

Project ID : Online
Structure element : Wall
Description : Insulated dry lining - mechanically fastened
File reference : 1Q136A64DC.FCF

Calculated 'U' value = 0.18W/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	-	-	0.040	-	-	78.26	0.10
BRICKWORK FACING	215.0	0.770	0.279	42.00	9.03	78.64	0.68
TIMBER BATTEN CAVITY; U/V.- strips of dpc down the back of battens 11.4% wall timber - 47mm batten @ 600mm ctrs + 47mm noggins @ 1200mm ctrs (25.0mm)	25.0	-	0.644	-	0.05	79.76	1.56
KOOLTHERM K118 (12.5mm plasterboard internal finish)	102.5	-	5.066	-	100.00	86.67	2.26
PLASTER SKIM	3.0	0.180	0.017	60.00	0.18	92.82	0.04
Inside surface resistance	-	-	0.130	-	-	92.99	0.31

Detailed U-value Calculation Results

Construction includes 2 bridged layers.

Non-bridged layers

Outside surface resistance	0.040 m²K/W
BRICKWORK FACING	0.279 m²K/W
KOOLTHERM K118 (12.5mm plasterboard internal finish)	5.066 m²K/W
PLASTER SKIM	0.017 m²K/W
Inside surface resistance	0.130 m²K/W
Resistance of non-bridged layers, R_{NB} =	<u>5.532 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

$$R_{P1} = R_{NB} + R_{L1} = 5.532 + 0.644 = 6.175 \text{ m}^2\text{K/W} \quad F_{P1} = 88.557\%$$

$$R_{P2} = R_{NB} + R_{L2} = 5.532 + 0.192 = 5.724 \text{ m}^2\text{K/W} \quad F_{P2} = 11.443\%$$

Fraction of face area of materials

TIMBER BATTEN CAVITY; U/V.- strips of dpc down the back of battens, $F_{L1} = 88.6\%$

wall timber - 47mm batten @ 600mm ctrs + 47mm noggins @ 1200mm ctrs, $F_{B1} = 11.4\%$

Upper resistance limit

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

$$R_{upper} = 1 / ((0.886/6.175) + (0.114/5.724)) = 6.120 \text{ m}^2\text{K/W}$$

Lower resistance limit

$$R_{lower} = R_{NB} + 1 / ((F_{L1}/R_{L1}) + (F_{B1}/R_{B1})) + 1 / ((F_{L2}/R_{L2}) + (F_{B2}/R_{B2}))$$

$$R_{lower} = 5.532 + 1 / ((0.8856/0.6435) + (0.1144/0.1923)) + 1 / ((0.0000/0.0000) + (1.0000/0.0000)) = 6.039 \text{ m}^2\text{K/W}$$

Total resistance of wall

$$R_T = (R_{upper} + R_{lower}) / 2 = (6.120 + 6.039) / 2 = 6.080 \text{ m}^2\text{K/W}$$

(Correction for mechanical fasteners, $\Delta U_f = 0.0175 \text{ W/m}^2\text{K}$ | Correction for air gaps, $\Delta U_g = 0.0000 \text{ W/m}^2\text{K}$)

(Alpha 0.8 m^{-1} | Fasteners per square metre 16.7000)

(Fasteners cross-sectional area 4.000 mm^2 | Thermal conductivity of fastener 50.00 W/mK)

$$U = (1 / R_T) + (\Delta U_f + \Delta U_g) = (1/6.080) + 0.0175 + 0.0000 = 0.18 \text{ W/m}^2\text{K}$$

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File reference : **1Q136A64DC.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

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

