Insulation for use in Pitched Roofs

Pitched Roofs Design & Installation Guide

URSA. Insulation for a better tomorrow.

URSA have been specialists in innovative, award-winning insulation since 1959 - and a leading European manufacturer of glass mineral wool for over 50 years.

Our headquarters are in Madrid, Spain, although our business spans more than 40 countries, with 11 production sites and over 1,500 employees. Our team in the UK are dedicated to providing glass mineral wool insulation solutions, whatever the project.

Part of the Etex Group

In 2022 URSA became part of Etex - a global group comprising of 160 facilities across 45 countries and the name behind many other construction product brands in the building materials sector including Superglass, a leading UK glass mineral wool insulation manufacturer. In 2025, the Superglass and URSA brands came together to form Etex UK Insulation Ltd.

URSA TERRA

Developed in 2009, URSA TERRA showcases the latest in glass mineral wool technology. Our distinctive production methods and product formulation define the character of our extensive insulation product range.

Insulation at rafter level has the distinct advantage of offering additional living or storage space without increasing the footprint of the building. As the roof space is warm there's no need for additional insulation to water services within the void.

Warm roof space

Insulation at rafter level falls into three main categories:

- Cold Roof (Unventilated) - a cold roof construction allowing the full depth of the rafter to be used but requiring the use of a vapour permeable sarking membrane. Further insulation can be added under the rafters, ceiling height permitting, which masks the thermal bridge effect of the timbers, improving the U-value and reducing the possibility of pattern staining.
- Cold Roof (Ventilated) - a traditional cold roof using bitumen or polythene based sarking felt, requiring both eaves-to-ridge ventilation (50mm minimum airspace) and a vapour control layer. Again insulation can be added under the rafters to mask the thermal bridge effect of the timbers.
- Warm Roof (Unventilated) - a warm roof construction allowing the full depth of the rafter to be used but requiring the use of a vapour permeable sarking membrane. Insulation is also used over the rafters which masks the thermal bridge effect of the timbers improving the U-value and reducing the possibility of pattern staining.

Thermal Bridging
Ensure that the insulation is continuous and forms a tight joint at details such as between rafters, at ridges, valleys and hips.

Where the timber floor meets the sloping ceiling or wall it's important to limit air infiltration by sealing around the perimeter of the floor at the skirting board using expanding foam and/or mastic type sealants.

Limiting Air Infiltration
The plasterboard ceiling should be installed with all joints between the ceiling and walls sealed with plaster, adhesive or flexible sealant, and all penetrations sealed using a flexible sealant. A correctly detailed and installed polythene air and vapour control layer (AVCL) will further enhance the air tightness of the construction.

Condensation
When increasing the amount of insulation, the increased risk of interstitial condensation must be carefully considered - BS 5250 gives detailed design advice.

In pitched roofs the governing factor is the choice of roof tile underlay, either High Resistance (HR) or Low Resistance (LR) types:

Type HR Underlay - these are the more traditional bitumen or polythene based products that have a water vapour resistance greater than 0.25 MNs/g.

A 25mm (minimum) ventilated air space must be provided between the insulation and the underlay (this space should be at least 25mm plus 15mm maximum allowable drape in the underlay).

Ventilation of the roof void must be provided as follows:

- 25,000mm^2/m, at low level
- 5,000mm^2/m, at high level (on both sides if the ridge board separates the roof into two sections)

Type LR Underlay - these are breather type membranes that have a water vapour resistance less than or equal to 0.25 MNs/g. There is normally no need to provide a ventilated void between the insulation and the underlay but sufficient space should be left to allow a slight drape in the membrane.

If the roof covering is relatively air tight, for example man-made artificial slates, counter battens (minimum 25mm deep) should be used to allow ventilation above the underlay. In domestic type applications, ventilation of the batten cavity should be provided as follows:

- 25,000mm^2/m, at low level
- 5,000mm^2/m at high level

There are a number of Type LR underlays available that promote the energy efficiency of not providing any ventilation - as these are not covered by BS 5250 URSA recommends only using such products if they carry a suitable technical approval such as BBA certification.

Further measures that should be taken include:

- Removal of the water vapour at source by using suitable ventilation and/or extractor fans in high humidity areas.
- Using a correctly detailed and carefully sealed air and vapour control layer (AVCL) (minimum 500g polythene sheet or foil-backed plasterboard) will reduce the amount of water vapour from the living area passing into the cold roof void.

Acoustic Performance
URSA FRAMETEC, URSA FRAMETEC SLAB and URSA HOMETEC ROLL, minimum 100mm, fitted between the rafters will help prevent noise transmission through or over the pitched roof structure.

Fire Performance
URSA FRAMETEC, URSA FRAMETEC SLAB and URSA HOMETEC ROLL are deemed non-combustible with a fire classification of Euroclass A1 (the highest possible rating) when tested to EN 13501-1:2018 Reaction to Fire.

Installation - Between Rafter Insulation - Unventilated

The standard procedure is:

1. Complete the tiling, battening and felting in the normal manner using a British Board of Agrément approved LR (breather) type underlay.
2. Fit the URSA FRAMETEC or URSA HOMETEC ROLL between the rafters ensuring there are no gaps between the rafters and between sections of insulation.
3. Maintain a 25mm (minimum) airspace above the insulation to allow a drape in the underlay.
4. Alternatively the LR type underlay may be pulled taut over the rafters and the full depth of the rafter filled with insulation. To ensure drainage above the membrane, 38 x 50mm counter battens must be nailed to the rafters at 300mm centres making sure there's a minimum of 38mm penetration of the fixing into the rafter. The tiling battens and tiles are then installed in the normal manner.
5. Continue the URSA FRAMETEC or URSA HOMETEC ROLL into the timber frame dwarf walls ensuring continuity of the wall and roof insulation.
6. If necessary further insulation may be added internal to the timber structure to both enhance the thermal performance and to mask the thermal bridge effect of the timbers.
7. An air and vapour control layer (AVCL) is required with this form of roof construction; this may be either polythene sheet or foil-backed plasterboard.
8. The plasterboard internal finish is fitted in the normal manner, though longer fixings are required when using a two-layer insulation system.

Figure 1
Between Rafter Insulation (Unventilated) - Eaves Detail

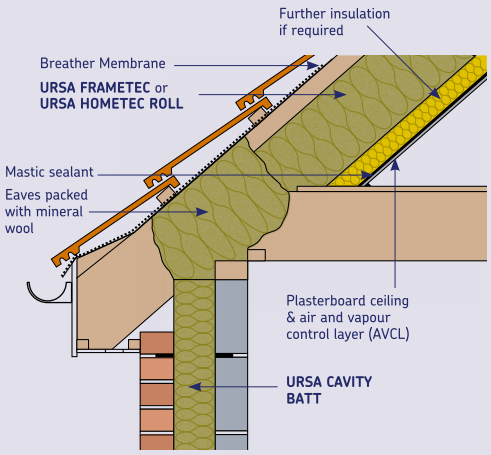
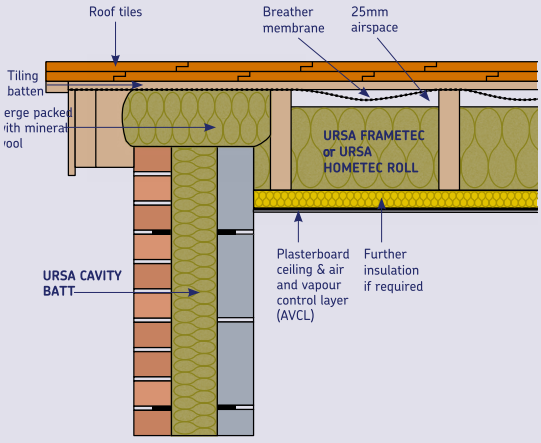


Figure 2
Between Rafter Insulation (Unventilated) - Verge Detail



Installation - Between Rafter Insulation - Ventilated

The standard procedure is:

1. Complete the tiling, battening and felting in the normal manner using type HR underlay. Provide for eaves-to-ridge ventilation in accordance with BS 5250 (see above).
2. Fit the URSA FRAMETEC or URSA HOMETEC ROLL between the rafters making sure there are no gaps between the rafters and between sections of insulation.
3. Maintain a 25mm airspace above the insulation allowing for 15mm maximum drape in the membrane.
4. Continue the URSA FRAMETEC or URSA HOMETEC ROLL into the timber frame dwarf walls ensuring continuity of the wall and roof insulation.
5. If necessary further insulation may be added internal to the timber structure to both enhance the thermal performance and to mask the thermal bridge effect of the timbers.
6. An air and vapour control layer (AVCL) is required with this form of roof construction; this may be either polythene sheet or foil-backed plasterboard.
7. The plasterboard internal finish is fitted in the normal manner, though longer fixings are required when using a two-layer insulation system.

Figure 3
Between Rafter Insulation (Ventilated) - Eaves Detail

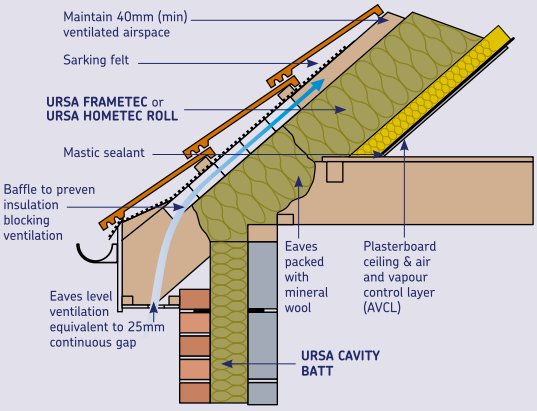
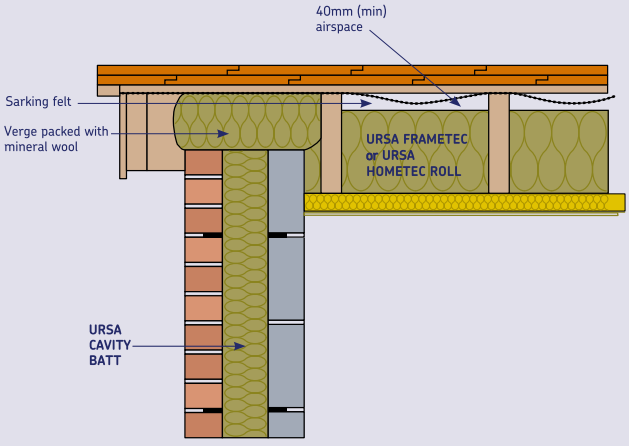


Figure 4
Between Rafter Insulation (Ventilated) - Verge Detail



Installation - Between Rafter Insulation - Warm Roof Construction

The standard procedure is:

1. Install the warm roof (over rafter) insulation and secure using counter battens in accordance with the manufacturer's instructions, and complete the tiling, battening and felting using a British Board of Agrément approved LR (breather) type underlay.
2. Once the roof is watertight and working from inside the building fit the URSA FRAMETEC or URSA HOMETEC ROLL between the rafters. Ensure the depth of the rafters is fully filled and there are no gaps between the rafters and sections of insulation.
3. Continue the URSA FRAMETEC or URSA HOMETEC ROLL into the timber frame dwarf walls ensuring continuity of the wall and roof insulation.
4. An air and vapour control layer (AVCL) is recommended with this form of warm roof construction. In high humidity applications, e.g. swimming pools, laundries, commercial kitchens and so on, an air and vapour control layer (AVCL) is required; this may be either a polythene sheet or high performance polythene/ aluminium foil laminate. The design should be checked using BS 5250.
5. The plasterboard internal finish is fitted in the normal manner.

Figure 5
Warm Roof Insulation
- Eaves Detail

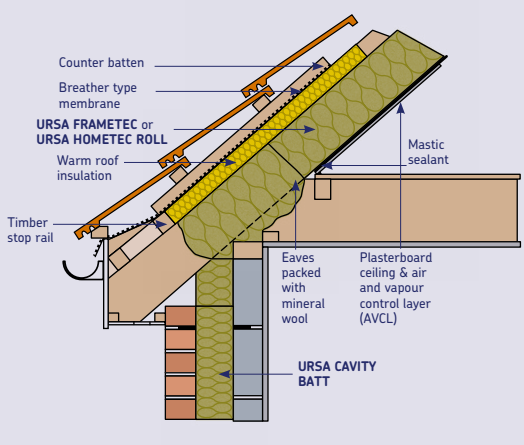
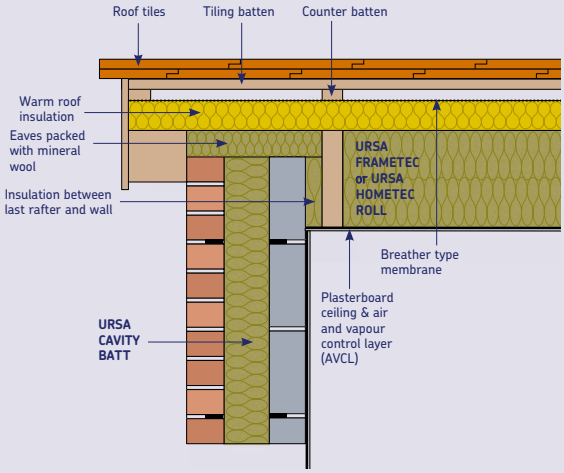


Figure 6
Warm Roof Insulation
- Verge Detail



Heat Loss Calculations

The normal method of calculating U-values in floors, walls an roofs is the Combined Method (see BS EN ISO 6946) which, as well as assessing the thermal bridge effect of mortar joints, timber studs and so on, accounts for air gaps in the insulation and mechanical fasteners penetrating the insulation.

Compliance with the Building Regulations is shown by limiting the overall CO_2 emissions from the building - this gives considerable design flexibility, with no specific U-values, except the worst allowable, that must be achieved.

In the cold roof details additional insulation is used under the rafters.

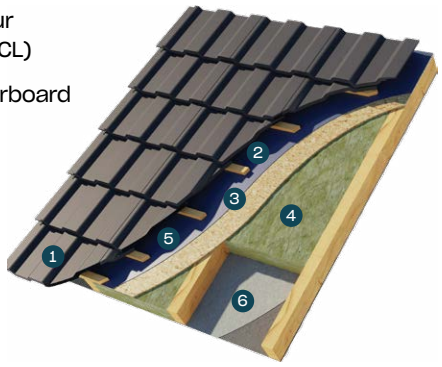
In warm roofs the additional insulation is fixed above the rafters.

Description	Thickness (mm)	Thermal Conductivity (W/mK)	Thermal Resistance (m2K/W)
Roof Tiles	20.00		
Ventilated cavity between timber battens	50.00		
Standard Breather Membrane			
Insulation between timber rafters*	See table below		
Reflective Vapour Control Layer (VCL)			
Unvented low-e cavity between service void/battens	25.00		0.53
Insulated Plasterboard	See table below		

*Timber bridging is assumed as 9% at 600mm centres.
Bridge thermal conductivity of 0.13W/mK

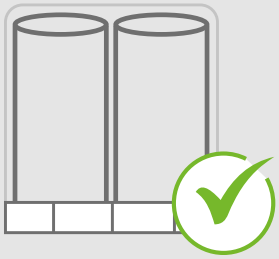
Typical Application

1. Roof tiles
2. Ventilated cavity between battens and counter battens
3. Standard Breather Membrane
4. Insulation between timber rafters
5. Reflective Vapour Control Layer (VCL)
6. Insulated Plasterboard

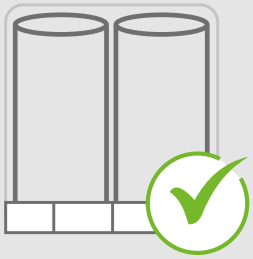


Insulation between timber rafters	Thermal Conductivity (W/mK)	Insulation & rafter thickness (mm)	U-Values achieved (W/m²K)			
			37.5mm Siniat Thermal PIR (1.20m²K/W)	52.5mm Siniat Thermal PIR (1.89m²K/W)	62.5mm Siniat Thermal PIR (2.34m²K/W)	72.5mm Siniat Thermal PIR (2.79m²K/W)
URSA HOMETEC ROLL 32	0.032	240	0.12	0.11	0.11	0.10
URSA FRAMETEC 32	0.032	230 (140+90)	0.13	0.12	0.11	0.11
URSA HOMETEC ROLL 32	0.032	220	0.13	0.12	0.11	0.11
URSA HOMETEC ROLL 32	0.032	200	0.14	0.13	0.12	0.12
URSA FRAMETEC 32 / HOMETEC ROLL 32	0.032	180 (2x90)	0.15	0.14	0.13	0.12
URSA FRAMETEC 35	0.035	180 (2x90)	0.16	0.14	0.14	0.13
URSA FRAMETEC 32	0.032	140	0.18	0.16	0.15	0.14
URSA FRAMETEC 35	0.035	140	0.19	0.17	0.16	0.15

How to store our insulation

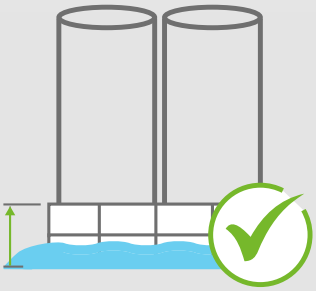


Keep the product covered and fully wrapped on a pallet until required.

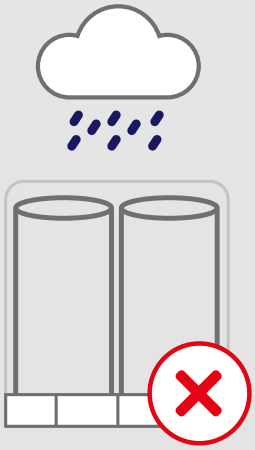


A pallet that is wrapped and has an undamaged hood can be stored outside when indoor space is unavailable, provided it is kept off the ground and protected from the elements. This should only be for short-term storage and not in severe weather conditions.

Once the plastic hood has been removed keep all of the product inside and off the ground away from the elements.



Product should be kept elevated on a pallet at all times to avoid sitting water.



Product can become wet and damaged when exposed to the elements.

Loose product is extremely likely to have water damage when left in the rain rendering your stock unfit for sale.

Please note: This guide is suitable for all URSA roll, slab and batt products. We do not recommend that URSA pallets are double stacked.

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