

**Project Information**

Reference Thermic Technology 140240-1  
 Date 11/2/20  
 Client Timber Frame Solutions  
 Tel: 01257 241084  
 Email: info@thermictechnology.co.uk

**This 4-page document contains:**

- U-value calculation
- Condensation risk analysis
- CAD drawing of wall structure

**Construction Type**

Element	: Wall - 89 - PhotonWrap - 0.040 - PhotonFoil - 0.22				
Timber framed wall					
Internal surface emissivity	: High	External surface emissivity		: High	
		Thickness	Thermal Conductivity	Thermal Resistance	Pitch Bridge details
		(mm)	(W/mK)	(m <sup>2</sup> K/W)	(°) Air gaps
					(Level, Delta U")
Outside surface resistance	-	-	-	0.040	
Brick - outer leaf (BRE)	103.0	0.770	0.134		17.332% Mortar (103.0mm)
Cavity	50.0	-	-	0.665	
(Un-vented cavity - width=562.0mm, hro=5.100, E1=0.050, E2=0.900, horizontal heat flow)					
PhotonWrap reflective breather membrane	0.5	0.030	0.017		L:0 0.000W/m <sup>2</sup> K
OSB (BS5250)	9.0	0.130	0.069		L:0 0.000W/m <sup>2</sup> K
Earthwool FrameTherm Roll 40	90.0	0.040	2.250		15.000%
					Prefabricated panels (90.0mm)
PhotonFoil	33.0	0.034	0.971		L:0 0.000W/m <sup>2</sup> K
					6.333%
					Compressed PhotonFoil and Timber (33.0mm)
50x38mm batten cavity	23.0	-	-	0.665	6.333% Softwood (~500kg/m <sup>3</sup> ) (23.0mm)
					(Bridged un-vented cavity - width=550.0mm, hro=5.100, E1=0.050, E2=0.900, horizontal heat flow)
Plasterboard (BS5250)	12.5	0.170	0.074		
Plaster, lightweight (BS5250)	3.0	0.220	0.014		
Inside surface resistance	-	-	-	0.130	

**U-value = 0.22W/m<sup>2</sup>K**

U-value, Combined Method : 0.223W/m<sup>2</sup>K (upper/lower limit 4.634 / 4.322m<sup>2</sup>K/W, dUf 0.0000, dUg 0.0000, dUp0.0000, dUr0.0000, dUrc1 0.0000, dUrc2 0.0000)

**Correction factors**

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

(Based on the combined method for determining U-values of structures containing repeating thermal bridges)

	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	-	-
Brick - outer leaf (BRE)	103.0	0.770	0.134	50.00	5.15
Cavity (Un-vented cavity - width=562.0mm, hro=5.100, E1=0.050, E2=0.900, horizontal heat flow)	50.0	-	0.665	-	0.26
PhotonWrap reflective breather membrane	0.5	0.030	0.017	50.00	0.03
OSB (BS5250)	9.0	0.130	0.069	500.00	4.50
Earthwool FrameTherm Roll 40	90.0	0.040	2.250	5.00	0.45
PhotonFoil	33.0	0.034	0.971	-	192.00
50x38mm batten cavity (Bridged un-vented cavity - width=550.0mm, hro=5.100, E1=0.050, E2=0.900, horizontal heat flow)	23.0	-	0.665	-	0.13
Plasterboard (BS5250)	12.5	0.170	0.074	60.00	0.75
Plaster, lightweight (BS5250)	3.0	0.220	0.014	30.00	0.09
Inside surface resistance	-	-	0.130	-	-

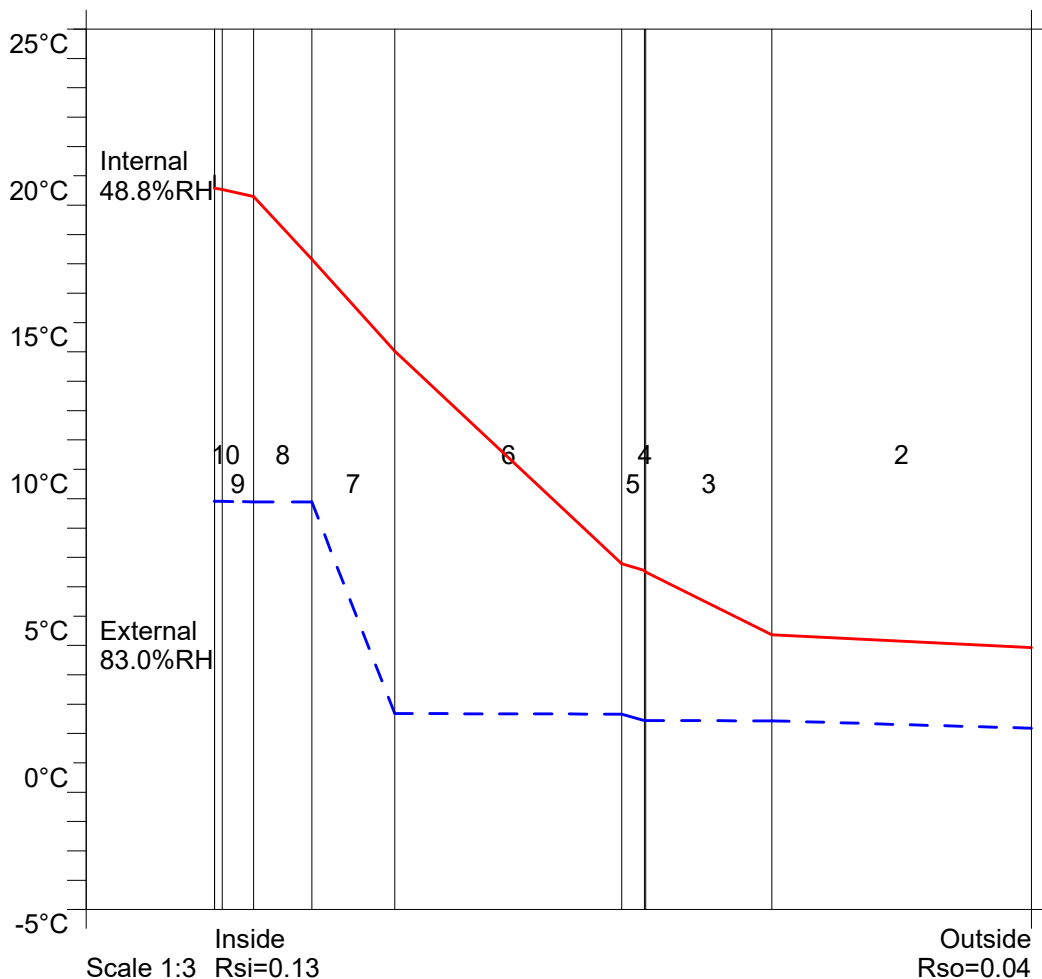
### Condensation Risk Analysis (no account taken of thermal bridges)

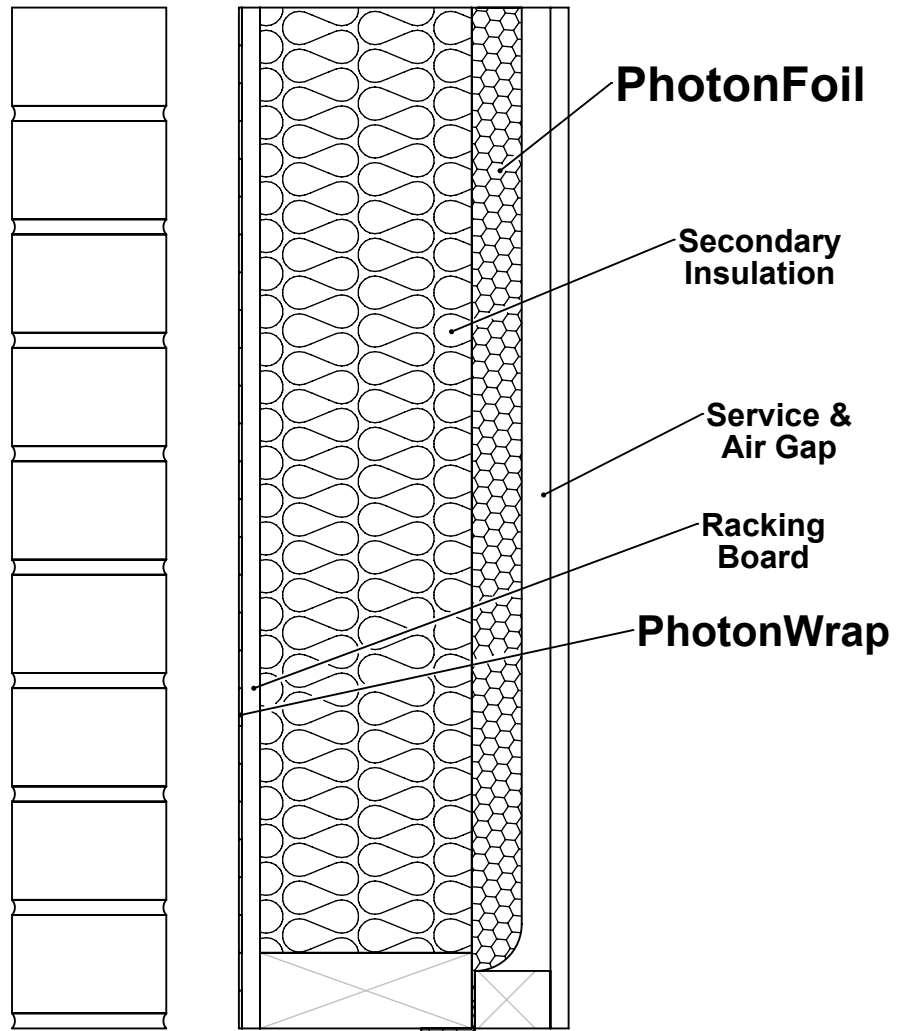
#### 3 - Dwellings with low occupancy

Jan (worst)	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
20.0C 48.8%	20.0C 48.9%	20.0C 50.7%	20.0C 52.9%	20.6C 56.3%	22.1C 59.2%	22.9C 60.8%	22.9C 60.7%	21.8C 58.5%	20.3C 55.6%	20.0C 51.3%	20.0C 49.5%
3.8C 83.0%	3.9C 81.0%	5.7C 76.5%	7.9C 74.0%	11.3C 71.5%	14.2C 73.5%	15.8C 75.5%	15.7C 76.5%	13.5C 78.5%	10.6C 81.0%	6.3C 82.5%	4.5C 83.5%

	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 Brick - outer leaf (BRE)	3.9	1.2	0.67	0.81			No
3 Cavity	4.4	1.4	0.68	0.83			No
4 PhotonWrap reflective breather membrane	6.5	1.4	0.68	0.97			No
5 OSB (BS5250)	6.6	1.4	0.68	0.97			No
6 Earthwool FrameTherm Roll 40	6.8	1.7	0.69	0.99			No
7 PhotonFoil	14.0	1.7	0.69	1.60			No
8 50x38mm batten cavity	17.2	8.9	1.14	1.96			No
9 Plasterboard (BS5250)	19.3	8.9	1.14	2.24			No
10 Plaster, lightweight (BS5250)	19.5	8.9	1.14	2.27			No
11 Inside surface resistance	19.6	8.9	1.14	2.28			No

Worst case internal / external conditions for graph : 20.0°C @ 48.8%RH / 3.8°C @ 83.0%RH





TF\_Brick\_PhotonFoil+PhotonWrap

2D CAD

Thermic Technology Ltd  
Issue: October 2017 A4