

Project ID : Online
 Structure element : Wall
 Description : Brick and block cavity wall, full fill (with 10mm cavity) cavity less than or equal to 125mm
 File reference : 1Z154P412F.FCF

Calculated 'U' value = 0.17W/m²K (Calculated in accordance with BS EN ISO 6946:2017)

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	102.5	0.770	0.133	42.00	4.31	78.48	0.34
UNV. A/SPACE;	10.0	-	0.150	-	0.05	78.84	0.38
KOOLTHERM K106	90.0	0.018	5.000	-	100.00	85.34	2.64
BLOCKWORK 1400 Kg/m³ (k-value = 0.51 W/mK)	100.0	0.510	0.196	45.00	4.50	91.91	0.50
PLASTER DABS CAVITY. 20.0% Plaster dabs (15.0mm)	15.0	-	0.180	-	0.05	92.39	0.46
PLASTERBOARD	12.5	0.190	0.066	50.00	0.63	92.70	0.17
PLASTER SKIM	3.0	0.180	0.017	60.00	0.18	92.80	0.04
Inside surface resistance	-	-	0.130	-	-	92.99	0.33

Detailed U-value Calculation Results

Construction includes 3 bridged layers.

Non-bridged layers

Outside surface resistance	0.040 m²K/W
BRICKWORK FACING	0.133 m²K/W
UNV. A/SPACE;	0.150 m²K/W
KOOLTHERM K106	5.000 m²K/W
BLOCKWORK 1400 Kg/m³ (k-value = 0.51 W/mK)	0.196 m²K/W
PLASTERBOARD	0.066 m²K/W
PLASTER SKIM	0.017 m²K/W
Inside surface resistance	0.130 m²K/W
Resistance of non-bridged layers, R _{NB} =	<u>5.732 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

$$R_{P1} = R_{NB} + R_{L1} = 5.732 + 0.180 = 5.912 \text{ m}^2\text{K/W} \quad F_{P1} = 80.000\%$$

$$R_{P2} = R_{NB} + R_{L2} = 5.732 + 0.035 = 5.766 \text{ m}^2\text{K/W} \quad F_{P2} = 20.000\%$$

Fraction of face area of materials

PLASTER DABSCAVITY., $F_{L1} = 80.0\%$

Plaster dabs, $F_{B1} = 20.0\%$

Upper resistance limit

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

$$R_{upper} = 1 / ((0.800/5.912) + (0.200/5.766)) = 5.882 \text{ m}^2\text{K/W}$$

Lower resistance limit

$$R_{lower} = R_{NB} + 1 / ((F_{L1}/R_{L1}) + (F_{B1}/R_{B1})) + 1 / ((F_{L2}/R_{L2}) + (F_{B2}/R_{B2})) + 1 / ((F_{L3}/R_{L3}) + (F_{B3}/R_{B3}))$$

$$R_{lower} = 5.732 + 1 / ((0.8000/0.1804) + (0.2000/0.0349)) + 1 / ((0.0000/0.0000) + (1.0000/0.0000)) + 1 / ((0.0000/0.0000) + (1.0000/0.0000)) = 5.830 \text{ m}^2\text{K/W}$$

Total resistance of wall

$$R_T = (R_{upper} + R_{lower}) / 2 = (5.882 + 5.830) / 2 = 5.856 \text{ m}^2\text{K/W}$$

(Correction for mechanical fasteners, $\Delta U_f = 0.0034 \text{ W/m}^2\text{K}$ | Correction for air gaps, $\Delta U_g = 0.0000 \text{ W/m}^2\text{K}$)

(Alpha 0.8 m^{-1} | Fasteners per square metre 2.5000)

(Fasteners cross-sectional area 12.500 mm^2 | Thermal conductivity of fastener 17.00 W/mK)

($\Delta U_f + \Delta U_g$) is less than 3% of $(1 / R_T)$ so $U = (1 / R_T) = 0.17 \text{ W/m}^2\text{K}$