

**Project Information**

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 Date 9/3/17  
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This 4-page document contains:

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

**Construction Type**

Element : Wall - 184 - PhotonFrame - 0.035 - PhotonFoil - 0.13

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 35		180.0	0.035	5.143		15.000% Prefabricated panels (180.0mm)	
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 (Bridged un-vented cavity - width=550.0mm, hro=5.100, E1=0.050, E2=0.900, horizontal heat flow)		23.0	-	0.665		6.333% Softwood (~500kg/m <sup>3</sup> ) (23.0mm)	
Plasterboard (BS5250)		12.5	0.170	0.074			
Plaster, lightweight (BS5250)		3.0	0.220	0.014			
Inside surface resistance	-	-	-	0.130			

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

U-value, Combined Method : 0.132W/m<sup>2</sup>K (upper/lower limit 7.907 / 7.232m<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 35	180.0	0.035	5.143	5.00	0.90
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	-	-

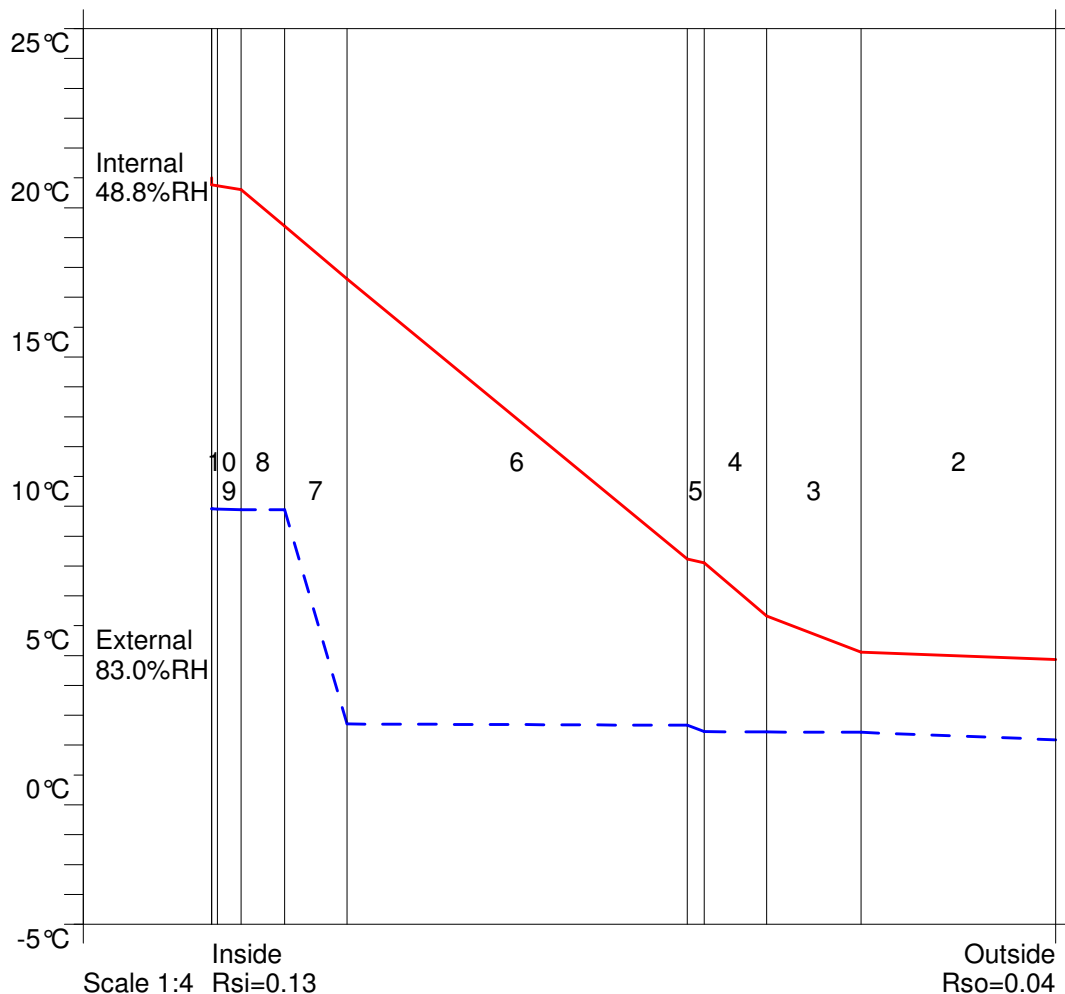
### Condensation Risk Analysis (no account taken of thermal bridges)

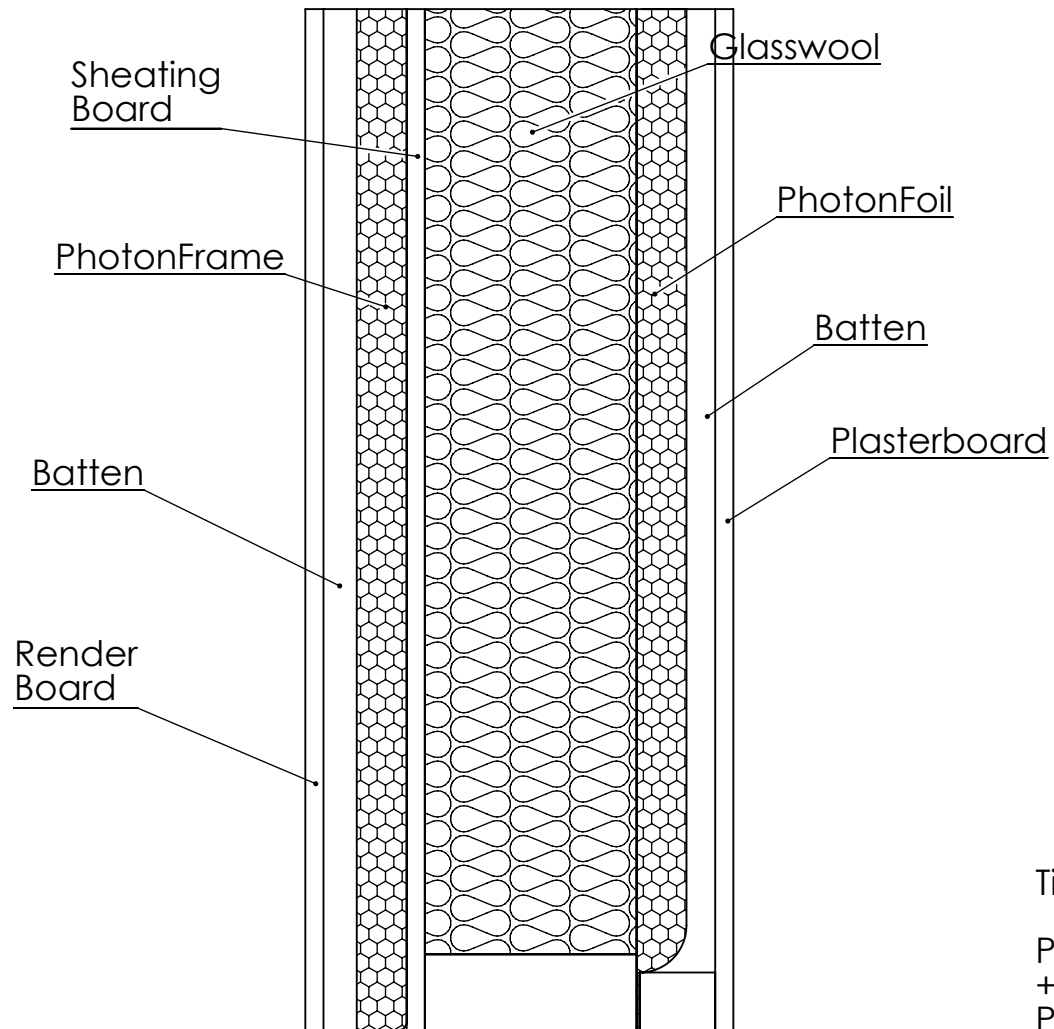
#### 3 - Dwellings with low occupancy

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	4.1	1.4	0.68	0.82			No
4 PhotonFrame	5.3	1.4	0.68	0.89			No
5 OSB (BS5250)	7.1	1.5	0.68	1.01			No
6 Earthwool FrameTherm Roll 35	7.2	1.7	0.69	1.02			No
7 PhotonFoil	16.6	1.7	0.69	1.89			No
8 50x38mm batten cavity	18.4	8.9	1.14	2.11			No
9 Plasterboard (BS5250)	19.6	8.9	1.14	2.28			No
10 Plaster, lightweight (BS5250)	19.7	8.9	1.14	2.30			No
11 Inside surface resistance	19.8	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





Timber Frame

PhotonFoil  
 +  
 PhotonFrame  
 +  
 RenderBoard

2D CAD

October 2107