly, professional technical team on 01544 387 382.

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CERTIFICATE CS/1004-2
U Value Competency Scheme

Project ID : Online
Structure element : Pitched or mansard roof, ceiling at line of pitch
Description : Warm pitched roof - 61-80mm insulation above rafters
File reference : 1E142K4C98.FCF

Calculated 'U' value = 0.14W/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	-	-	0.104	-	-	78.30	0.18
TILES / SLATES ON BATTENS ; PITCHED ROOF.	30.0	-	0.000	-	0.00	78.39	0.00
COUNTER BATTEN CAVITY	38.0	-	0.000	-	0.00	78.39	0.00
KINGSPAN NILVENT.17 BREATHABLE MEMBRANE	0.5	-	0.006	-	0.25	78.40	0.01
KOOLTHERM K107 - FIXED ABOVE THE RAFTERS	70.0	0.018	3.889	-	24.50	81.81	6.82
KOOLTHERM K107 - BETWEEN TIMBER RAFTERS 12.7% roof timber - 47mm @ 400mm ctrs + 1% for noggins + loft hatches (70.0mm)	70.0	0.018	3.889	-	24.50	88.62	6.82
TIMBER RAFTER CAVITY; U/V. 12.7% roof timber - 47mm @ 400mm ctrs + 1% for noggins + loft hatches (80.0mm)	80.0	-	0.454	-	0.05	92.43	0.80
1000 GAUGE 0.25mm POLYTHENE VAPOUR CONTROL LAYER	0.3	-	0.001	-	500.00	92.83	0.00
PLASTERBOARD	12.5	0.190	0.066	50.00	0.63	92.89	0.12
PLASTER SKIM	3.0	0.180	0.017	60.00	0.18	92.96	0.03
Inside surface resistance	-	-	0.100	-	-	93.06	0.18

Detailed U-value Calculation Results

Construction includes 2 bridged layers.

Non-bridged layers

Outside surface resistance	0.104 m²K/W
KINGSPAN NILVENT.17 BREATHABLE MEMBRANE	0.006 m²K/W
KOOLTHERM K107 - FIXED ABOVE THE RAFTERS	3.889 m²K/W
1000 GAUGE 0.25mm POLYTHENE VAPOUR CONTROL LAYER	0.001 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}=	4.183 m²K/W

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

Detailed U-value Calculation Results (continued)

Resistance of heat flow paths

R_{P1} = R_{NB} + R_{L1} = 4.183 + 4.343 = 8.526 m²K/W F_{P1} = 87.251%

R_{P2} = R_{NB} + R_{L2} = 4.183 + 1.154 = 5.336 m²K/W F_{P2} = 12.749%

Fraction of face area of materials

KOOLTHERM K107 - BETWEEN TIMBER RAFTERS, F_{L1} = 87.3%

roof timber - 47mm @ 400mm ctrs + 1% for noggins + loft hatches, F_{B1} = 12.7%

Upper resistance limit

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

$R_{upper} = 1 / ((0.873/8.526) + (0.127/5.336)) = 7.922 m²K/W$

Lower resistance limit

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

$R_{lower} = 4.183 + 1 / ((0.8725/4.3430) + (0.1275/1.1538)) = 6.821$ m²K/W

Total resistance of roof

$R_T = (R_{upper} + R_{lower}) / 2 = (7.922 + 6.821) / 2 = 7.372$ m²K/W

(Correction for mechanical fasteners, Delta Uf = 0.0027W/m²K | Correction for air gaps, Delta Ug = 0.0000W/m²K)
(Alpha 0.8 m^{-1} | Fasteners per square metre 8.3000)
(Fasteners cross-sectional area 7.900 mm² | Thermal conductivity of fastener 17.00 W/mK)

(Delta Uf + Delta Ug) is less than 3% of (1 / Rt) so U = (1 / Rt) = 0.14W/m²K

For further information on the specified products, e.g. literature or specification clauses, please follows the links below:-

Nilvent.17

KOOLTHERM K107

KOOLTHERM K107

BBA

CERTIFICATE CS/1004-2

U Value Competency Scheme

Kingspan

Project ID : Online
Structure element : Pitched or mansard roof, ceiling at line of pitch
Description : Warm pitched roof - 61-80mm insulation above rafters
File reference : 1E142K4C98.FCF
Humidity Class: 4 - Dwellings with high occupancy, sport halls, kitchens, canteens; buildings heated with unflued gas heaters
Location: 1c Scotland West

Condensation calculations performed in accordance with BS5250: 2011

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

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

Month	Int (°C)	Int (%RH)	Ext (°C)	Ext (%RH)
Jan	20.0	69.5	-0.2	90.5
Feb	20.0	68.7	-0.2	87.5
Mar	20.0	71.9	1.5	85.5
Apr	20.0	69.7	3.7	83.0
May	20.0	68.0	6.7	81.5
Jun	20.0	68.6	9.7	82.5
Jul	20.0	70.4	11.2	84.5
Aug	20.0	71.4	10.9	86.5
Sep	20.0	71.1	8.7	88.0
Oct	20.0	71.2	6.1	89.0
Nov	20.0	72.9	2.1	90.0
Dec	20.0	74.2	0.5	91.0

Gc = Monthly moisture accumulation per area at an interface
Ma = Accumulated moisture content per area at an interface

Peak accumulated moisture content per area at interface (Ma) = 0.00 Kg/m²
Annual moisture accumulation (Ma) = 0.00 Kg/m²