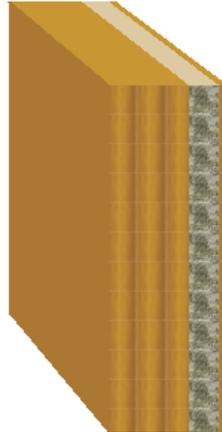




Documentation of the component
Thermal transmittance (U-value) according to BS EN ISO 6946
Source: **own catalogue - External walls**
Component: **300 mm log with 100 mm wood fibre loose infill**

OUTSIDE

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Assignment: External wall

| | Manufacturer | Name | Thickness [m], number | Lambda [W/(mK)] | Q | R [m²K/W] |
|-------------------------------------|--------------|----------------------------|---|-----------------|----------------|-----------|
| | | Rse | | | | 0.04 |
| <input checked="" type="checkbox"/> | 1 | Generic Building Materials | Softwood Timber [500 kg/m³] | 0.275 | 0.130 D | 2.12 |
| <input checked="" type="checkbox"/> | 2 | CIBSE 2006 | Wood Fibre Loose Infill | 0.100 | 0.043 E | 2.33 |
| | | Air gaps | Level 1: dU" = 0.01 W/(m²K) | | | |
| <input checked="" type="checkbox"/> | 3 | BS EN 12524 | Polyethylene 0.15 mm | 0.000 | 0.170 D | 0.00 |
| <input checked="" type="checkbox"/> | 4 | Generic Building Materials | Prefab Timber frame wall panels [460-480 kg/m³] | 0.025 | 0.120 D | 0.21 |
| | | Rsi | | | | 0.13 |
| 0.400 | | | | | | |

$$R_T = R_{si} + \sum R_i + R_{se} = 4.82 \text{ m}^2\text{K/W}$$

| Correction to U-value for | according to | delta U [W/(m²K)] |
|--|------------------------|-------------------|
| Air gaps | BS EN ISO 6946 Annex D | 0.002 |
| Air gaps and fixings corrections need not be applied, as their total effect is less than 3% (Annex D BS 6946:1996). | | 0.000 |

$$U = 1/R_T + \sum \Delta U = 0.21 \text{ W/(m}^2\text{K)}$$

- Q .. The physical values of the building materials has been graded by their level of quality. These 5 levels are the following
- A** .. A: Data is entered and validated by the manufacturer or supplier. Data is continuously tested by 3rd party.
 - B** .. B: Data is entered and validated by the manufacturer or supplier. Data is certified by 3rd party
 - C** .. C: Data is entered and validated by the manufacturer or supplier.
 - D** .. D: Information is entered by BuildDesk without special agreement with the manufacturer, supplier or others.
 - E** .. E: Information is entered by the user of the BuildDesk software without special agreement with the manufacturer, supplier or others.

U_{max} = **0.30 W/(m²K)** U = **0.21 W/(m²K)** R_T = **4.82 m²K/W**

Source of U_{max} value: Scotland: Approved Document J (2001), Table 1 to J3.2 - dwellings, column A
Gas or oil central heating with boiler SEDBUK not less than the relevant entry in Table 2 to J3.2



Documentation of the component
Calculation according BS EN ISO 13788

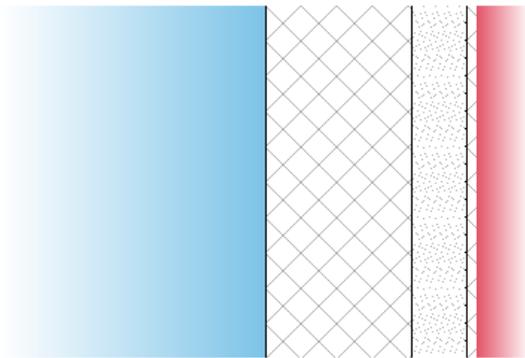
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Source: **own catalogue - External walls**

Component: **300 mm log with 100 mm wood fibre loose infill**

OUTSIDE

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The list of material layers shown below may differ from those in the U-value calculation print out. Only material layers which are used in the Condensation Risk Analysis are listed.

Assignment: External wall

| Name | Thickn. [m] | lambda [W/(mK)] | Q | μ [-] | Q | sd [m] | R [m ² K/W] |
|--|----------------|--------------------|----------|--------------|----------|-----------|---------------------------|
| Softwood Timber [500 kg/m ³] | 0.275 | 0.130 | D | 20.00 | D | 5.50 | 2.12 |
| Wood Fibre Loose Infill | 0.100 | 0.043 | E | 1.00 | E | 0.10 | 2.33 |
| Polyethylene 0.15 mm | 0.000 | 0.170 | D | 300000.0 | D | 45.00 | 0.00 |
| | | | | 0 | | | |
| Prefab Timber frame wall panels [460-480 kg/m ³] | 0.025 | 0.120 | D | 20.00 | D | 0.50 | 0.21 |

- Q .. The physical values of the building materials has been graded by their level of quality. These 5 levels are the following
- A** .. A: Data is entered and validated by the manufacturer or supplier. Data is continuously tested by 3rd party.
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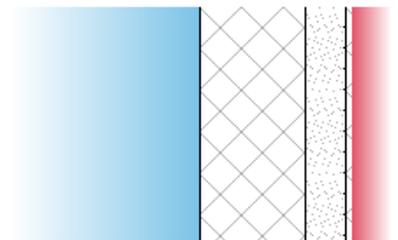
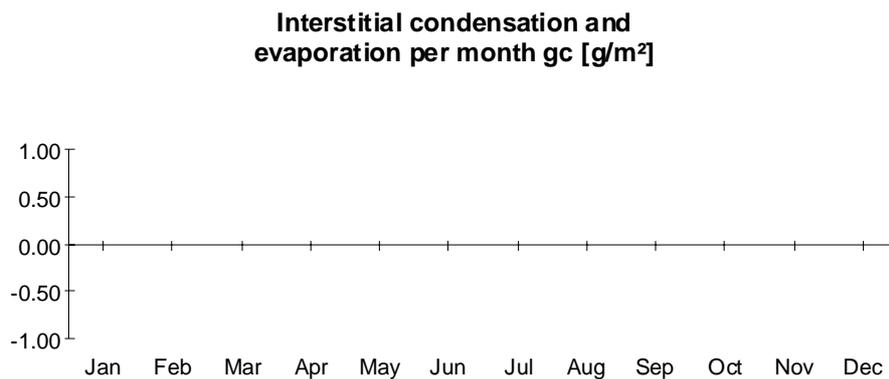
Documentation of the component
Calculation according BS EN ISO 13788
Source: **own catalogue - External walls**
Component: **300 mm log with 100 mm wood fibre loose infill**

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Condensation risk analysis - summary of main results Calculation according BS EN ISO 13788

✓ **Surface temperature to avoid critical surface moisture:
No danger of mould growth is expected.**

✓ **Interstitial condensation:
No condensation is predicted at any interface in any month.**



Component, condensation range



Documentation of the component
Calculation according BS EN ISO 13788

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Source: **own catalogue - External walls**
Component: **300 mm log with 100 mm wood fibre loose infill**

Surface temperature to avoid critical surface humidity Calculation according BS EN ISO 13788

Location: Prestwick; Humidity class according BS EN ISO 13788 annex A: Dwellings with low occupancy

| Month | 1 Te [°C] | 2 phi_e --- | 3 Ti [°C] | 4 phi_i --- | 5 pe [Pa] | 6 delta p [Pa] | 7 pi [Pa] | 8 ps(Tsi) [Pa] | 9 Tsi,min [°C] | 10 fRsi --- | 11 Tsi [°C] | 12 Tse [°C] |
|-----------|-----------------|-------------------|-----------------|-------------------|-----------------|----------------------|-----------------|----------------------|----------------------|-------------------|-------------------|-------------------|
| ● January | 4.3 | 0.840 | 20.0 | 0.598 | 697 | 699 | 1397 | 1746 | 15.4 | 0.705 | 19.2 | 4.4 |
| February | 4.4 | 0.810 | 20.0 | 0.587 | 677 | 695 | 1372 | 1715 | 15.1 | 0.686 | 19.2 | 4.5 |
| March | 5.9 | 0.800 | 20.0 | 0.587 | 743 | 628 | 1371 | 1713 | 15.1 | 0.651 | 19.3 | 6.0 |
| April | 7.4 | 0.760 | 20.0 | 0.575 | 782 | 561 | 1344 | 1679 | 14.8 | 0.585 | 19.4 | 7.5 |
| May | 10.5 | 0.740 | 20.0 | 0.583 | 939 | 423 | 1362 | 1703 | 15.0 | 0.472 | 19.5 | 10.6 |
| June | 12.9 | 0.780 | 20.0 | 0.632 | 1160 | 316 | 1476 | 1845 | 16.2 | 0.471 | 19.6 | 13.0 |
| July | 14.9 | 0.790 | 20.0 | 0.670 | 1338 | 227 | 1565 | 1956 | 17.2 | 0.443 | 19.7 | 14.9 |
| August | 14.2 | 0.800 | 20.0 | 0.665 | 1295 | 258 | 1553 | 1942 | 17.0 | 0.490 | 19.7 | 14.2 |
| September | 12.1 | 0.820 | 20.0 | 0.646 | 1157 | 352 | 1509 | 1886 | 16.6 | 0.568 | 19.6 | 12.2 |
| October | 9.6 | 0.830 | 20.0 | 0.623 | 992 | 463 | 1455 | 1819 | 16.0 | 0.617 | 19.5 | 9.7 |
| November | 6.4 | 0.840 | 20.0 | 0.605 | 807 | 606 | 1413 | 1766 | 15.6 | 0.673 | 19.3 | 6.5 |
| December | 5.5 | 0.850 | 20.0 | 0.605 | 767 | 646 | 1413 | 1767 | 15.6 | 0.694 | 19.3 | 5.6 |

- The critical month is January with $f_{Rsi,max} = 0.705$
 $f_{Rsi} = 0.949$

$f_{Rsi} > f_{Rsi,max}$, the component complies.

Nr Explanation

- External temperature
- External rel. humidity
- Internal temperature
- Internal relative humidity
- External partial pressure $p_e = \phi_e \cdot p_{sat}(T_e)$; $p_{sat}(T_e)$ according formula E.7 and E.8 of BS EN ISO 13788
- Partial pressure difference. The security factor of 1.10 according to BS EN ISO 13788, ch.4.2.4 is already included.
- Internal partial pressure $p_i = \phi_i \cdot p_{sat}(T_i)$; $p_{sat}(T_i)$ according formula E.7 and E.8 of BS EN ISO 13788
- Minimum saturation pressure on the surface obtained by $p_{sat}(T_{si}) = p_i / \phi_{si}$,
where $\phi_{si} = 0.8$ (critical surface humidity)
- Minimum surface temperature as function of $p_{sat}(T_{si})$, formula E.9 and E.10 of BS EN ISO 13788
- Design temperature factor according 3.1.2 of BS EN ISO 13788
- Internal surface temperature, obtained from $T_{si} = T_i - R_{si} \cdot U \cdot (T_i - T_e)$
- External surface temperature, obtained from $T_{se} = T_e + R_{se} \cdot U \cdot (T_i - T_e)$



Documentation of the component
Calculation according BS EN ISO 13788

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Source: **own catalogue - External walls**
Component: **300 mm log with 100 mm wood fibre loose infill**

Interstitial condensation - main results Calculation according BS EN ISO 13788

No condensation is predicted at any interface in any month.

Climatic conditions

Location: Prestwick; Humidity class according BS EN ISO 13788 annex A: Dwellings with low occupancy

| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|----------------------------|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| Internal temperature [°C] | Ti | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 |
| Internal rel. humidity [%] | phi_i | 59.8 | 58.7 | 58.7 | 57.5 | 58.3 | 63.2 | 67.0 | 66.5 | 64.6 | 62.3 | 60.5 | 60.5 |
| External temperature [°C] | Te | 4.3 | 4.4 | 5.9 | 7.4 | 10.5 | 12.9 | 14.9 | 14.2 | 12.1 | 9.6 | 6.4 | 5.5 |
| External rel. humidity [%] | phi_e | 84.0 | 81.0 | 80.0 | 76.0 | 74.0 | 78.0 | 79.0 | 80.0 | 82.0 | 83.0 | 84.0 | 85.0 |