

**Project Information**

Reference Thermic Technology 140240-27  
 Date 11/2/20  
 Client Timber Frame Solutions  
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This 4-page document contains:

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

**Construction Type**

Element : Wall - 140 - PhotonWrap - 100 0.022PIR - PhotonFoil - 0.15

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	-	0.770	
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
PIR 0.022 - 100mm		100.0	0.022	4.545	15.000% Prefabricated panels (100.0mm)
Stud Cavity		27.0	-	0.724	15.000% Prefabricated panels (27.0mm)
(Bridged un-vented cavity - width=562.0mm, hro=5.100, E1=0.050, E2=0.050, horizontal heat flow)					
PhotonFoil		33.0	0.034	0.971	6.333% Compressed PhotonFoil and Timber (33.0mm)
38x38mm batten cavity		25.0	-	0.724	6.333% Softwood (~500kg/m <sup>3</sup> ) (25.0mm)
(Bridged un-vented cavity - width=562.0mm, hro=5.100, E1=0.050, E2=0.050, horizontal heat flow)					
Plasterboard		12.5	0.170	0.074	
Plaster, lightweight (BS5250)		3.0	0.220	0.014	
Inside surface resistance	-	-	-	0.130	

**U-value = 0.15W/m<sup>2</sup>K**

U-value, Combined Method : 0.154W/m<sup>2</sup>K (upper/lower limit 6.993 / 6.025m<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	50.0	-	0.770	-	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
PIR 0.022 - 100mm	100.0	0.022	4.545	-	150.00
Stud Cavity	27.0	-	0.724	-	0.09
(Bridged un-vented cavity - width=562.0mm, hro=5.100, E1=0.050, E2=0.050, horizontal heat flow)					
PhotonFoil	33.0	0.034	0.971	-	192.00
38x38mm batten cavity	25.0	-	0.724	-	0.13
(Bridged un-vented cavity - width=562.0mm, hro=5.100, E1=0.050, E2=0.050, horizontal heat flow)					
Plasterboard	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	-	-

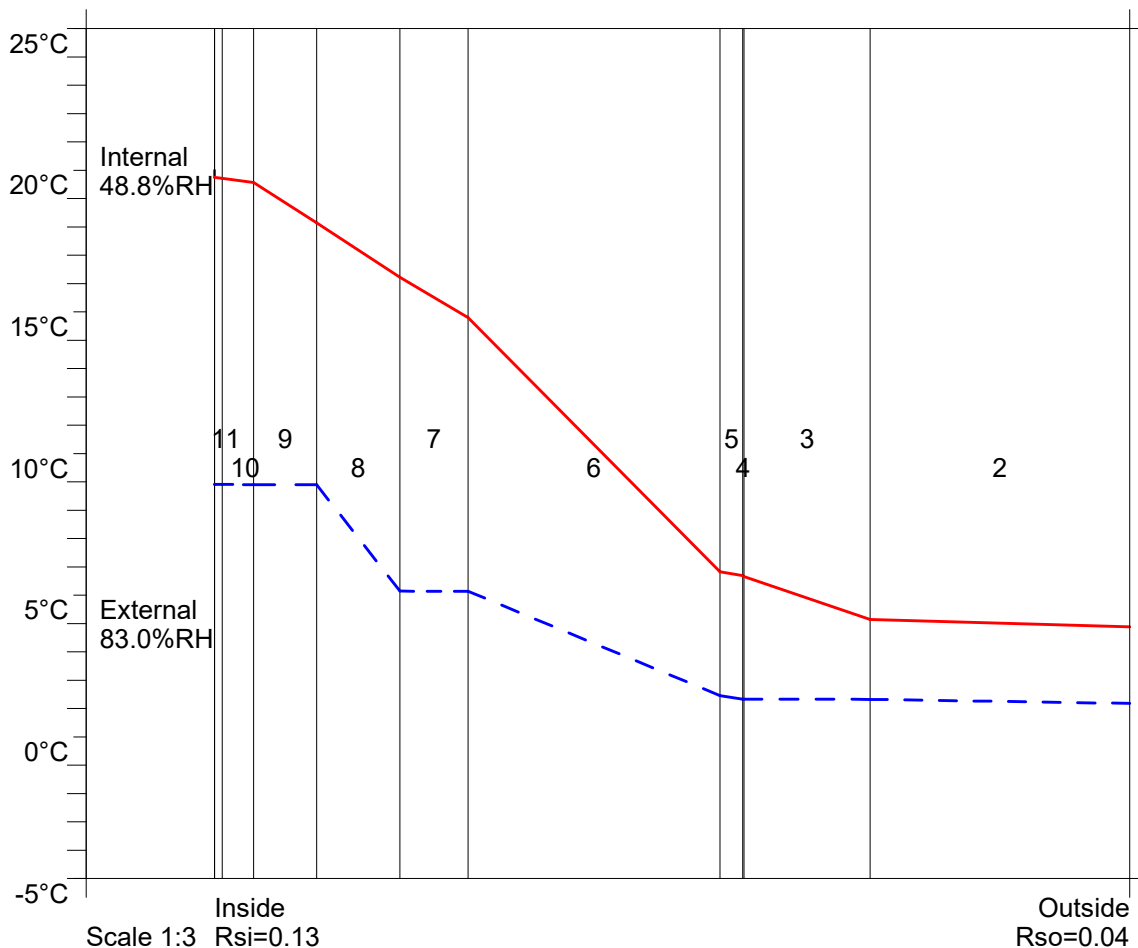
### Condensation Risk Analysis (no account taken of thermal bridges)

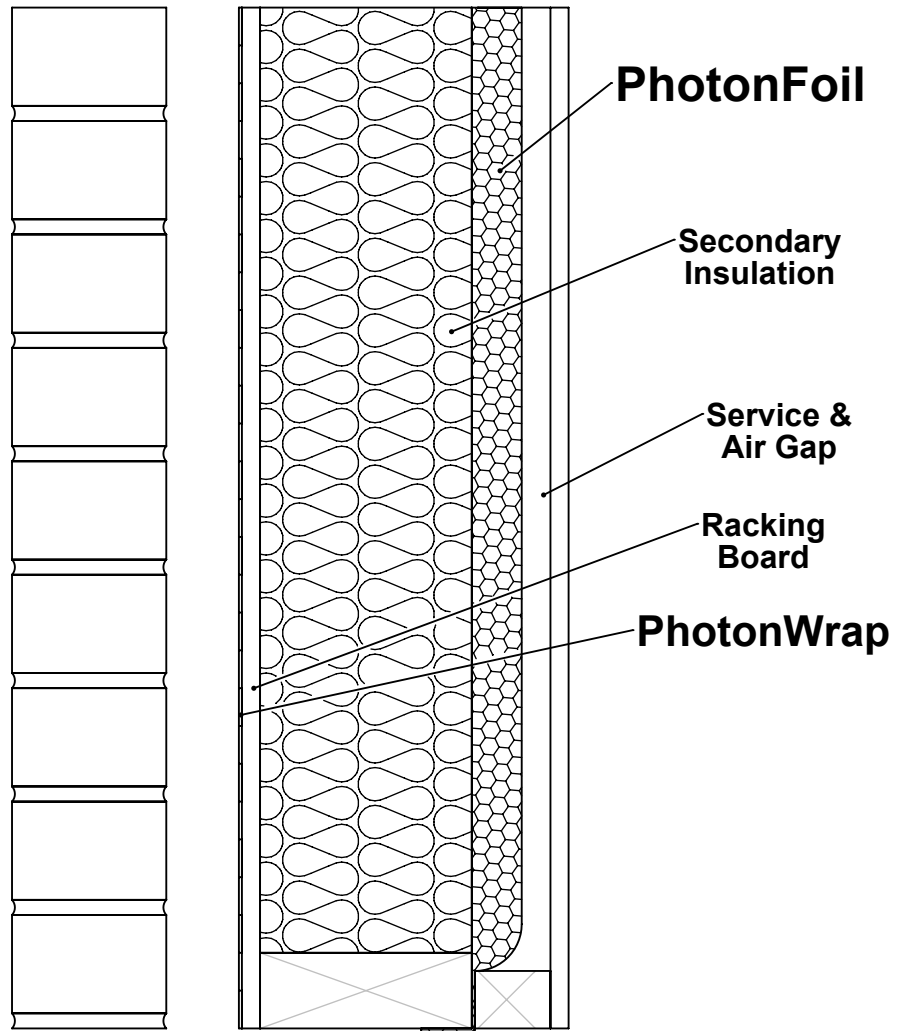
#### 3 - Dwellings with low occupancy

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	4.1	1.3	0.67	0.82			No
4 PhotonWrap reflective breather membrane	5.7	1.3	0.67	0.91			No
5 OSB (BS5250)	5.7	1.3	0.67	0.92			No
6 PIR 0.022 - 100mm	5.8	1.5	0.68	0.92			No
7 Stud Cavity	14.8	5.1	0.88	1.68			No
8 PhotonFoil	16.2	5.1	0.88	1.84			No
9 38x38mm batten cavity	18.1	8.9	1.14	2.08			No
10 Plasterboard	19.6	8.9	1.14	2.28			No
11 Plaster, lightweight (BS5250)	19.7	8.9	1.14	2.30			No
12 Inside surface resistance	19.7	8.9	1.14	2.30			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  
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