

## Back to Earth SW Ltd

7 Tuns Lane  
Silverton, Exeter  
Devon. EX5 4HY

### Project Information

Reference

Date 14 September 2018

### Construction Type

Element : Wall - 0 Spec generator copies

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	-	-	0.130		
Airspace, heat flow horizontal, 50 mm thick	50.0	-	0.000		
Ampatex Aero	-	-	-		
Beltermo Ultra	80.0	0.042	1.900		L:0 0.000W/m <sup>2</sup> K
Beltermo Kombi	100.0	0.038	2.600		L:0 0.000W/m <sup>2</sup> K
Ampatex Solero	-	-	-		
Timber (500 kg/m <sup>3</sup> )	140.0	0.130	1.077		
Inside surface resistance	-	-	0.130		
<b>Total thickness</b>	<b>370.0mm</b>				

### U-value = 0.18W/m<sup>2</sup>K

U-value, Combined Method : 0.177W/m<sup>2</sup>K (upper/lower limit 5.837 / 5.837m<sup>2</sup>K/W, dUf 0.0054, 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 : 17.0000W/mK nf : 9.000 per m<sup>2</sup> Af : 28.000mm<sup>2</sup> Recess : 20.0mm

Delta Uf for Beltermo Ultra : 0.0019

Warm pitched roof - insulation over rafters

Alpha : 0.80 per m lambda f : 17.0000W/mK nf : 9.000 per m<sup>2</sup> Af : 28.000mm<sup>2</sup> Recess : 20.0mm

Delta Uf for Beltermo Kombi : 0.0035

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	-	-	0.130	-	-
Airspace, heat flow horizontal, 50 mm thick	50.0	-	0.000	-	0.00
Ampatex Aero	-	-	-	-	0.20
Beltermo Ultra	80.0	0.042	1.900	15.00	1.20
Beltermo Kombi	100.0	0.038	2.600	15.00	1.50
Ampatex Solero	-	-	-	-	25.00
Timber (500 kg/m <sup>3</sup> )	140.0	0.130	1.077	250.00	35.00
Inside surface resistance	-	-	0.130	-	-
<b>Total thickness</b>	<b>370.0mm</b>				

Structure element : Wall  
Condensation calculations performed in accordance with BS5250:2011

**Condensation is occurring at the following layers interfaces:-**

Month	Int (C°)	Int (%RH)	Ext (C°)	Ext (%RH)
Jan	21.00	54.70	3.50	86.00
Feb	21.00	53.80	3.80	82.50
Mar	21.00	53.90	5.70	80.00
Apr	21.00	54.40	8.00	77.00
May	21.00	57.90	11.30	77.00
Jun	21.00	62.20	14.40	76.00
Jul	21.00	66.80	16.50	76.50
Aug	21.00	67.40	16.10	78.50
Sep	21.00	64.60	13.80	81.50
Oct	21.00	60.80	10.70	84.00
Nov	21.00	56.50	6.40	85.50
Dec	21.00	55.50	4.50	86.50

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)
Airspace, heat flow horizontal, 50 mm thick	0.0 (50.0)	1.2	1008.0	0.0
Ampatex Aero	0.0 (-)	300.0	850.0	0.0
Beltermo Ultra	0.0 (80.0)	180.0	2100.0	0.0
Beltermo Kombi	0.0 (100.0)	110.0	2100.0	0.0
Ampatex Solero	0.0 (-)	280.0	850.0	0.0
Timber (500 kg/m <sup>3</sup> )	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/m<sup>2</sup>K    Decrement : 0.08 factor    Decrement delay : -17.33 hours

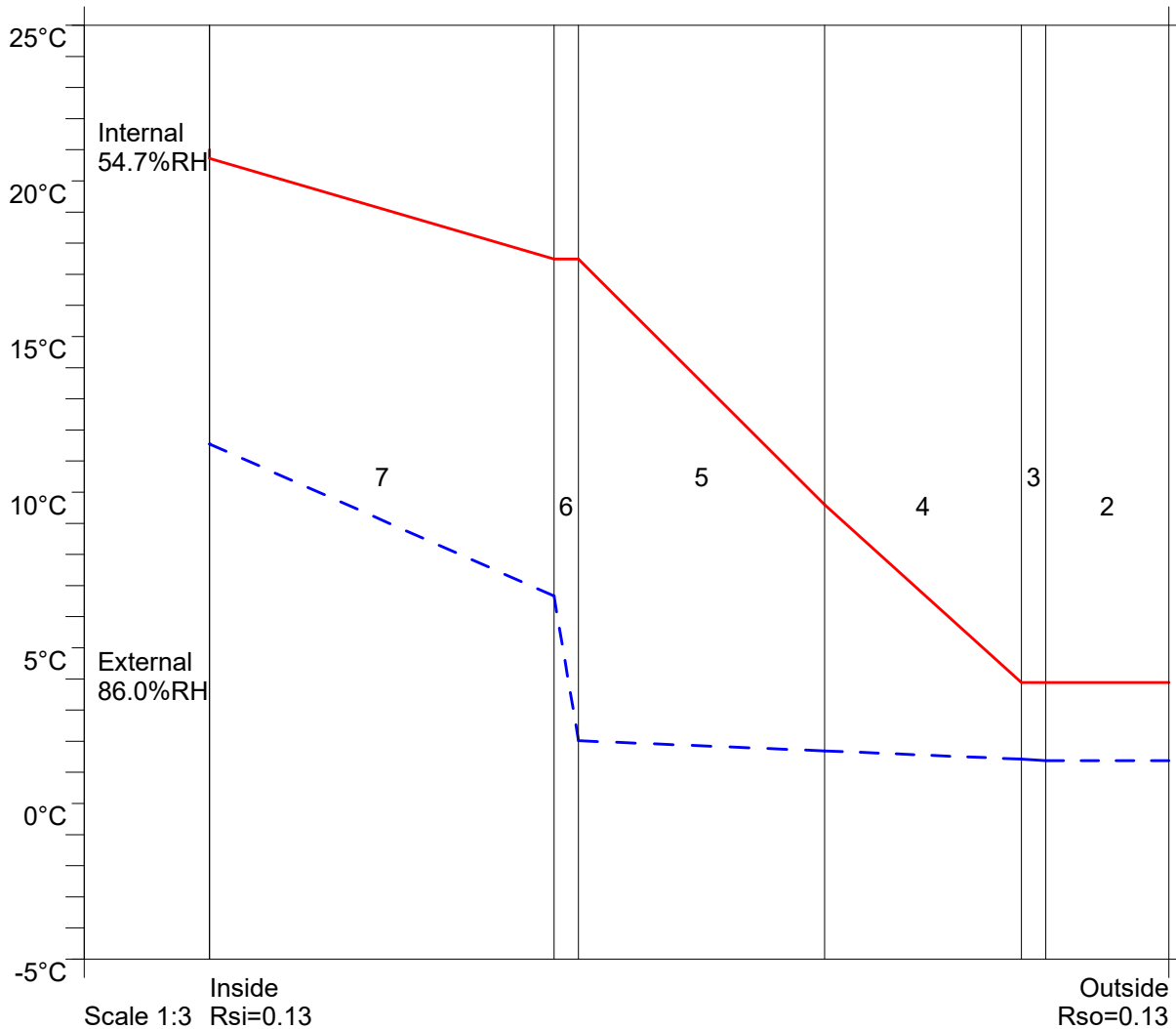
**Condensation Risk Analysis (no account taken of thermal bridges)**

**3 - Dwellings with low occupancy**

Jan (worst)	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
21.0C 54.7%	21.0C 53.8%	21.0C 53.9%	21.0C 54.4%	21.0C 57.9%	21.0C 62.2%	21.0C 66.8%	21.0C 67.4%	21.0C 64.6%	21.0C 60.8%	21.0C 56.5%	21.0C 55.5%
3.5C 86.0%	3.8C 82.5%	5.7C 80.0%	8.0C 77.0%	11.3C 77.0%	14.4C 76.0%	16.5C 76.5%	16.1C 78.5%	13.8C 81.5%	10.7C 84.0%	6.4C 85.5%	4.5C 86.5%

	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 Airspace, heat flow horizontal, 50 mm thick	3.9	1.4	0.67	0.81			No
3 Ampatex Aero	3.9	1.4	0.67	0.81			No
4 Beltermo Ultra	3.9	1.4	0.68	0.81			No
5 Beltermo Kombi	9.6	1.7	0.69	1.19			No
6 Ampatex Solero	17.5	2.0	0.71	2.00			No
7 Timber (500 kg/m <sup>3</sup> )	17.5	6.7	0.98	2.00			No
8 Inside surface resistance	20.7	11.5	1.36	2.44			No

Worst case internal / external conditions for graph : 21.0°C @ 54.7%RH / 3.5°C @ 86.0%RH



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

**3 - Dwellings with low occupancy**

Jan (worst)	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
21.0C 54.7%	21.0C 53.8%	21.0C 53.9%	21.0C 54.4%	21.0C 57.9%	21.0C 62.2%	21.0C 66.8%	21.0C 67.4%	21.0C 64.6%	21.0C 60.8%	21.0C 56.5%	21.0C 55.5%
3.5C 86.0%	3.8C 82.5%	5.7C 80.0%	8.0C 77.0%	11.3C 77.0%	14.4C 76.0%	16.5C 76.5%	16.1C 78.5%	13.8C 81.5%	10.7C 84.0%	6.4C 85.5%	4.5C 86.5%

	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 Airspace, heat flow horizontal, 50 mm thick	16.6	12.4	1.44	1.89			No
3 Ampatex Aero	16.6	12.4	1.44	1.89			No
4 Beltermo Ultra	16.6	12.4	1.44	1.89			No
5 Beltermo Kombi	18.1	12.4	1.44	2.07			No
6 Ampatex Solero	20.1	12.5	1.45	2.35			No
7 Timber (500 kg/m <sup>3</sup> )	20.1	13.4	1.54	2.35			No
8 Inside surface resistance	20.9	14.6	1.66	2.47			No

Worst case internal / external conditions for graph : 21.0°C @ 66.8%RH / 16.5°C @ 76.5%RH

