

Project Information

Reference Thermic Technology 140240-22
 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 - 184 - PhotonFrame - 0.040 - PhotonCheck - 0.16

Timber framed wall

| Internal surface emissivity | : High | External surface emissivity | : High | | | | | |
|---|--------|-----------------------------|-----------------------------------|---|--------------|--|--|--|
| | | Thickness (mm) | Thermal Conductivity (W/mK) | Thermal Resistance (m ² 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 ² K | | |
| Earthwool FrameTherm Roll 40 | | 180.0 | 0.040 | 4.500 | | 15.000% Prefabricated panels (180.0mm) | | |
| PhotonCheck reflective VCL | | 0.5 | 0.300 | 0.002 | | | | |
| 25x38mm batten cavity | | 25.0 | - | 0.724 | | 6.333% Softwood (~500kg/m ³) (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 = 0.16W/m²K

U-value, Combined Method : 0.158W/m²K (upper/lower limit 6.547 / 6.098m²K/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/m²K

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

| | Thickness (mm) | Thermal Conductivity (W/mK) | Thermal Resistance (m ² 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 | 180.0 | 0.040 | 4.500 | 5.00 | 0.90 |
| 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 | - | - |

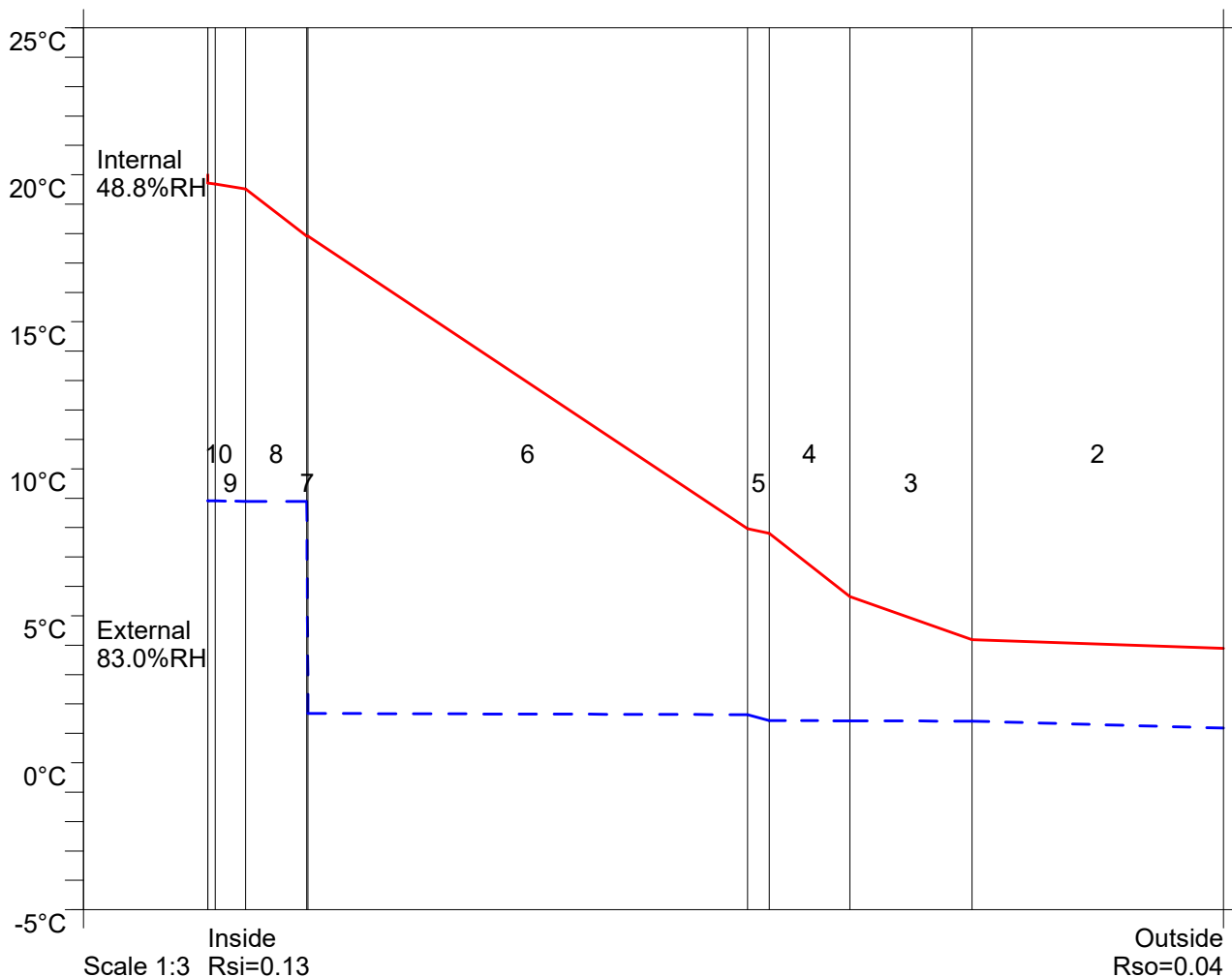
Condensation Risk Analysis (no account taken of thermal bridges)

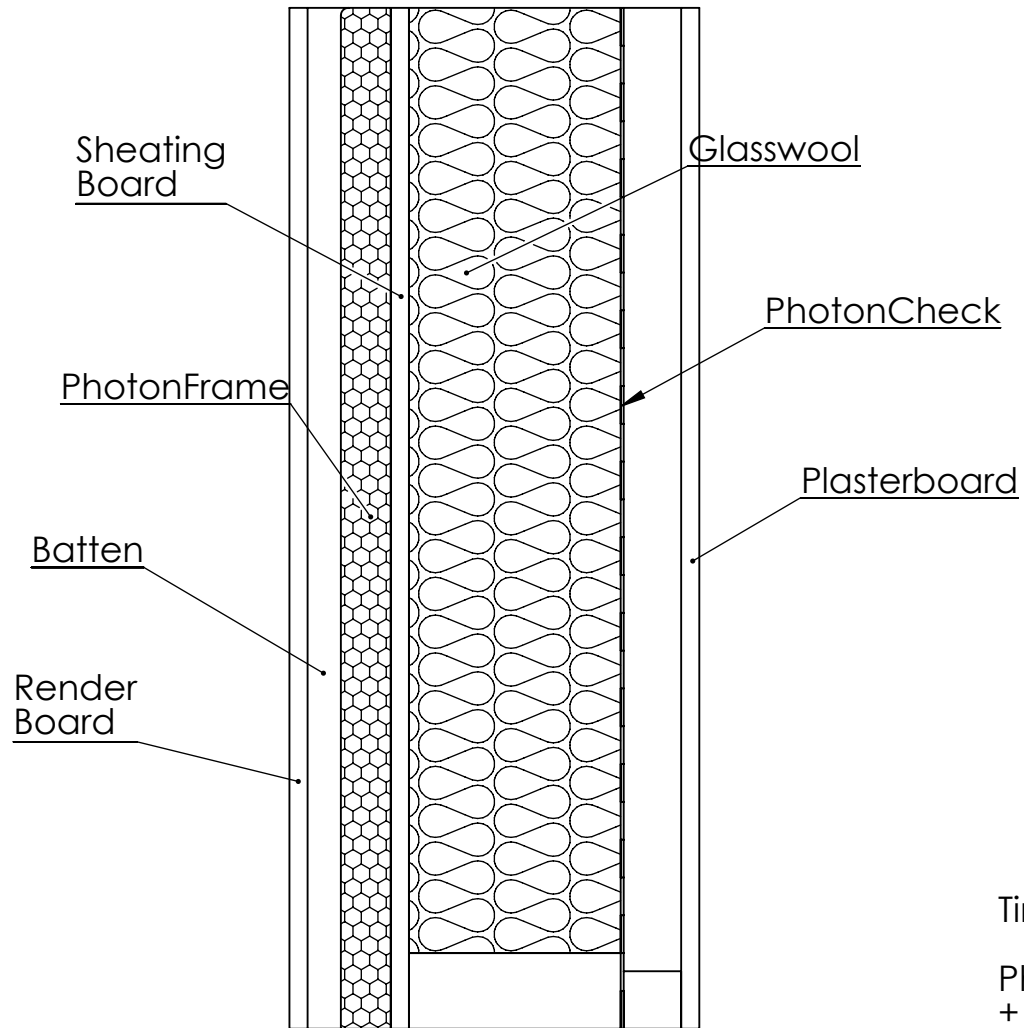
3 - Dwellings with low occupancy

| 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 ²) | Peak Buildup (g/m ²) | 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 | 0.82 | | | No |
| 4 PhotonFrame | 5.7 | 1.4 | 0.68 | 0.91 | | | No |
| 5 OSB (BS5250) | 7.8 | 1.4 | 0.68 | 1.06 | | | No |
| 6 Earthwool FrameTherm Roll 40 | 8.0 | 1.6 | 0.69 | 1.07 | | | No |
| 7 PhotonCheck reflective VCL | 17.9 | 1.7 | 0.69 | 2.05 | | | No |
| 8 25x38mm batten cavity | 17.9 | 8.9 | 1.14 | 2.05 | | | No |
| 9 Plasterboard (BS5250) | 19.5 | 8.9 | 1.14 | 2.27 | | | No |
| 10 Plaster, lightweight (BS5250) | 19.7 | 8.9 | 1.14 | 2.29 | | | No |
| 11 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





Timber Frame

PhotonFrame
+
PhotonCheck
+
RenderBoard

2D CAD

October 2017