Back to Earth SW Ltd
7 Tuns Lane
Silverton
Exeter
EX5 4HY

Project Information
Reference
Date 22 November 2023

Construction Type
Element : Wall - Wall-CLT-140mm-Clad
Internal surface emissivity : High External surface emissivity : High

	Thickness (mm)	Thermal Conductivity (W/mK)	Thermal Resistance (m²K/W)	Pitch (º)	Bridge details Air gaps (Level, Delta U")
Outside surface resistance	-	-	0.040		
Ampatop Protecta	-	-	-		
Beltermo Ultra	80.0	0.042	1.900		L:0 0.000W/m²K
UdiTHERM	200.0	0.038	5.250		L:0 0.000W/m²K
Ampatex Solero	-	-	-		
Timber (500 kg/m³)	140.0	0.130	1.077		
Inside surface resistance	-	-	0.130		
Total thickness	**420.0mm**				

U-value = 0.14W/m²K

U-value, Combined Method : 0.139W/m²K (upper/lower limit 8.397 / 8.397m²K/W, dUf 0.0198, dUg 0.0000, dUp0.0000, dUr0.0000, dUrc1 0.0000, dUrc2 0.0000)

Correction factors
Mechanical fasteners :-
Warm pitched roof - insulation over rafters
Alpha : 0.80 per m lambda f : 50.0000W/mK nf : 6.700 per m² Af : 28.500mm² Recess : 0.0mm
Delta Uf for Beltermo Ultra : 0.0049
Warm pitched roof - insulation over rafters
Alpha : 0.80 per m lambda f : 50.0000W/mK nf : 6.700 per m² Af : 28.500mm² Recess : 0.0mm
Delta Uf for UdiTHERM : 0.0149
nf = fasteners per m² Af = fasteners cross-sectional area
Air gaps, Delta Ug = 0.000W/m²K

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	Thickness (mm)	Thermal Conductivity (W/mK)	Thermal Resistance (m²K/W)	Vapour Resistivity (MNs/gm)	Vapour Resistance (MNs/g)
Outside surface resistance	-	-	0.040	-	-
Ampatop Protecta	-	-	-	-	0.50
Beltermo Ultra	80.0	0.042	1.900	15.00	1.20
UdiTHERM	200.0	0.038	5.250	25.00	5.00
Ampatex Solero	-	-	-	-	25.00
Timber (500 kg/m³)	140.0	0.130	1.077	250.00	35.00
Inside surface resistance	-	-	0.130	-	-
Total thickness	**420.0mm**				

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Structure element : Wall
Condensation calculations performed in accordance with BS5250:2021

Condensation is occuring at the following layers interfaces:-

Month	Int (C°)	Int (%RH)	Ext (C°)	Ext (%RH)
Jan	21.00	45.10	3.10	85.00
Feb	21.00	44.60	3.10	83.50
Mar	21.00	45.40	5.20	79.50
Apr	21.00	46.70	7.60	75.50
May	21.00	51.40	10.60	76.00
Jun	21.00	57.20	14.00	74.50
Jul	21.00	61.90	15.80	75.00
Aug	21.00	62.60	15.40	77.50
Sep	21.00	58.60	13.20	79.50
Oct	21.00	53.90	10.00	83.00
Nov	21.00	48.00	6.00	84.00
Dec	21.00	46.40	4.20	85.50

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) = 0.00000 Kg/m²

Annual moisture accumulation = 0.00000 Kg/m²

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Thermal Mass Details

	Thickness assessed (actual) (mm)	Density (kg/m³)	Specific heat capacity (J/kgK)	Heat capacity (kJ/m²K)
Ampatop Protecta	0.0 (-)	300.0	850.0	0.0
Beltermo Ultra	0.0 (80.0)	180.0	2100.0	0.0
UdiTHERM	0.0 (200.0)	140.0	2100.0	0.0
Ampatex Solero	0.0 (-)	280.0	850.0	0.0
Timber (500 kg/m³)	100.0 (140.0)	500.0	1600.0	80000000.0
Total				80000000.0
kappa value				80.0000

Limiting condition: 100mm in

Admittance : 2.16 W/m²K Decrement : 0.02 factor Decrement delay : -0.23 hours

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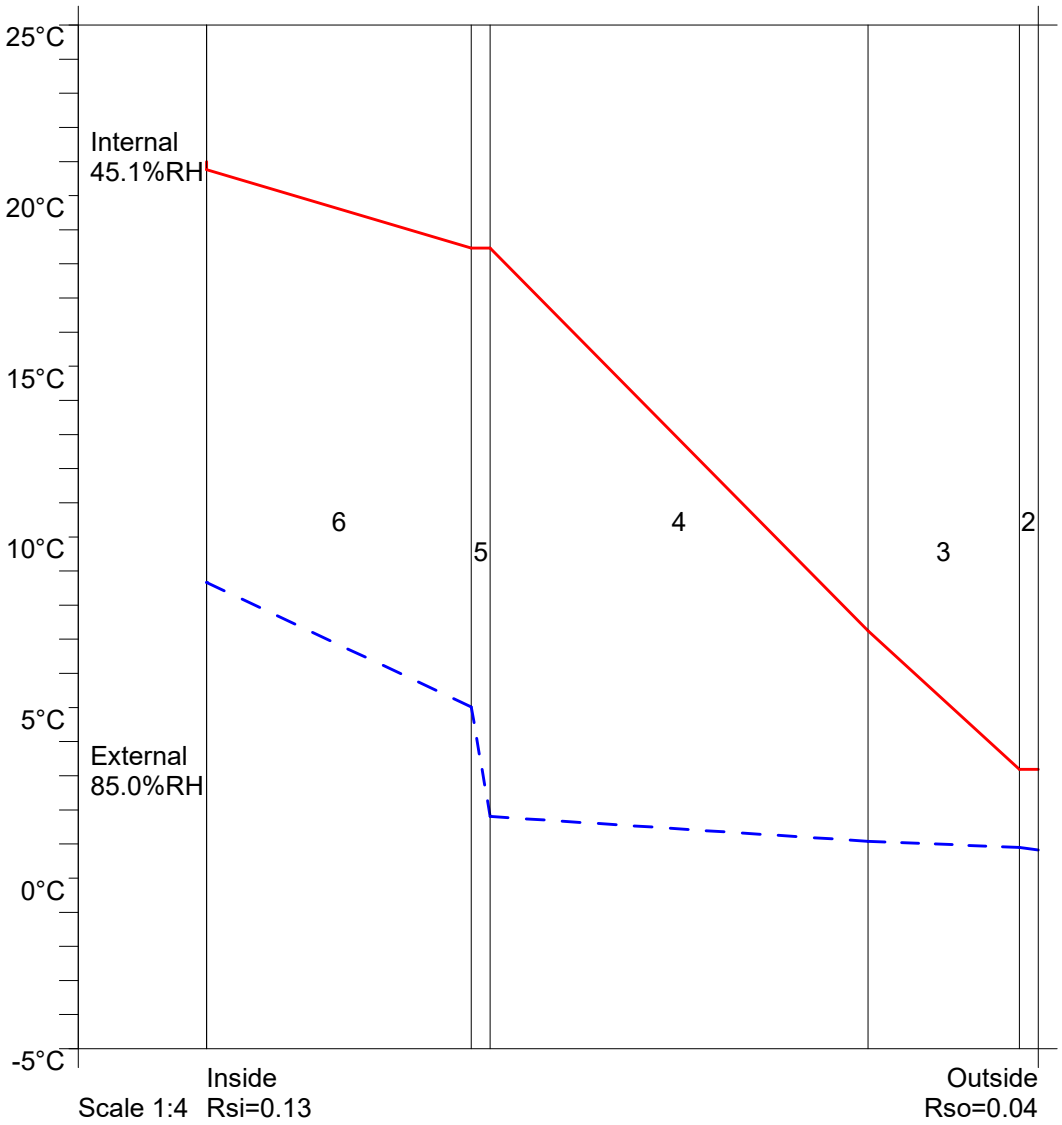
Condensation Risk Analysis (no account taken of thermal bridges)

2 - Offices, shops and dwellings with low occupancy

Jan (worst)	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
21.0C 45.1%	21.0C 44.6%	21.0C 45.4%	21.0C 46.7%	21.0C 51.4%	21.0C 57.2%	21.0C 61.9%	21.0C 62.6%	21.0C 58.6%	21.0C 53.9%	21.0C 48.0%	21.0C 46.4%
3.1C 85.0%	3.1C 83.5%	5.2C 79.5%	7.6C 75.5%	10.6C 76.0%	14.0C 74.5%	15.8C 75.0%	15.4C 77.5%	13.2C 79.5%	10.0C 83.0%	6.0C 84.0%	4.2C 85.5%

	Interface Temp. ºC	Dewpoint Temp. ºC	Vapour Pressure (kPa)	Saturated V.P. (kPa)	Worst Cond. (g/m²)	Peak Buildup (g/m²)	Conden-sation
1 Outside surface resistance	3.2	0.8	0.65	0.77			No
2 Ampatop Protecta	3.2	0.9	0.65	0.77			No
3 Beltermo Ultra	7.2	1.1	0.66	1.02			No
4 UdiTHERM	18.5	1.8	0.70	2.12			No
5 Ampatex Solero	18.5	5.0	0.87	2.12			No
6 Timber (500 kg/m³)	20.8	8.7	1.12	2.45			No
7 Inside surface resistance							

Worst case internal / external conditions for graph : 21.0°C @ 45.1%RH / 3.1°C @ 85.0%RH



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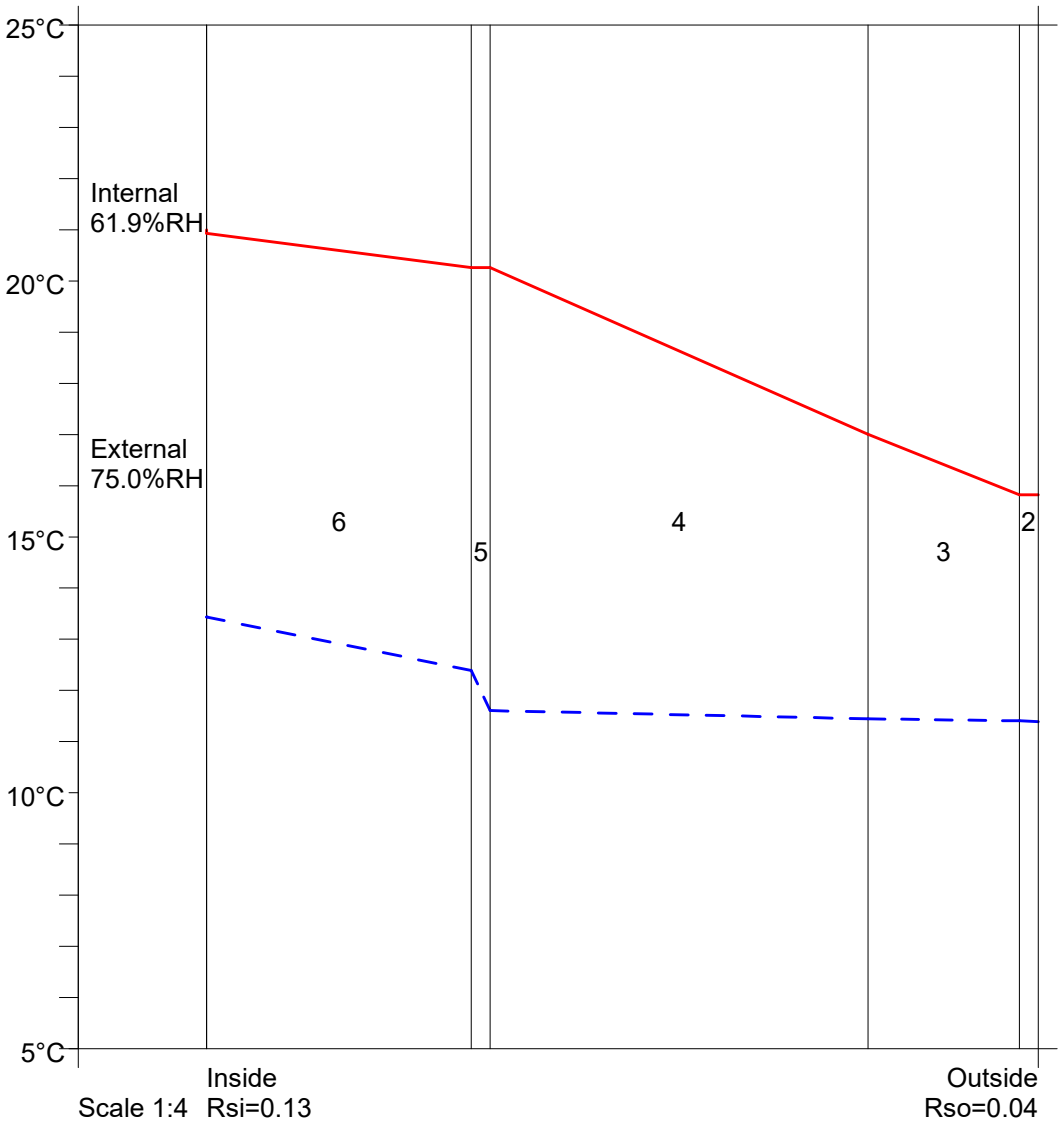
Condensation Risk Analysis (no account taken of thermal bridges)

2 - Offices, shops and dwellings with low occupancy

Jan (worst)	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
21.0C 45.1%	21.0C 44.6%	21.0C 45.4%	21.0C 46.7%	21.0C 51.4%	21.0C 57.2%	21.0C 61.9%	21.0C 62.6%	21.0C 58.6%	21.0C 53.9%	21.0C 48.0%	21.0C 46.4%
3.1C 85.0%	3.1C 83.5%	5.2C 79.5%	7.6C 75.5%	10.6C 76.0%	14.0C 74.5%	15.8C 75.0%	15.4C 77.5%	13.2C 79.5%	10.0C 83.0%	6.0C 84.0%	4.2C 85.5%

	Interface Temp. ºC	Dewpoint Temp. ºC	Vapour Pressure (kPa)	Saturated V.P. (kPa)	Worst Cond. (g/m²)	Peak Buildup (g/m²)	Conden-sation
1 Outside surface resistance	15.8	11.4	1.35	1.80			No
2 Ampatop Protecta	15.8	11.4	1.35	1.80			No
3 Beltermo Ultra	17.0	11.4	1.35	1.94			No
4 UdiTHERM	20.3	11.6	1.37	2.38			No
5 Ampatex Solero	20.3	12.4	1.44	2.38			No
6 Timber (500 kg/m³)	20.9	13.4	1.54	2.48			No
7 Inside surface resistance							

Worst case internal / external conditions for graph : 21.0°C @ 61.9%RH / 15.8°C @ 75.0%RH



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