

**Project Information**

Reference Thermic Technology 140240-19  
 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 - PhotonFrame - 0.040 - PhotonCheck - 0.18

Timber framed wall

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		
Brick - outer leaf (BRE)	103.0	0.770	0.134		17.332% Mortar (103.0mm)
Cavity (Un-vented cavity - width=600.0mm, hro=5.100, E1=0.050, E2=0.900, horizontal heat flow)	50.0	-	0.665		
PhotonFrame	33.0	0.034	0.971		6.333% Compressed PhotonFrame and Timber (33.0mm)
OSB (BS5250)	9.0	0.130	0.069		L:0 0.000W/m <sup>2</sup> K
Earthwool FrameTherm Roll 40	140.0	0.040	3.500		15.000% Prefabricated panels (140.0mm) L:0 0.000W/m <sup>2</sup> K
PhotonCheck reflective VCL	0.5	0.300	0.002		
25x38mm 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 (BS5250)	12.5	0.170	0.074		
Plaster, lightweight (BS5250)	3.0	0.220	0.014		
Inside surface resistance	-	-	0.130		

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

U-value, Combined Method : 0.181W/m<sup>2</sup>K (upper/lower limit 5.728 / 5.329m<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=600.0mm, hro=5.100, E1=0.050, E2=0.900, horizontal heat flow)	50.0	-	0.665	-	0.26
PhotonFrame	33.0	0.034	0.971	0.00	0.22
OSB (BS5250)	9.0	0.130	0.069	500.00	4.50
Earthwool FrameTherm Roll 40	140.0	0.040	3.500	5.00	0.70
PhotonCheck reflective VCL	0.5	0.300	0.002	410000	205.00
25x38mm batten cavity (Bridged un-vented cavity - width=562.0mm, hro=5.100, E1=0.050, E2=0.050, horizontal heat flow)	25.0	-	0.724	-	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	-	-

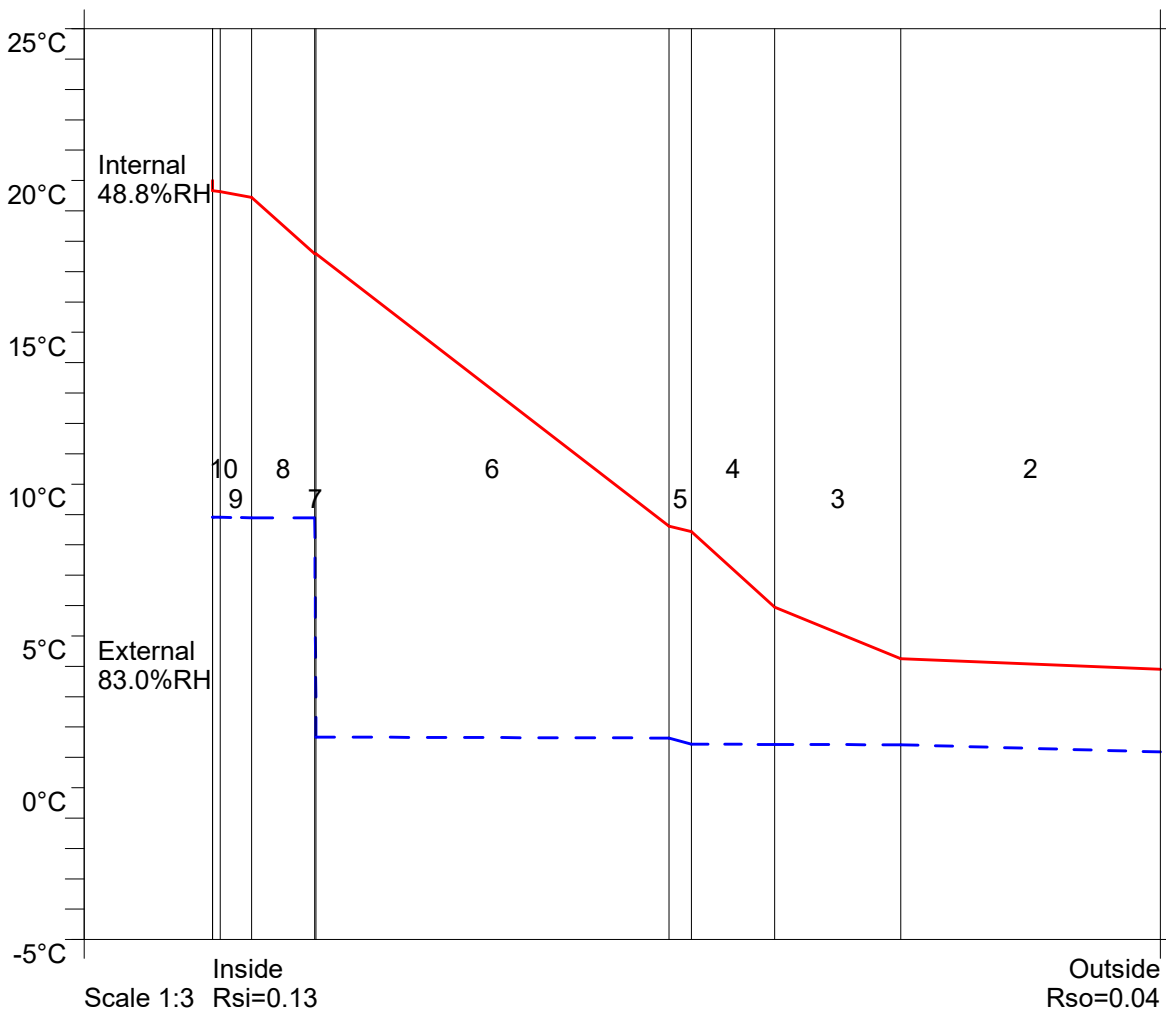
### Condensation Risk Analysis (no account taken of thermal bridges)

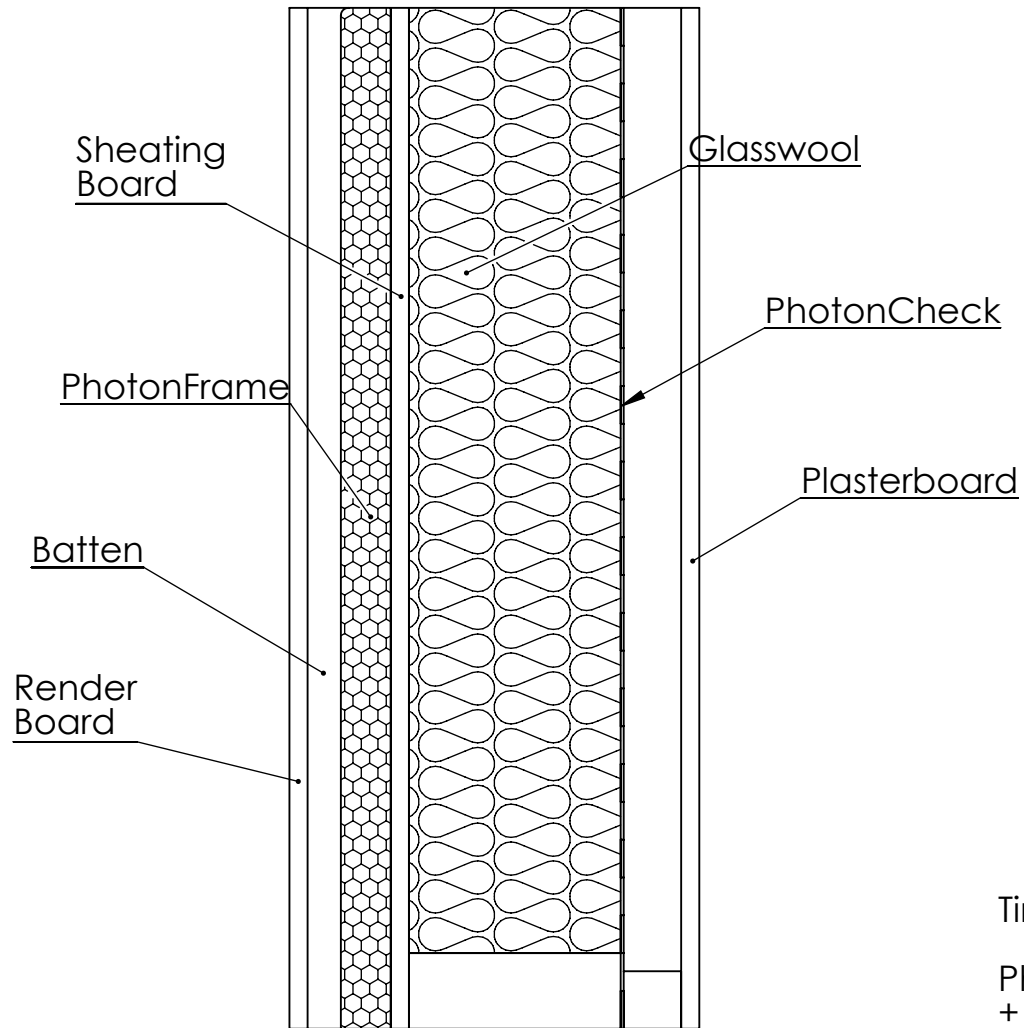
#### 3 - Dwellings with low occupancy

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	4.2	1.4	0.68	0.83			No
4 PhotonFrame	5.9	1.4	0.68	0.93			No
5 OSB (BS5250)	8.4	1.4	0.68	1.10			No
6 Earthwool FrameTherm Roll 40	8.6	1.6	0.69	1.12			No
7 PhotonCheck reflective VCL	17.6	1.7	0.69	2.01			No
8 25x38mm batten cavity	17.6	8.9	1.14	2.01			No
9 Plasterboard (BS5250)	19.4	8.9	1.14	2.26			No
10 Plaster, lightweight (BS5250)	19.6	8.9	1.14	2.28			No
11 Inside surface resistance	19.7	8.9	1.14	2.29			No

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





Timber Frame

PhotonFrame  
+  
PhotonCheck  
+  
RenderBoard

2D CAD

October 2017