U-Value Calculation and Condensation Risk Assessment

Project Information

7 Tresham Road, Orton Southgate

Construction: Timber frame wall

Construction Type: Wall

File reference: 1-MP-260319-140503-976

Calculated U-value = 0.32W/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				
PLASTERBOARD	12.5	0.190	0.066		50.000	0.625	
ECOTHERM ECO-LINER 37.5mm (12.5mm plasterboard internal finish)	37.5		1.202			100.000	
ECOTHERM ECO-VERSAL	50.0	0.022	1.994	15% wall timber - timber frame		100.000	
OSB SHEATHING	9.0	0.130	0.069		500.000	4.500	
BITUMEN ROOFING 3 LAYERS	9.0	0.230	0.039			850.000	
Outside Surface			0.040				

Key Bridged and fastened | Bridged | Fastened

Supporting Information

CalculationNotes:SMALLLOCALISED AREA - CUSTOMER SPECIFIED CONSTRUCTION - ROOF UPSTAND

Product Details

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

Ecotherm Eco-Liner
www.ecotherm.co.uk/products/eco-liner

Ecotherm Eco-Versal
www.ecotherm.co.uk/products/eco-versal

Detailed U-value

Thecalculationmethod 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

$$Rtotal(R_{tot}) = R_{si} + R1 + R2 + \ldots + R_n + R_{se}$$

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

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

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

$$R_{tot;lower} = R_{si}+R1+R2+Rj+\ldots+Rn+R_{se}$$

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

$$=(3.344+2.908)/2$$

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

$$=3.126$$

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

ΔU_g correction for air voids - 0.0000

ΔU_f correction for fasteners by approximate procedure - 0.0000

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

ΔU_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 ΔU 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: 4 Midlands

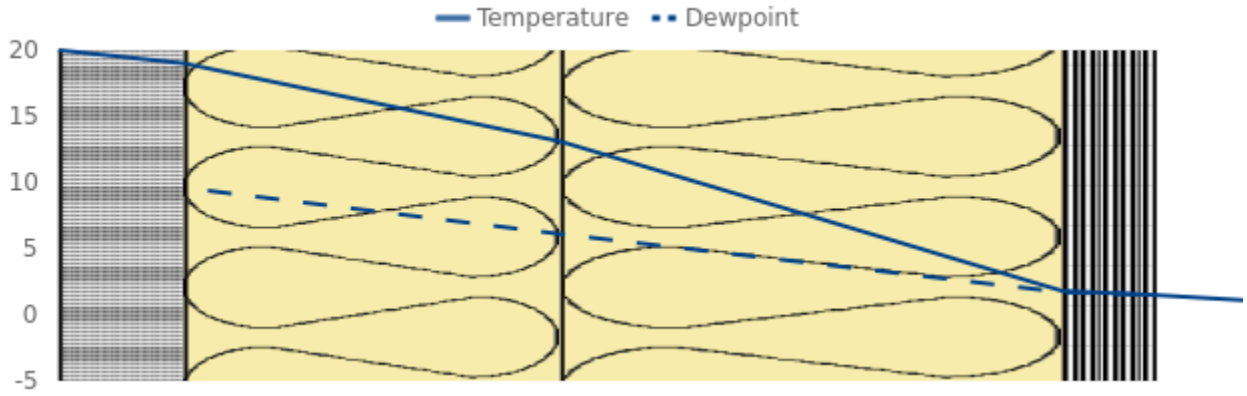
Condensation risk has been assessed up to and including Level 2 Humidity Class (2 - Offices, shops and dwellings with low occupancy) within worst case environment conditions. The risk level is 1 in 20 years
Condensation has been calculated to accumulate at the followings interfaces:

Interface1: OSB SHEATHING / BITUMEN ROOFING 3 LAYERS

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 (%)	51.3	50.9	51.1	51.8	55.7	60.6	64.8	65.5	62.0	58.1	53.4	52.2
External Temperature (°C)	1.1	1.1	3.2	5.6	8.6	12.0	13.8	13.4	11.2	8.0	4.0	2.2
External Relative Humidity (%)	89.0	87.5	83.5	79.5	80.0	78.5	79.0	81.5	83.5	87.0	88.0	89.5
Interface1 (Gc (kg/m²))	0.006	0.006	0.005	0.003	0.001	-0.001	-0.002	-0.001	0.001	0.003	0.005	0.006
Interface1 (Ma (kg/m²))	0.021	0.027	0.032	0.035	0.036	0.035	0.033	0.032	0.001	0.004	0.008	0.014

Gc = Monthlymoisture accumulation per area at an interface
Ma = Accumulated moisture content per area at an interface
Peak accumulated moisture content per area at interface1(Ma) = 0.036m Kg/m²
Annual moisture accumulation (Ma) = 0.032 Kg/m²
Peak moisture build-up month: May



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