# Psi-values for Timber Frame Wall Construction

# Content

## Introduction

The Psi-value is a measure of the rate of heat loss at a junction where two elements meet or around door and window openings. It is measured in W/mK (Watts per metre Kelvin) and is calculated using two dimensional thermal modelling.

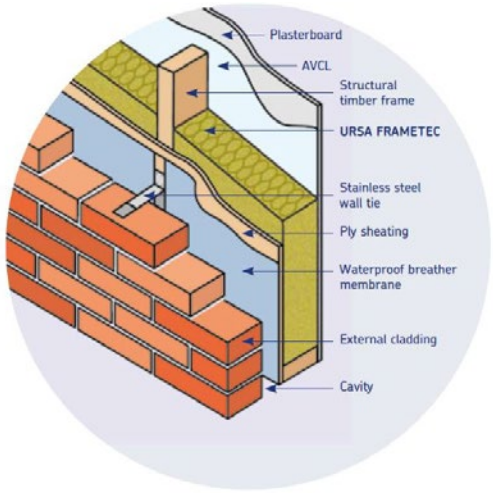
Psi-values must be considered when assessing the energy efficiency of a building and are an input into SAP or SBEM calculations. In the past SAP assessors had the option to use the Accredited Construction Details, but these are no longer valid as they do not represent current levels of insulation. Instead, energy assessors are required to use bespoke Psi-values provided by building material manufacturers, their trade associations or specialist consultants.

As part of our enhanced technical service offer to specifiers and users of URSA UK Glass Wool products we have produced this document covering Psi-values for the common junctions in timber frame walls.

This document includes a range of timber frame wall details all based on our TIMBER FRAME WALL technical brochure. The details are based on the use 140mm URSA FRAMETEC 35 (roll), 140mm URSA FRAMETEC 32 (roll) or 140mm URSA FRAMETEC SLAB 32 with standard and reflective breather membrane and a polyurethane foam insulated lining. Each junction includes the URSA product thickness, the associated Psi-value, temperature factor and U-value and a drawing showing the temperature response through the detail.

Typical wall construction is as follows.

102mm brick outer
50mm cavity (normal 0.18 $m^2K/W$, low emissivity 0.66 $m^2K/W$)
Breather membrane (standard & reflective)
10mm OSB sheathing
**140mm URSA FRAMETEC 35/URSA FRAMETEC 32/FRAMETEC SLAB 32**
AVCL
12.5mm plasterboard



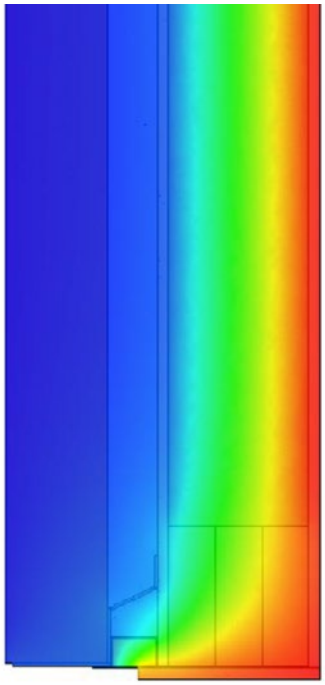

## References


| | |
|---|---|
| BS EN ISO 10211 | Thermal bridges in building construction – Heat flows and surface temperatures - Detailed calculations. |
| BS EN ISO 6946 | Building components and building elements – Thermal resistance and thermal transmittance – Calculation methods. |
| BRE BR 497 (2nd Ed) | Conventions for calculating linear thermal transmittance and temperature factors. |
| BRE BR 443 | Conventions for U-value calculations. |
| BRE IP 1/06 | Assessing the effects of thermal bridging at junctions and around openings. |

# Lintel

**SAP Ref: E2 (Default 1.00 W/mK)**

Notes;
Minimum 30mm overlap of frame and cavity closer.
Thermal conductivity of cavity closer 0.022 W/mK.
10mm PUR to window head with 30mm PUR lining.



**140mm URSA FRAMETEC/FRAMETEC SLAB 32**

| Description | U-Value ($W/m^2K$) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.26 | 0.122 | 0.85 |
| Reflective breather membrane | 0.23 | 0.105 | 0.87 |
| 30mm PUR & standard membrane | 0.19 | 0.084 | 0.91 |
| 30mm PUR & reflective membrane | 0.17 | 0.084 | 0.91 |

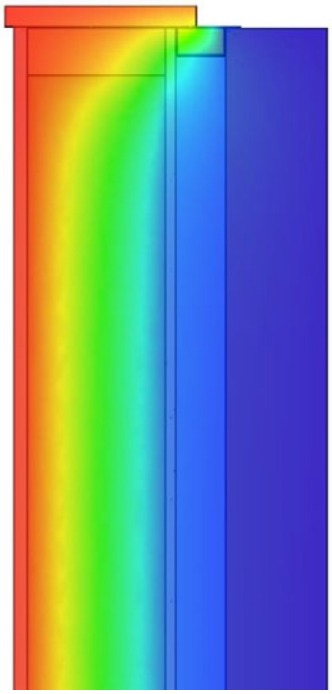
**140mm URSA FRAMETEC 35**

| Description | U-Value ($W/m^2K$) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.27 | 0.119 | 0.88 |
| Reflective breather membrane | 0.24 | 0.103 | 0.87 |
| 30mm PUR & standard membrane | 0.20 | 0.083 | 0.91 |
| 30mm PUR & reflective membrane | 0.18 | 0.082 | 0.91 |

# CILL

**SAP Ref: E3 (Default 0.10 W/mK)**

Notes;
Minimum 30mm overlap of frame and cavity closer.
Thermal conductivity of cavity closer 0.022 W/mK.



**140mm URSA FRAMETEC/FRAMETEC SLAB 32**

| Description | U-Value ($W/m^2K$) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.26 | 0.068 | 0.88 |
| Reflective breather membrane | 0.23 | 0.045 | 0.90 |
| 30mm PUR & standard membrane | 0.19 | 0.074 | 0.87 |
| 30mm PUR & reflective membrane | 0.17 | 0.052 | 0.90 |

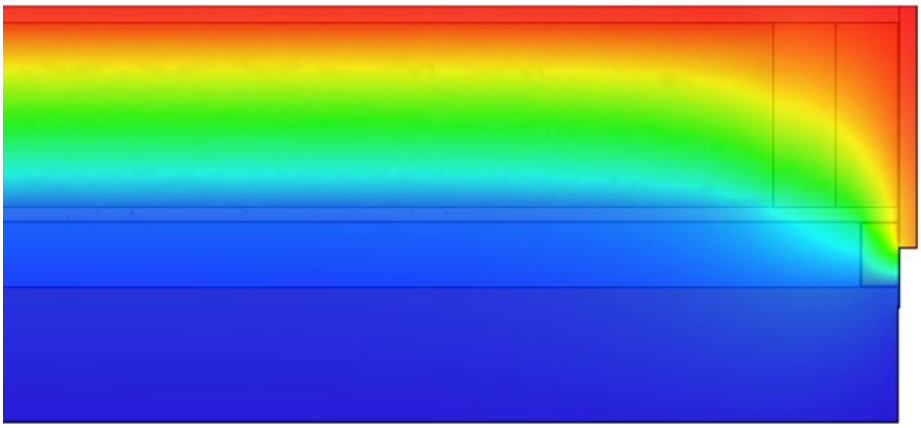
**140mm URSA FRAMETEC 35**

| Description | U-Value ($W/m^2K$) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.27 | 0.067 | 0.88 |
| Reflective breather membrane | 0.24 | 0.045 | 0.90 |
| 30mm PUR & standard membrane | 0.20 | 0.074 | 0.87 |
| 30mm PUR & reflective membrane | 0.18 | 0.052 | 0.90 |

# JAMB

**SAP Ref: E4 (Default 0.10 W/mK)**

Notes;
Minimum 30mm overlap of frame and cavity closer.
Thermal conductivity of cavity closer 0.022 W/mK.
10mm PUR to jamb with 30mm PUR lining.



**140mm URSA FRAMETEC/FRAMETEC SLAB 32**

| Description | U-Value ($W/m^2K$) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.26 | 0.094 | 0.85 |
| Reflective breather membrane | 0.23 | 0.063 | 0.86 |
| 30mm PUR & standard membrane | 0.19 | 0.068 | 0.92 |
| 30mm PUR & reflective membrane | 0.17 | 0.049 | 0.93 |

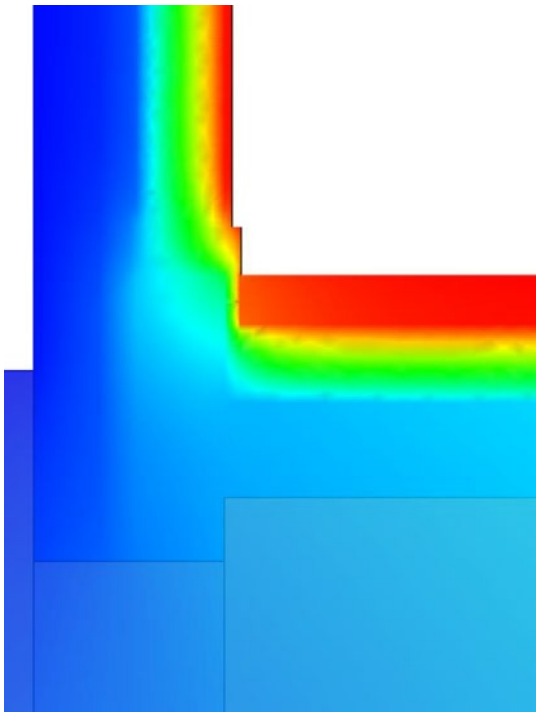
**140mm URSA FRAMETEC 35**

| Description | U-Value ($W/m^2K$) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.27 | 0.092 | 0.86 |
| Reflective breather membrane | 0.24 | 0.061 | 0.88 |
| 30mm PUR & standard membrane | 0.20 | 0.067 | 0.92 |
| 30mm PUR & reflective membrane | 0.18 | 0.048 | 0.93 |

# GROUND FLOOR (Solid)

**SAP Ref: E5 (Default 0.32 W/mK)**

Notes;
30mm PUR edge insulation.
150mm PUR floor insulation.
Medium density block below DPC.



**140mm URSA FRAMETEC/FRAMETEC SLAB 32**

| Description | U-Value ($W/m^2K$) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.26 | 0.165 | 0.85 |
| Reflective breather membrane | 0.23 | 0.162 | 0.85 |
| 30mm PUR & standard membrane | 0.19 | 0.119 | 0.92 |
| 30mm PUR & reflective membrane | 0.17 | 0.119 | 0.92 |

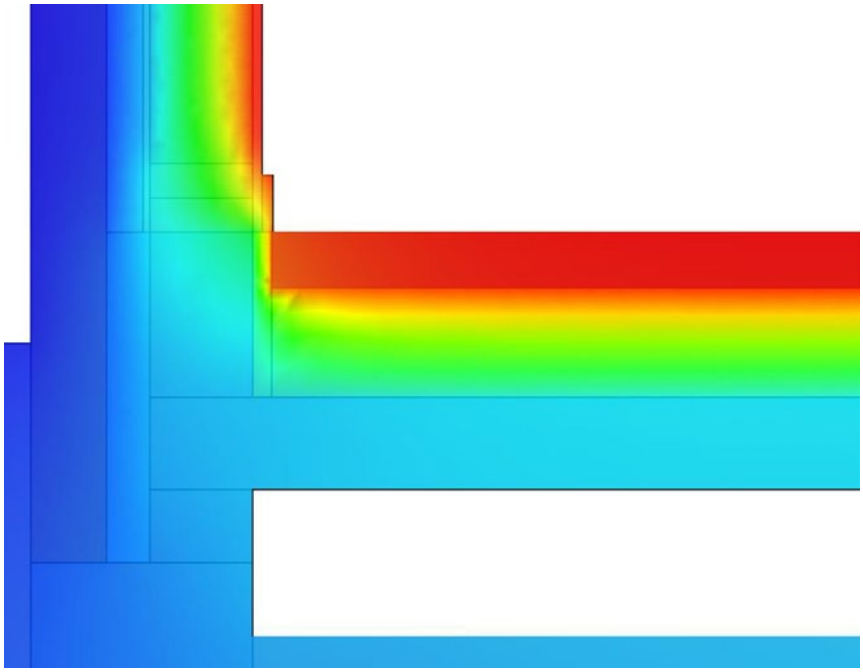
**140mm URSA FRAMETEC 35**

| Description | U-Value ($W/m^2K$) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.27 | 0.163 | 0.85 |
| Reflective breather membrane | 0.24 | 0.161 | 0.85 |
| 30mm PUR & standard membrane | 0.20 | 0.118 | 0.92 |
| 30mm PUR & reflective membrane | 0.18 | 0.118 | 0.92 |

# GROUND FLOOR (Suspended beam & block)

**SAP Ref: E5 (Default 0.32 W/mK)**

Notes;
30mm PUR edge insulation.
150mm PUR floor insulation.
Medium density block below DPC.



**140mm URSA FRAMETEC/FRAMETEC SLAB 32**

| Description | U-Value ($W/m^2K$) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.26 | 0.133 | 0.85 |
| Reflective breather membrane | 0.23 | 0.130 | 0.85 |
| 30mm PUR & standard breather | 0.19 | 0.067 | 0.93 |
| 30mm PUR & reflective breather | 0.17 | 0.667 | 0.93 |

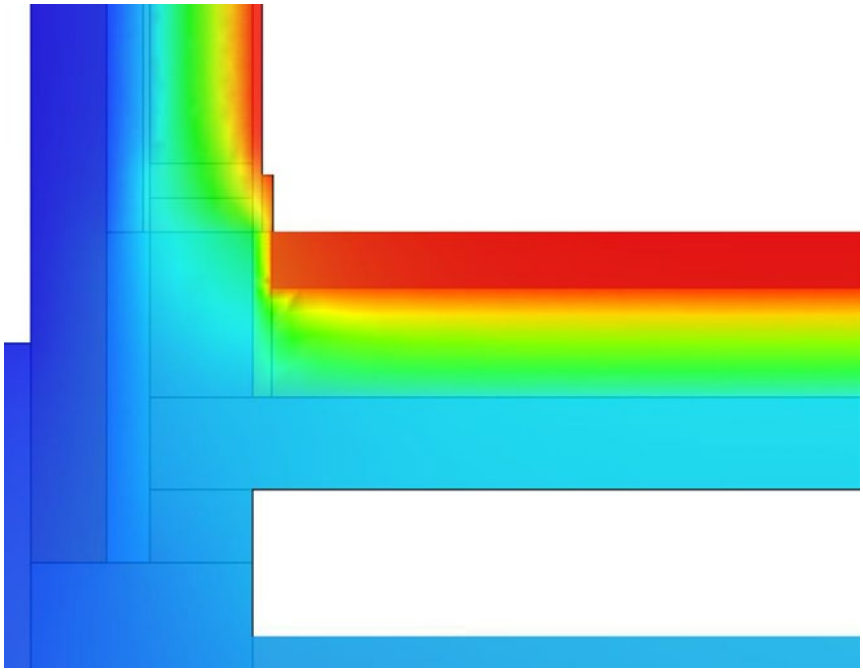
**140mm URSA FRAMETEC 35**

| Description | U-Value ($W/m^2K$) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.27 | 0.131 | 0.85 |
| Reflective breather membrane | 0.24 | 0.129 | 0.85 |
| 30mm PUR & standard breather | 0.20 | 0.066 | 0.93 |
| 30mm PUR & reflective breather | 0.18 | 0.066 | 0.93 |

# GROUND FLOOR (Suspended beam & block)

**SAP Ref: E5 (Default 0.32 W/mK)**

Notes;
30mm PUR edge insulation.
150mm PUR floor insulation.
Medium density block below DPC.



**140mm URSA FRAMETEC/FRAMETEC SLAB 32**

| Description | U-Value ($W/m^2K$) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.26 | 0.133 | 0.85 |
| Reflective breather membrane | 0.23 | 0.130 | 0.85 |
| 30mm PUR & standard breather | 0.19 | 0.067 | 0.93 |
| 30mm PUR & reflective breather | 0.17 | 0.667 | 0.93 |

**140mm URSA FRAMETEC 35**

| Description | U-Value ($W/m^2K$) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.27 | 0.131 | 0.85 |
| Reflective breather membrane | 0.24 | 0.129 | 0.85 |
| 30mm PUR & standard breather | 0.20 | 0.066 | 0.93 |
| 30mm PUR & reflective breather | 0.18 | 0.066 | 0.93 |

# INTERMEDIATE FLOOR

**SAP Ref: E6 (Default 0.14 W/mK)**

**140mm URSA FRAMETEC/FRAMETEC SLAB 32**

| Description | U-Value ($W/m^2K$) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.26 | 0.083 | 0.93 |
| Reflective breather membrane | 0.23 | 0.062 | 0.94 |
| 30mm PUR & standard membrane | 0.19 | 0.073 | 0.94 |
| 30mm PUR & reflective membrane | 0.17 | 0.058 | 0.95 |

**140mm URSA FRAMETEC 35**

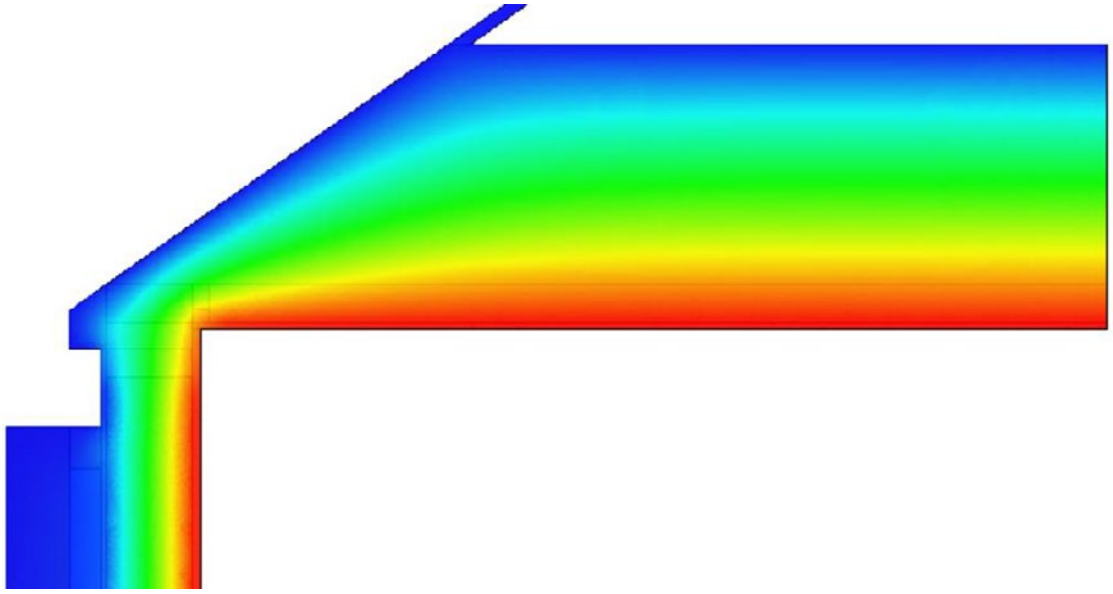
| Description | U-Value ($W/m^2K$) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.27 | 0.079 | 0.93 |
| Reflective breather membrane | 0.24 | 0.060 | 0.94 |
| 30mm PUR & standard membrane | 0.20 | 0.071 | 0.94 |
| 30mm PUR & reflective membrane | 0.18 | 0.056 | 0.95 |

# EAVES (Ceiling Level Insulation)

## U-value = 0.10 W/m²K

**SAP Ref: E10 (Default 0.12 W/mK)**

Notes;
450mm URSA 10 loft insulation.
Minimum 50mm insulation above wall plate.



**140mm URSA FRAMETEC/FRAMETEC SLAB 32**

| Description | U-Value (W/m²K) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.26 | 0.091 | 0.89 |
| Reflective breather membrane | 0.23 | 0.095 | 0.89 |
| 30mm PUR & standard membrane | 0.19 | 0.068 | 0.90 |
| 30mm PUR & reflective membrane | 0.17 | 0.071 | 0.90 |

**140mm URSA FRAMETEC 35**

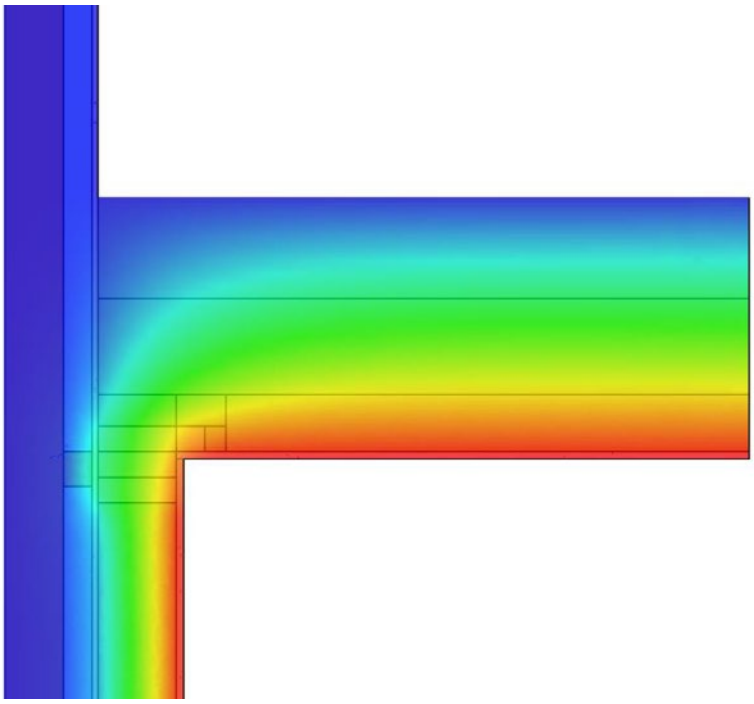
| Description | U-Value (W/m²K) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.27 | 0.090 | 0.89 |
| Reflective breather membrane | 0.24 | 0.095 | 0.89 |
| 30mm PUR & standard membrane | 0.20 | 0.067 | 0.90 |
| 30mm PUR & reflective membrane | 0.18 | 0.070 | 0.90 |

# GABLE (Ceiling Level Insulation)

## U-value = 0.10 W/m²K

**SAP Ref: E4 (Default 0.10 W/mK)**

Notes;
450mm URSA 10 loft insulation.



**140mm URSA FRAMETEC/FRAMETEC SLAB 32**

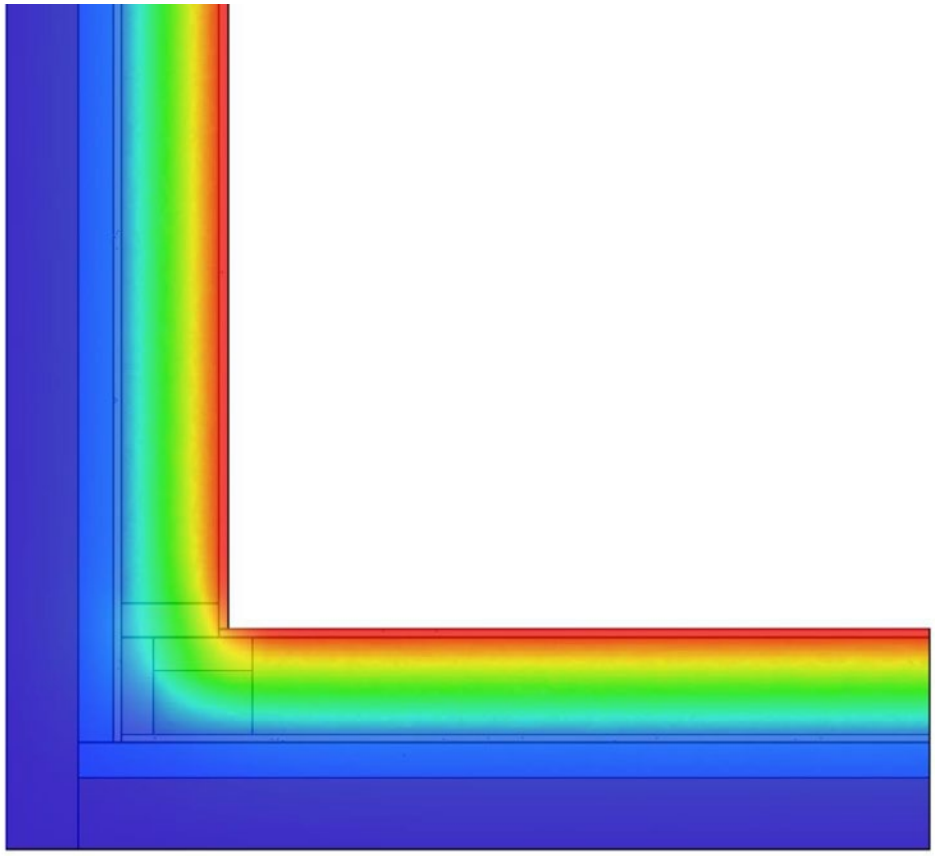
| Description | U-Value (W/m²K) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.26 | 0.074 | 0.89 |
| Reflective breather membrane | 0.23 | 0.063 | 0.90 |
| 30mm PUR & standard membrane | 0.19 | 0.055 | 0.89 |
| 30mm PUR & reflective membrane | 0.17 | 0.049 | 0.90 |

**140mm URSA FRAMETEC 35**

| Description | U-Value (W/m²K) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.27 | 0.072 | 0.89 |
| Reflective breather membrane | 0.24 | 0.062 | 0.90 |
| 30mm PUR & standard membrane | 0.20 | 0.054 | 0.89 |
| 30mm PUR & reflective membrane | 0.18 | 0.048 | 0.90 |

## CORNER (Normal)

### SAP Ref: E16 (Default 0.18 W/mK)



**140mm URSA FRAMETEC/FRAMETEC SLAB 32**

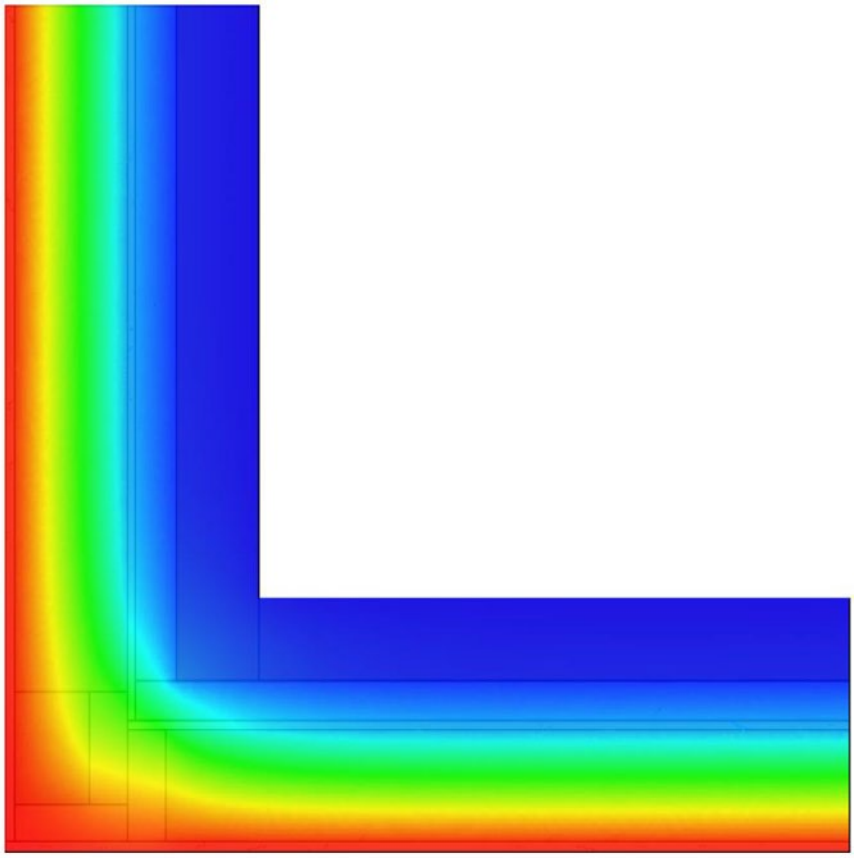
| Description | U-Value ($W/m^2K$) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.26 | 0.061 | 0.86 |
| Reflective breather membrane | 0.23 | 0.054 | 0.87 |
| 30mm PUR & standard membrane | 0.19 | 0.030 | 0.92 |
| 30mm PUR & reflective membrane | 0.17 | 0.029 | 0.92 |

**140mm URSA FRAMETEC 35**

| Description | U-Value ($W/m^2K$) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.27 | 0.061 | 0.85 |
| Reflective breather membrane | 0.24 | 0.055 | 0.87 |
| 30mm PUR & standard membrane | 0.20 | 0.030 | 0.92 |
| 30mm PUR & reflective membrane | 0.18 | 0.029 | 0.93 |

## CORNER (Inverted)

### SAP Ref: E17 (Default 0.00 W/mK)



**140mm URSA FRAMETEC/FRAMETEC SLAB 32**

| Description | U-Value ($W/m^2K$) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.26 | -0.029 | 0.97 |
| Reflective breather membrane | 0.23 | -0.040 | 0.97 |
| 30mm PUR & standard membrane | 0.19 | -0.030 | 0.98 |
| 30mm PUR & reflective membrane | 0.17 | -0.036 | 0.98 |

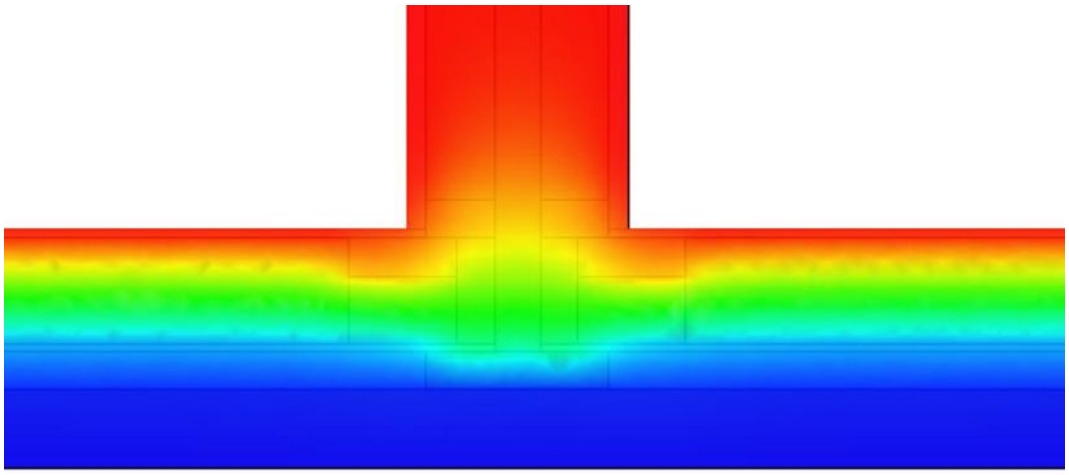
**140mm URSA FRAMETEC 35**

| Description | U-Value ($W/m^2K$) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.27 | -0.036 | 0.96 |
| Reflective breather membrane | 0.24 | -0.045 | 0.97 |
| 30mm PUR & standard membrane | 0.20 | -0.034 | 0.98 |
| 30mm PUR & reflective membrane | 0.18 | -0.040 | 0.98 |

## PARTY WALL (Between dwellings)

### SAP Ref: E18 (Default 0.24 W/mK)

Notes;
Psi-value is applied to each dwelling.
60mm (min) URSA ACOUSTIC ROLL between party wall leaves to fully fill cavity.
Party wall is 90mm studs.
All party wall stud voids filled with URSA FRAMETEC.
Mineral wool cavity barrier, thermal conductivity (max) 0.037 W/mK.



**140mm URSA FRAMETEC/FRAMETEC SLAB 32**

| Description | U-Value ($W/m^2K$) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.26 | 0.041 | 0.93 |
| Reflective breather membrane | 0.23 | 0.037 | 0.93 |
| 30mm PUR & standard breather | 0.19 | 0.034 | 0.94 |
| 30mm PUR & reflective breather | 0.17 | 0.032 | 0.94 |

**140mm URSA FRAMETEC 35**

| Description | U-Value ($W/m^2K$) | Psi-Value (W/mK) | Temperature Factor |
|---|---|---|---|
| Standard breather membrane | 0.27 | 0.042 | 0.93 |
| Reflective breather membrane | 0.24 | 0.038 | 0.93 |
| 30mm PUR & standard breather | 0.20 | 0.034 | 0.94 |
| 30mm PUR & reflective breather | 0.18 | 0.032 | 0.94 |

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