

## 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-120mm-Clad

Internal surface emissivity : High External surface emissivity : High

	Thickness (mm)	Thermal Conductivity (W/mK)	Thermal Resistance (m <sup>2</sup> K/W)	Pitch (°)	Bridge details Air gaps (Level, Delta U")
Outside surface resistance	-	-	0.040		
Ampatop Protecta	-	-	-		
Beltermo Ultra	120.0	0.042	2.850		L:0 0.000W/m <sup>2</sup> K
UdiTHERM	200.0	0.038	5.250		L:0 0.000W/m <sup>2</sup> K
Ampatex Solero	-	-	-		
Timber (500 kg/m <sup>3</sup> )	120.0	0.130	0.923		
Inside surface resistance	-	-	0.130		
<b>Total thickness</b>	<b>440.0mm</b>				

### U-value = 0.13W/m<sup>2</sup>K

U-value, Combined Method : 0.127W/m<sup>2</sup>K (upper/lower limit 9.193 / 9.193m<sup>2</sup>K/W, dUf 0.0186, 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 m<sup>2</sup> Af : 28.500mm<sup>2</sup> Recess : 0.0mm

Delta Uf for Beltermo Ultra : 0.0061

Warm pitched roof - insulation over rafters

Alpha : 0.80 per m lambda f : 50.0000W/mK nf : 6.700 per m<sup>2</sup> Af : 28.500mm<sup>2</sup> Recess : 0.0mm

Delta Uf for UdiTHERM : 0.0125

nf = fasteners per m<sup>2</sup> Af = fasteners cross-sectional area

Air gaps, Delta Ug = 0.000W/m<sup>2</sup>K

	Thickness (mm)	Thermal Conductivity (W/mK)	Thermal Resistance (m <sup>2</sup> K/W)	Vapour Resistivity (MNs/gm)	Vapour Resistance (MNs/g)
Outside surface resistance	-	-	0.040	-	-
Ampatop Protecta	-	-	-	-	0.50
Beltermo Ultra	120.0	0.042	2.850	15.00	1.80
UdiTHERM	200.0	0.038	5.250	25.00	5.00
Ampatex Solero	-	-	-	-	25.00
Timber (500 kg/m <sup>3</sup> )	120.0	0.130	0.923	250.00	30.00
Inside surface resistance	-	-	0.130	-	-
<b>Total thickness</b>	<b>440.0mm</b>				

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

**Condensation is occurring 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/m<sup>2</sup>

Annual moisture accumulation = 0.00000 Kg/m<sup>2</sup>

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**Thermal Mass Details**

	Thickness assessed (actual) (mm)	Density (kg/m <sup>3</sup> )	Specific heat capacity (J/kgK)	Heat capacity (kJ/m <sup>2</sup> K)
Ampatop Protecta	0.0 (-)	300.0	850.0	0.0
Beltermo Ultra	0.0 (120.0)	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/m <sup>3</sup> )	100.0 (120.0)	500.0	1600.0	8000000.0
Total				8000000.0
kappa value				80.0000
Limiting condition:	100mm in			

Admittance : 2.19 W/m<sup>2</sup>K    Decrement : 0.01 factor    Decrement delay : -1.87 hours

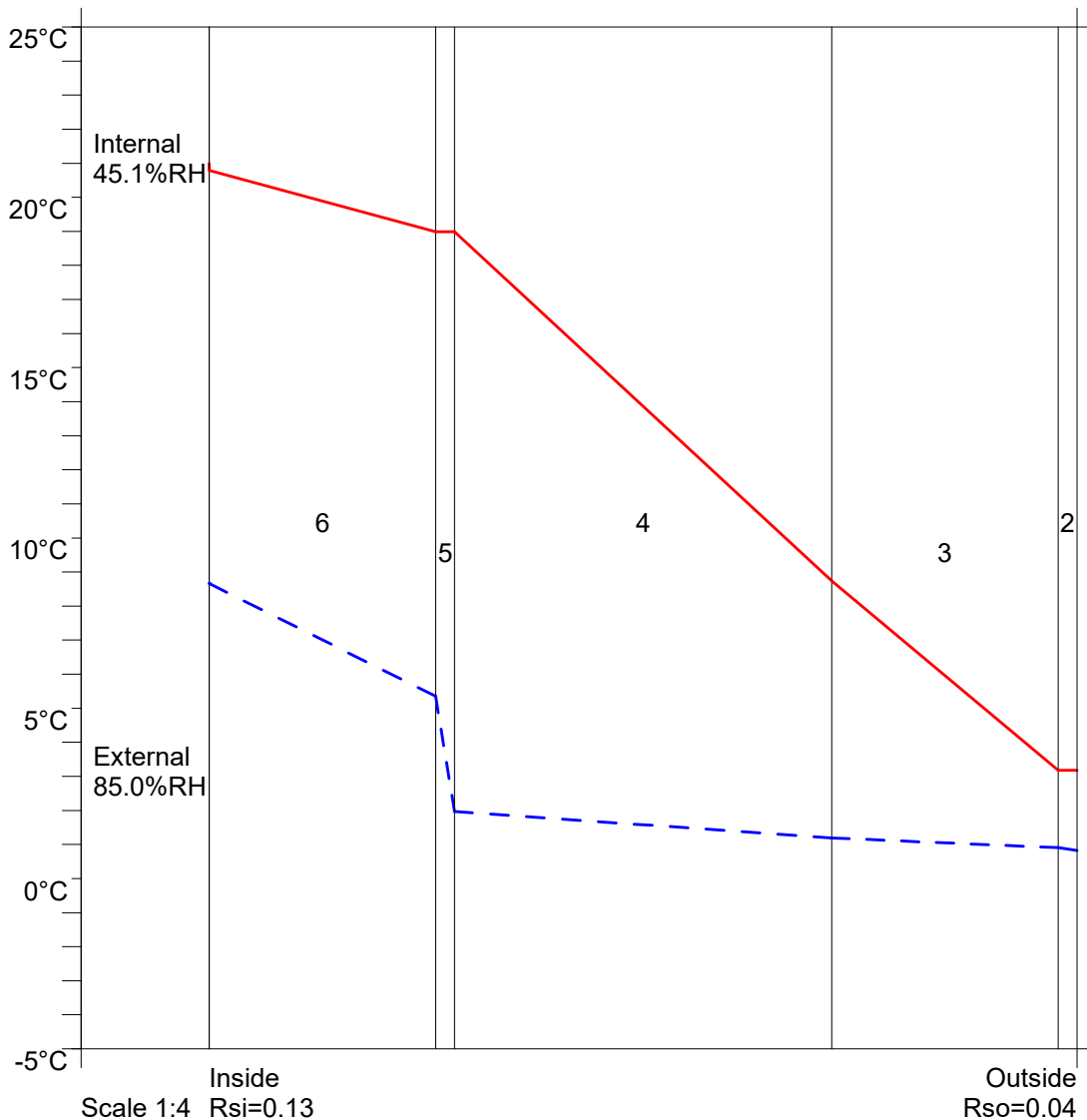
## Condensation Risk Analysis (no account taken of thermal bridges)

### 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. °C	Dewpoint Temp. °C	Vapour Pressure (kPa)	Saturated V.P. (kPa)	Worst Cond. (g/m <sup>2</sup> )	Peak Buildup (g/m <sup>2</sup> )	Condensation
1 Outside surface resistance							
2 Ampatop Protecta	3.2	0.8	0.65	0.77			No
3 Beltermo Ultra	3.2	0.9	0.65	0.77			No
4 UdiTHERM	8.7	1.2	0.67	1.13			No
5 Ampatex Solero	19.0	2.0	0.70	2.19			No
6 Timber (500 kg/m <sup>3</sup> )	19.0	5.4	0.89	2.19			No
7 Inside surface resistance	20.8	8.7	1.12	2.45			No

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



## 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. °C	Dewpoint Temp. °C	Vapour Pressure (kPa)	Saturated V.P. (kPa)	Worst Cond. (g/m <sup>2</sup> )	Peak Buildup (g/m <sup>2</sup> )	Condensation
1 Outside surface resistance							
2 Ampatop Protecta	15.8	11.4	1.35	1.80			No
3 Beltermo Ultra	15.8	11.4	1.35	1.80			No
4 UdiTHERM	17.4	11.5	1.35	1.99			No
5 Ampatex Solero	20.4	11.6	1.37	2.40			No
6 Timber (500 kg/m <sup>3</sup> )	20.4	12.5	1.45	2.40			No
7 Inside surface resistance	20.9	13.4	1.54	2.48			No

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

