Client :
Contract :
Structure element : Wall
Description : Structural Insulated Panels (SIPs)
File reference : 1TF89462C.FCF

Calculated 'U' value = 0.20W/m²K (Calculated in accordance with BS EN ISO 6946:2007)

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	-	-	281.13	0.30
BRICKSLIPS ON CARRIER BOARD	30.0	0.140	0.000	60.00	1.80	281.29	0.00
COUNTER BATTEN CAVITY	25.0	-	0.000	-	0.00	281.29	0.00
BREATHABLE MEMBRANE	0.5	-	0.006	-	0.20	281.29	0.01
TEK 142 WALL PANEL(4% bridge, 15/112/15mm) (Delta U" = 0.0100W/m²K) 4.0% Timber (142.0mm)	142.0	-	5.100	-	49.00	286.77	10.94
UNV. A/SPACE;	25.0	-	0.184	-	0.05	292.44	0.40
STONE 6.6% Mortar (200.0mm)	200.0	2.300	0.087	135.00	27.00	292.73	0.19
PLASTER DENSE	13.0	0.570	0.023	60.00	0.78	292.85	0.05
Inside surface resistance	-	-	0.130	-	-	293.01	0.28

Detailed U-value Calculation Results

Construction includes 2 bridged layers.

Non-bridged layers

Outside surface resistance	0.141 m²K/W
BREATHABLE MEMBRANE	0.006 m²K/W
UNV. A/SPACE;	0.184 m²K/W
PLASTER DENSE	0.023 m²K/W
Inside surface resistance	0.130 m²K/W
Resistance of non-bridged layers, R_{NB} =	0.484 m²K/W

Bridged layers
TEK 142 WALL PANEL(4% bridge, 15/112/15mm) (L1) bridged by Timber (B1)
STONE (L2) bridged by Mortar (B2)

Path 1 - TEK 142 WALL PANEL(4% bridge, 15/112/15mm) / STONE
Path 2 - Timber / STONE
Path 3 - TEK 142 WALL PANEL(4% bridge, 15/112/15mm) / Mortar
Path 4 - Timber / Mortar

Resistance of heat flow paths
$R_{P1} = R_{NB} + R_{L1} = 0.484 + 5.187 = 5.671$ m²K/W $F_{P1} = 89.695\%$
$R_{P2} = R_{NB} + R_{L2} = 0.484 + 1.179 = 1.664$ m²K/W $F_{P2} = 3.737\%$
$R_{P3} = R_{NB} + R_{L3} = 0.484 + 5.327 = 5.812$ m²K/W $F_{P3} = 6.305\%$
$R_{P4} = R_{NB} + R_{L4} = 0.484 + 1.320 = 1.804$ m²K/W $F_{P4} = 0.263\%$

Fraction of face area of materials
TEK 142 WALL PANEL(4% bridge, 15/112/15mm), F_{L1} = 96.0%
Timber, F_{B1} = 4.0%
STONE, F_{L2} = 93.3%
Mortar, F_{B2} = 6.7%

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Detailed U-value Calculation Results (continued)

Upper resistance limit

$R_{upper} = 1 / ((F_{P1}/R_{P1}) + (F_{P2}/R_{P2}) + (F_{P3}/R_{P3}) + (F_{P4}/R_{P4}))$

$R_{upper} = 1 / ((0.897/5.671) + (0.037/1.664) + (0.063/5.812) + (0.003/1.804)) = 5.183 m^2K/W$

Lower resistance limit

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

$R_{lower} = 0.484 + 1 / ((0.9600/5.1000) + (0.0400/1.0923)) + 1 / ((0.9333/0.0870) + (0.0667/0.2273)) = 5.022 m^2K/W$

Total resistance of wall

$R_T = (R_{upper} + R_{lower}) / 2 = (5.183 + 5.022) / 2 = 5.103 m^2K/W$

(Correction for mechanical fasteners, Delta Uf = 0.0000W/m²K | Correction for air gaps, Delta Ug = 0.0000W/m²K)
(Alpha 0.0 m^{-1} | Fasteners per square metre 0.0000)
(Fasteners cross-sectional area 0.000 mm² | Thermal conductivity of fastener 0.00 W/mK)

(Delta Uf + Delta Ug) is less than 3% of (1 / Rt) so U = (1 / Rt) = 0.20W/m²K

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Client :
Contract :
Structure element : Wall
Description : Structural Insulated Panels (SIPs)
File reference : 1TF89462C.FCF
Humidity Class: 3 - Dwellings with low occupancy
Location: Europe - Netherlands - Amsterdam (Mean)

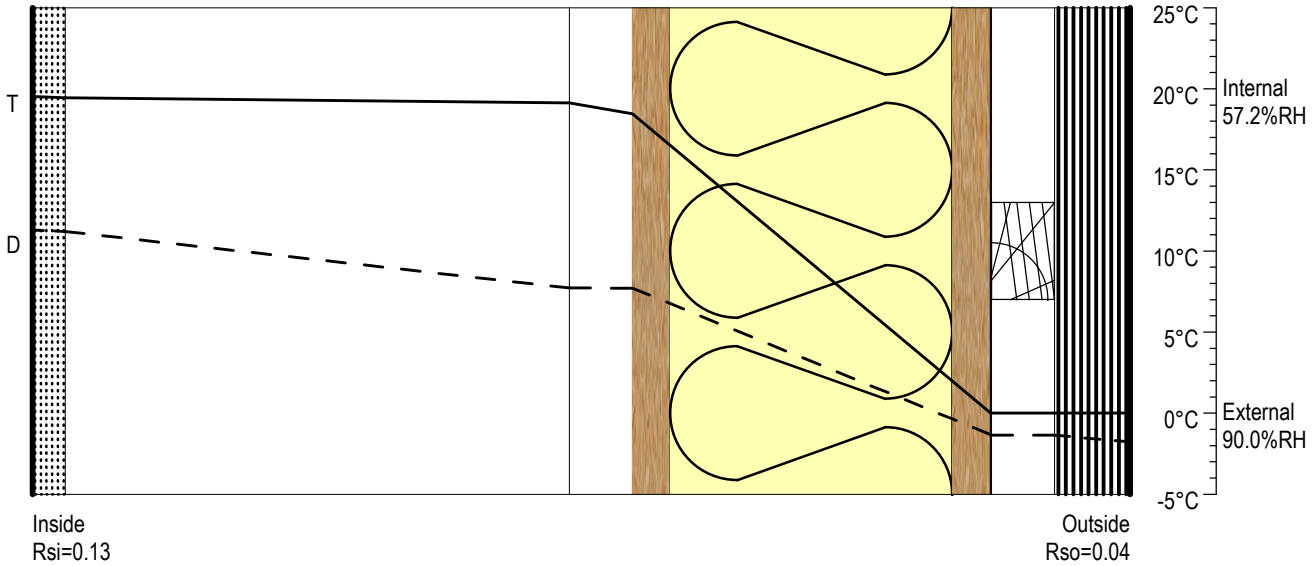
Condensation calculations performed in accordance with BS5250: 2002

Month	Int (°C)	Int (%RH)	Ext (°C)	Ext (%RH)	Prediction of mould growth	Prediction of surface condensation	pe (Pa)	Dp (Pa)	pi (Pa)	psat (Pa)	simin (°C)	si (°C)	frsi
January	20.00	57.20	-0.50	90.00	No	No	527.2	736.4	1337.2	1671.5	14.7	20.0	0.742
February	20.00	57.40	0.00	87.00	No	No	531.1	736.4	1341.1	1676.4	14.8	20.0	0.738
March	20.00	58.30	4.00	80.00	No	No	650.3	648.0	1363.1	1703.8	15.0	20.0	0.688
April	20.00	56.50	7.00	74.00	No	No	741.0	526.5	1320.1	1650.2	14.5	20.0	0.578
May	20.00	57.00	11.00	71.00	No	No	931.5	364.5	1332.5	1665.6	14.7	20.0	0.406
June	20.00	60.00	14.00	71.00	No	No	1134.4	243.0	1401.7	1752.1	15.4	20.0	0.241
July	20.00	66.70	16.00	76.00	No	No	1381.1	162.0	1559.3	1949.2	17.1	20.0	0.280
August	20.00	67.30	15.50	78.00	No	No	1372.8	182.3	1573.3	1966.6	17.3	20.0	0.391
September	20.00	65.20	13.00	81.00	No	No	1212.5	283.5	1524.4	1905.5	16.8	20.0	0.537
October	20.00	62.70	9.00	85.00	No	No	975.3	445.5	1465.4	1831.7	16.1	20.0	0.649
November	20.00	62.20	4.00	91.00	No	No	739.7	648.0	1452.5	1815.6	16.0	20.0	0.750
December	20.00	62.10	1.00	92.00	No	No	603.9	769.5	1450.3	1812.9	16.0	20.0	0.788

fRsi for mould growth = 0.975
fRsi,max for mould growth = 0.788
fRsi,max for surface condensation = 0.618
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) = 0.000 Kg/m²
Annual moisture accumulation (Ma) = 0.000 Kg/m²

Scale 1 : 3



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