

Project ID : Online
Structure element : Wall
Description : Timber framed wall
File reference : 1E136M558B.FCF

Calculated 'U' value = 0.15W/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 | - | - | 0.141 | - | - | 78.34 | 0.26 |
| TIMBER CLADDING | 10.0 | 0.140 | 0.000 | 60.00 | 0.60 | 78.47 | 0.00 |
| VERTICAL BATTEN CAVITY - VENTILATED | 25.0 | - | 0.000 | - | 0.00 | 78.47 | 0.00 |
| KINGSPAN NILVENT.17 BREATHABLE MEMBRANE | 0.5 | - | 0.006 | - | 0.25 | 78.47 | 0.01 |
| OSB SHEATHING | 9.0 | 0.130 | 0.069 | 500.00 | 4.50 | 78.54 | 0.13 |
| TIMBER STUD CAVITY; U/V. 15.0% wall timber - timber frame (25.0mm) | 25.0 | - | 0.644 | - | 0.05 | 79.19 | 1.18 |
| KOOLTHERM K7 - BETWEEN TIMBER STUDS 15.0% wall timber - timber frame (75.0mm) | 75.0 | 0.020 | 3.750 | - | 100.00 | 83.22 | 6.87 |
| KOOLTHERM K118 (12.5mm plasterboard internal finish) | 72.5 | - | 3.399 | - | 100.00 | 89.77 | 6.23 |
| PLASTER SKIM | 3.0 | 0.180 | 0.017 | 60.00 | 0.18 | 92.90 | 0.03 |
| Inside surface resistance | - | - | 0.130 | - | - | 93.03 | 0.24 |

Detailed U-value Calculation Results

Construction includes 2 bridged layers.

Non-bridged layers

| | |
|--|--------------------|
| Outside surface resistance | 0.141 m²K/W |
| KINGSPAN NILVENT.17 BREATHABLE MEMBRANE | 0.006 m²K/W |
| OSB SHEATHING | 0.069 m²K/W |
| KOOLTHERM K118 (12.5mm plasterboard internal finish) | 3.399 m²K/W |
| PLASTER SKIM | 0.017 m²K/W |
| Inside surface resistance | 0.130 m²K/W |
| Resistance of non-bridged layers, R_{NB} = | <u>3.762 m²K/W</u> |

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

Whilst the information and/or specification contained herein 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.

Detailed U-value Calculation Results (continued)

Resistance of heat flow paths

$$R_{P1} = R_{NB} + R_{L1} = 3.762 + 4.394 = 8.155 \text{ m}^2\text{K/W} \quad F_{P1} = 85.000\%$$

$$R_{P2} = R_{NB} + R_{L2} = 3.762 + 0.833 = 4.595 \text{ m}^2\text{K/W} \quad F_{P2} = 15.000\%$$

Fraction of face area of materials

TIMBER STUD CAVITY; U/V., $F_{L1} = 85.0\%$

wall timber - timber frame, $F_{B1} = 15.0\%$

Upper resistance limit

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

$$R_{upper} = 1 / ((0.850/8.155) + (0.150/4.595)) = 7.306 \text{ m}^2\text{K/W}$$

Lower resistance limit

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

$$R_{lower} = 3.762 + 1 / ((0.8500/4.3935) + (0.1500/0.8333)) = 6.395 \text{ m}^2\text{K/W}$$

Total resistance of wall

$$R_T = (R_{upper} + R_{lower}) / 2 = (7.306 + 6.395) / 2 = 6.851 \text{ m}^2\text{K/W}$$

(Correction for mechanical fasteners, $\Delta U_f = 0.0000 \text{ W/m}^2\text{K}$ | Correction for air gaps, $\Delta U_g = 0.0000 \text{ W/m}^2\text{K}$)

(Alpha 0.0 m^{-1} | Fasteners per square metre 0.0000)

(Fasteners cross-sectional area 0.000 mm^2 | Thermal conductivity of fastener 0.00 W/mK)

($\Delta U_f + \Delta U_g$) is less than 3% of $(1 / R_T)$ so $U = (1 / R_T) = 0.15 \text{ W/m}^2\text{K}$

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

[Nilvent.17](#)

[Kooltherm K7](#)

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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

| 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

