# U-Value Calculation and Condensation Risk Assessment

**Project Information**

12 Barrington Court, London, NW5 4AT

Construction: EWI render system

Construction Type: Wall

File reference: 1-TC-230125-124825-103

Calculated U-value = $0.24 W/m^2K$

## Selected Build-Up

| Description | Thickness (mm) | Thermal Conductivity (W/mK) | Thermal Resistance ($m^2K/W$) | Thermal Bridging | Vapour Resistivity (MNs/gm) | Vapour Resistance (MNs/g) | |
|---|---|---|---|---|---|---|---|
| Inside Surface | | | 0.130 | | | | |
| PLASTER SKIM | 3.0 | 0.180 | 0.017 | | 60.000 | 0.180 | |
| PLASTERBOARD | 12.5 | 0.190 | 0.066 | | 50.000 | 0.625 | |
| PLASTER DABS CAVITY. | 15.0 | | 0.150 | 20.0% Plaster dabs, 100.0 centres | | 0.050 | |
| BLOCKWORK 2000 kg/m³ (k-value = 1.13 W/mK) | 50.0 | 1.130 | 0.044 | 6.6% Mortar, 450.0 centres | 45.000 | 2.250 | |
| UNV. A/SPACE; | 65.0 | | 0.183 | | | 0.050 | |
| BLOCKWORK 1400 Kg/m³ (k-value = 0.51 W/mK) | 100.0 | 0.510 | 0.196 | 6.6% Mortar, 450.0 centres | 45.000 | 4.500 | |
| KOOLTHERM K5 EWB | 70.0 | 0.021 | 3.333 | | 300.000 | 21.000 | |
| POLYMER RENDER | 10.0 | 0.115 | 0.087 | | 100.000 | 1.000 | |
| Outside Surface | | | 0.040 | | | | |

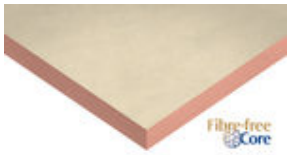
**Key** Bridged and fastened | Bridged | Fastened

## Supporting Information

## Product Details

For further information on the specified products e.g. literature or specification clauses, please follow the links below or scan the QR code to the right:

Kingspan Kooltherm K5 External Wall Board
www.kingspaninsulation.co.uk/k5



## Detailed U-value

The calculation method is in accordance with BS EN ISO 6946:2017 / I.S. EN ISO 6946:2017. A simplified summary of the steps involved are shown below

$$Rtotal(R_{tot}) = R_{si} + R_1 + R_2 + \ldots + R_n + R_{se}$$

For a construction containing inhomogeneous layers the upper and lower resistances of the construction must be used

$$R_{tot;upper} = 1/((f_a/R_{tot;a}) + (f_b/R_{tot;b}) + \ldots + (f_q/R_{tot;q}))$$

$$R_j = 1/((f_a/R_{aj}) + (f_b/R_{bj}) + \ldots + (f_q/R_{qj}))$$

$$R_{tot;lower} = R_{si} + R_1 + R_2 + R_j + \ldots + R_n + R_{se}$$

$$R_{tot} = (R_{tot;upper} + R_{tot;lower})/2$$

$$= (4.246 + 4.194)/2$$

$$U = 1/R_{tot}$$

$$= 4.220$$

$$\Delta U = \Delta U_g + \Delta U_f + \Delta U_r$$

$\Delta U_g$ correction for air voids - 0.0000

$\Delta U_f$ correction for fasteners by approximate procedure - 0.0000

( Fastener 1 : alpha 0.00 | fasteners per m² 0.001 | fasteners cross sectional area 0.001 mm² | thermal conductivity of fasteners 0.00 W/mK )

$\Delta U_f$ correction for fasteners by detailed calculation method (rainscreen cladding) – 0.0000
(point thermal transmittance 0.000 W/K | fasteners per m² 0.000)

$\Delta U_r$ correction for inverted roofs – 0.0000
(precipitation 0.000 mm/day | f• x 0.0000)

Total U-value $(U_c) = U + \Delta U$
If $\Delta U$ is less than 3% of U then the corrections need not be applied.

Calculations including a steel frame construction are calculated in accordance with BRE Digest 465.

## Condensation

Condensation calculations have been performed in accordance with BS EN ISO 13788:2012 and BS 5250:2021 and the risk assessed within environmental conditions with the following characteristics

Humidity class 2 - Offices, shops and dwellings with low occupancy

Location: 5a England SE & Central South

Condensation risk has been assessed up to and including Level 2 Humidity Class (2 - Offices, shops and dwellings with low occupancy) within worst case environment conditions. The risk level is 1 in 20 years

## Condensation Analysis

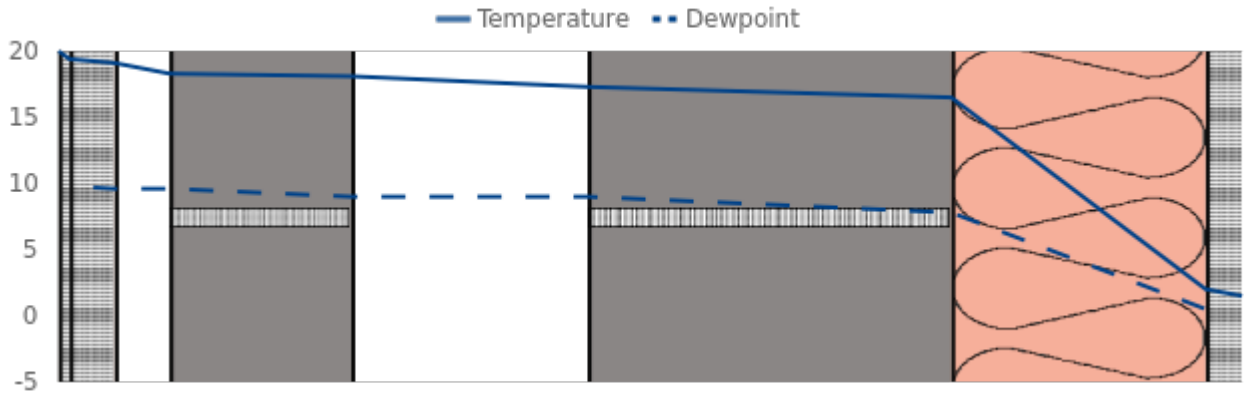
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Internal Temperature (°C) | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 |
| Internal Relative Humidity (%) | 51.9 | 51.0 | 51.7 | 52.8 | 57.2 | 62.3 | 67.5 | 67.9 | 64.4 | 59.7 | 54.3 | 52.8 |
| External Temperature (°C) | 1.5 | 1.8 | 3.7 | 6.0 | 9.3 | 12.4 | 14.5 | 14.1 | 11.8 | 8.7 | 4.4 | 2.5 |
| External Relative Humidity (%) | 90.0 | 86.5 | 84.0 | 81.0 | 81.0 | 80.0 | 80.5 | 82.5 | 85.5 | 88.0 | 89.5 | 90.5 |

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 all interfaces (Ma) = 0.000 Kg/m²**

**Annual moisture accumulation (Ma) = 0.000 Kg/m²**



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