Underlays, wall membranes & sealing products

KLÖBER
Professional roofing accessories

Contents

Overview of Klober

History

Klober was founded in 1960 in Schwelm, Germany. The philosophy of the company was to manufacture ventilation pipes on an industrial scale which could be installed on any roof – no matter what the pitch. During the seventies, the product range grew to include safety and support products as well as walkway systems and roof windows. By the start of the 1990's Klober entered the market with vapour permeable membranes which strongly influenced the way roofs were constructed.

The development of a ridge and hip solution also changed the installation methods within the whole industry. In 1997, Klober completed its offer for permeable underlays with the introduction of vapour control layers.

Its first overseas venture took place in 1985 when Klober established itself in the UK. Since then the company has continued to strengthen its position as a leading player in the European market by opening more subsidiaries in Austria, France, Italy, Poland and Belgium. Finally, in order to improve direct contact with its clients, Klober has recently set up sales organisations in Slovakia and the Czech Republic.

Technical support

Klober offers technical advice and design support on how best to incorporate its products into specific building types or particular forms and techniques of construction, whether for refurbishment or new-build projects. The service includes:

- Telephone helpline +44 (0)1509 500 675
- CPD approved seminars
- Computerised U-value calculations
- Condensation risk analyses
- Site visits by technical staff
- Copies of relevant test reports and certification
- Product samples
- Technical literature
- Help and advice on roof detailing and on meeting the requirements of Building Regulations

Klober is a leading manufacturer of high-quality universal roofing ventilation and accessory products.

With offices in 9 countries and sales worldwide, Klober is truly an international company.

Its strategy is to supply the market with universal products, making specifying, ordering and installing both easy and fast.

Its product range is unrivalled and covers the following areas:

- Roofing underlays, wall membranes, vapour control layers and tapes
- Dry fix, eaves and valleys
- Prismax® daylight roofing
- Trapac® snow and safety
- Venduct® tile and slate vents
- Flavent® flat roofing

Klober is dedicated to building long-term relationships with its customers and partners, working together to understand market requirements to help design and develop new, fit-for purpose products whilst continuing to improve its existing range.

Quality

Klober uses performance and wind tunnel testing to ensure that its products are fully fit for purpose. Fire, abrasion, weather tightness and tear tests are just a few of the areas which are used to ensure safety, longevity and durability. Strict quality measures are in place throughout the entire lifecycle of a product - from the initial development of a prototype to the full production roll-out. Later, during the main production run, quality checks are carried out on a daily basis. As a result, Klober continues to improve the quality of its products and production methods.

Environment

Looking after the environment is not just a phrase for Klober. Even at the first stage of sourcing raw materials, Klober considers the impact on the environment. Valuable raw materials are conserved and as such the environment is protected.

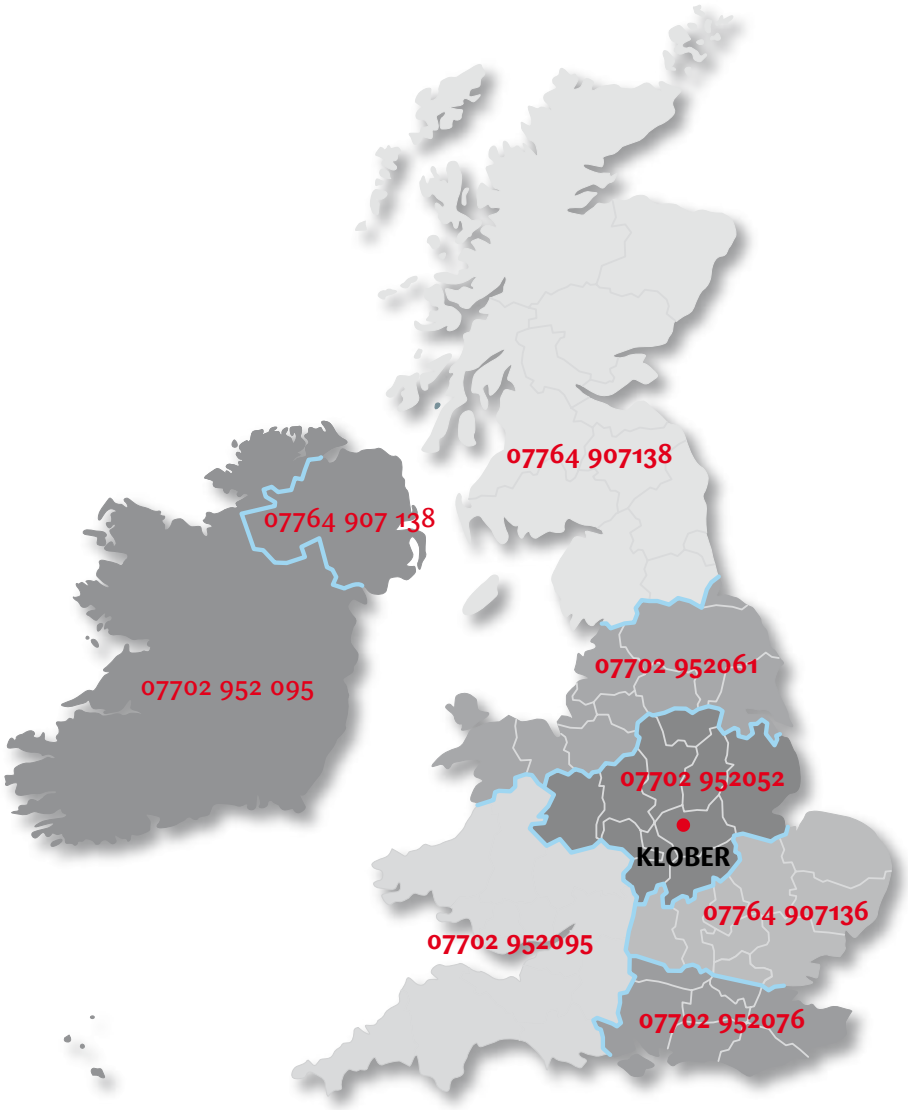
Klober's Permo® air-open and vapour-permeable underlays, for example, are a pure polyolefin product that can easily be recycled and can even be categorised as a normal household waste.

Certification

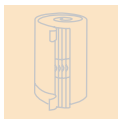
All of Klober's products conform to the relevant Building Regulations and British Standards and, where appropriate, are BBA, BRE, IAB and CE certified.

FM95146

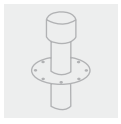
Contact details & product range



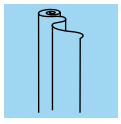

Venduct®
tile & slate vents


Dry fix roofing,
eaves & valleys


Trapac®
snow & safety


Flavent®
flat roofing


Prismax®
daylight roofing


Underlays, wall membranes & sealing products

KLÖBER

You can contact us by:

Phone

Sales:	0800 783 3216
Technical:	+44 (0)1509 500 675
Switchboard:	+44 (0)1509 500 660

Email

General:	info@klober.co.uk
Technical:	technical@klober.co.uk

Website

For information on Klober products, how to find your nearest stockist, literature downloads, training days, useful industry links, regulations and Klober's product certifications visit: www.klober.co.uk

Area account manager

See map opposite

Fax

Sales:	+44 (0)1509 505 535
General:	+44 (0)1509 600 061

Post

Klober Ltd.
Ingleberry Road
Shepshed
Loughborough
Leicestershire
LE12 9DE
UK

Guarantee

All products supplied by Klober Ltd are covered by a 10 year guarantee against manufacturing defect. Products are not covered for colour stability, poor workmanship or incorrect installation.

All products should be installed as per our literature/fixing instructions and/or guidelines set out in BS5534, BS5250 and our BBA/BRE/IAB certificates.

Introduction to membranes & sealing products

Reducing air leakage through the roof

With 25% of heat loss traditionally being through the roof, it is essential to use products which both reduce this figure whilst providing adequate levels of ventilation.

With increasingly strict legislation governing the energy efficiency of houses, those involved in roofing will need to take advantage of products which will help reduce heat loss including sealing tapes and vapour control layers/vapour barriers.

Airtight connections should be made between laps in the underlays themselves as well as at connections with rooflights, vents and vapour control layers.

Responsibility for reducing air leakage lies with all parties involved in the construction process from specifiers and contractors to merchants and, of course, manufacturers who must design and develop appropriate products.

Klober offers a range of high-quality, high performing roofing underlays, wall membranes and vapour control layers/barriers. When used in conjunction with our adhesive tapes these will form airtight areas within the roof, substantially reducing heat loss.

A range of sealing products is available: Permo® TR universal tape for sealing laps and repairing tears, Tacto® double-sided sealing tape, Easy-form® stretchable tape, Pasto® sealant and Permo® seal for sealing holes in underlays where nails have penetrated.

Klober is happy to offer advice on how best to combine and incorporate its products to ensure energy loss through the roof is kept to a minimum.

Permo® underlays

Sepa® non-vapour permeable underlays

Wallint ® vapour control layers

Adhesive tapes & sealants

Permo® - air open & vapour permeable membranes

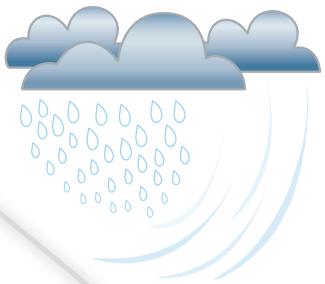
Klober's Permo® roofing underlays are strong and flexible with a range that covers all roof types. Depending upon specific construction requirements, there is a choice between air-open and vapour-permeable membranes. Being weather-proof they guard against wind-driven rain and snow during and after roof construction, protecting the building structure from the moment it is installed. In addition Klober manufactures Permo® frame, a wall membrane for use on timber frame walls.

Sepa® - non vapour-permeable underlays

Klober's Sepa® (formerly Span-tech®) underlay range of very strong, lightweight and safe, non-breathable membranes are easy to install alternatives to traditional 1F bituminised roofing felt.

They are suitable for all pitched roofs and not susceptible to drumming in windy conditions.

Introduction to membranes & adhesive tapes



Wallint® - air barriers & vapour control layers (AVCL's)

AVCL's are an excellent way to control the movement of vapour and air and allow any damp timbers in a building, particularly during the build process, to dry out quickly. This is an important product which will help those involved to comply with Part L of Building Regulations.

Sealing products

Klober provides a range of sealing products - including sealing tapes, sealants and sealing collars - for securely sealing and repairing air-open, vapour-permeable and non-breather membranes.

Tiling underlays

It is common practice to use an underlay below the roof covering as a secondary barrier against wind driven rain and snow. The underlay can also be used as a temporary waterproofing barrier during the construction process but we recommend that the roof finish is quickly applied. Underlays also play a significant part in deflecting wind pressure applied directly on to the roof finish.

Traditional felt underlays and the newer plastic/polypropylene based underlays are impervious to water vapour and require ventilation of the roof structure to prevent the build-up of condensation. Minimum requirements for ventilation are stated in BS 5250: 2002.

Whilst effective ventilation reduces the risk of condensation, its effectiveness is partially dependent on wind speed, wind direction and low level openings not being obstructed by items stored in the loft.

As insulation levels increase, roof spaces inevitably get colder and are at increased risk from condensation.

Klober's underlays are:

Waterproof

Impervious to any wind driven rain or snow that gets blown through the roof covering, even when in direct contact with timber rafters and insulation.

Windproof

When installed according to manufacturers' instructions, they provide a continuous windproof layer, ensuring insulation materials maintain their optimum thermal efficiency by minimising air infiltration

Strong and durable

Although much lighter than bitumen felts, Klober's underlays are extremely tough. They have excellent tear and nail strength, yet remain flexible even at low temperatures. They are extremely resistant to ageing.

Condensation

Condensation - a rising problem

Condensation is a symptom of modern living and of today's preoccupation with saving energy by minimising heat loss. The increased presence of central heating, showers and modern domestic appliances produces greater amounts of water vapour in the home. An unvented tumble drier alone can emit as much as 7.5 litres per day. Matters are made worse by the fact that these moisture-producing activities are often concentrated at certain times of the day, followed by long periods when the house is either unoccupied or unheated.

In addition, through greater draught proofing, double glazing and fewer open fire places, ventilation is reduced throughout the home - encouraging this moisture-laden air to rise into the roof space. Here too, natural ventilation is virtually eliminated through the use of underlays. The traditional roof void is also cold because of the presence of thicker insulation material. So as the warm, moisture-laden air rises from below, it cools, reaches dewpoint, and condenses on cold surfaces.

If left unchecked, this condensation can cause severe damage to the fabric of the building. Timber can rot, weakening the structure. Wetting will cause timber and timber-based materials to swell and distort, permanently damaging sarking boards and wall plates. Metal corrosion can occur on components such as roof truss nail plates. Insulation materials will absorb dripping water and lose their thermal effectiveness. Ceilings could be damaged by condensation soaking through. Electrical circuits could be affected. Mould growth will form, and anything stored in the loft could be permanently damaged.

Solution

There are two solutions to prevent excessive condensation forming in a roof void, one is to ventilate in the traditional way and the other is to use an air open or vapour permeable underlay that allows the roof structure to breathe.

Klober can offer both, providing a wide range of eaves ventilation systems, slate ventilators and tile ventilators along with a range of air open and vapour permeable underlays that all have BBA, BRE or IAB certification.

In recognition of the increased importance of controlling condensation, both the Approved Document of the Building Regulations and the British Standard relating to ventilation have been revised. A summary of the main requirements which apply generally to all new and existing buildings is given here, with specific situations tabled overleaf. It should be noted, however, that anything differing markedly from typical domestic situations may need special consideration.

The Klober roof ventilation products featured on the following pages have been specifically designed to provide the most simple and cost-effective solution to Condensation. They can be used in new build, re-roofing and refurbishment situations, and through their universal nature will simplify specifications and speed up installation.

Making the right choice of ventilation

The diagrams on pages 8-9 are designed to provide an at-a-glance guide to ventilation requirements for the most common roof types and the Klober products that can be used for them. In many cases, there is a choice of suitable products.

Product selection will depend on several factors – such as whether it is new build, re-roofing or refurbishment work and whether ventilation is preferred through the soffit or over the fascia. The ventilation requirements are the minimum levels set out in the Building Regulations and BS 5250. There may well be instances where additional ventilation is thought advisable.

Unusual roof types will demand special consideration.

The Control of Condensation in Buildings

BS 5250:2002

BS 5250: 2002 The Control of Condensation in Buildings looks at recommendations to limit the amount of interstitial and surface condensation forming in building structures including roofs.

The Standard makes recommendations into preventing excessive condensation forming in roof voids by looking at the two types of underlay used in pitched roofing, the air tightness of the ceiling below the roof structure, and the provision of roof void ventilation when using both types of underlay.

Non-ventilated roof structures are not covered in BS 5250: 2002, but it recommends the following:
"Where no ventilation to the roof space is proposed, it is recommended that reference be made to the conditions attached to Technical Approvals given by UKAS (or European equivalent) accredited technical approval bodies"

If you decide to provide a non ventilated roof system that will meet with Building Regulation approval, the underlay must have third party certification which states that it can be used on a roof without the provision for ventilation and that the procedures and fitting are carried out in accordance with the conditions stated in the BBA Certificate.

Permo® air, Permo® forte and Permo® light are BBA certified to be used in roof structures without ventilation and would therefore meet this recommendation.

The information detailed below is only a brief summary of the recommendations stated in the pitched roof section of BS 5250: 2002.

FAQs

"What are the advantages of using an air open or vapour permeable underlay in a non-ventilated pitched roof?"

- *no ventilation products are required, so installation is quicker*
- *produces a neater, cleaner looking roof - no tile/slate vents are needed*
- *the whole roof area is "Breathing"*
- *cost savings*

"What measures are required to enable an underlay to be used over an unventilated pitched roof?"
To limit the amount of water vapour entering the non-ventilated roof space, the following design points should be addressed:

- *all gaps around penetrations into the roof space must be properly sealed*
- *the loft hatch must have an effective draught seal*
- *the rooms directly below the ceiling should have extract fans fitted*
- *all water tanks in the roof space must be fully insulated, except underneath and have a cover*
- *vent pipes must not discharge water vapour into the roof space*
- *unsealed recessed light fittings should be avoided*

"Is a vapour check needed at ceiling level in a non-ventilated cold pitched roof?"
A vapour control layer is not essential, but is advisable over rooms with high humidity, such as bathrooms and kitchens, whether the roof is ventilated or not. More critical is to seal gaps and holes in the ceiling, which will 'short circuit' a vapour resistant ceiling.

Roofs with insulation between and/or over the rafters

These types of roof structures are when insulation is installed between and/or over the rafters. When using a type LR underlay these roof structures require no ventilation providing a well sealed ceiling and a VCL are installed. Ventilation below a type LR underlay in a partial fill system is only recommended if an effectively sealed vapour control layer is not provided. A condensation risk analysis is recommended for these particular roof systems (see pages 32 and 33 for further details) For tight fitting roof coverings, if not determined by testing that they are sufficiently air open, the batten space should be ventilated. For roof coverings such as tiles and natural slates the batten space does not require any additional ventilation.

Underlay Types

HR Underlays
Are non-vapour permeable underlays such as Sepa® forte or Sepa® light and have a water vapour resistance of greater than 0.25 MNs/g. These underlays should be fully ventilated.
LR Underlays
Are air open and vapour permeable underlays such as Permo® air, Permo® forte and Permo® light and have a water vapour resistance of less than 0.25 MNs/g.
The standard also looks at providing improved ceiling airtightness which will apply to **both** type HR and LR underlays.

Well Sealed Ceiling

- The design avoids any gaps within the ceiling
- No loft hatch should be located in or adjacent to the kitchen or bathroom
- Loft hatch covers should have a compressible seal
- Penetrations through the ceiling are permanently sealed
- The ceiling is sealed to the external walls
- Recessed light fittings should be IP60, IP65 or have a sealed hood
- The wall heads of brickwork require sealing

Normal Ceiling

- a ceiling that is not a well sealed ceiling

Roofs with Large Voids or cold roofs

BS 5250 recommends ventilation is provided with type LR Underlays, by providing the following:

- Well Sealed Ceiling-3mm continuous low level ventilation.
- Normal Ceiling - 7mm continuous low level ventilation

If the building contains large quantities of water in the construction process it recommends that 5mm ventilation is provided at high level in conjunction with the low level ventilation requirements.
If low level ventilation is not preferred the Standard recommends a 5mm continuous ventilation slot is provided at high level. For further details of this please refer to page 16 of this brochure.
On a re-roof where the ceiling is not being upgraded it recommends that a 5mm continuous ventilation slot is provided at high level.

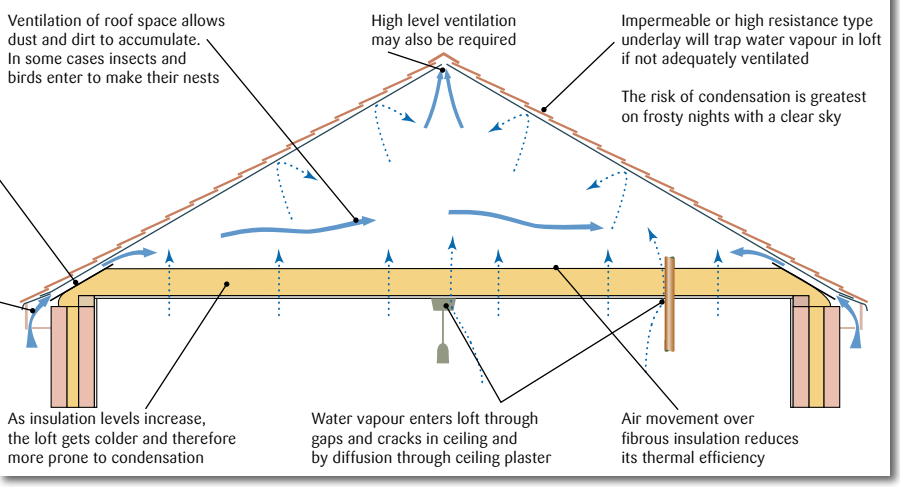
KLÖBER

Roof types

The cold ventilated pitched roof with type HR underlay

Thicker insulation means that ventilation accessories become more intricate to ensure a clear ventilation path is maintained at the eaves

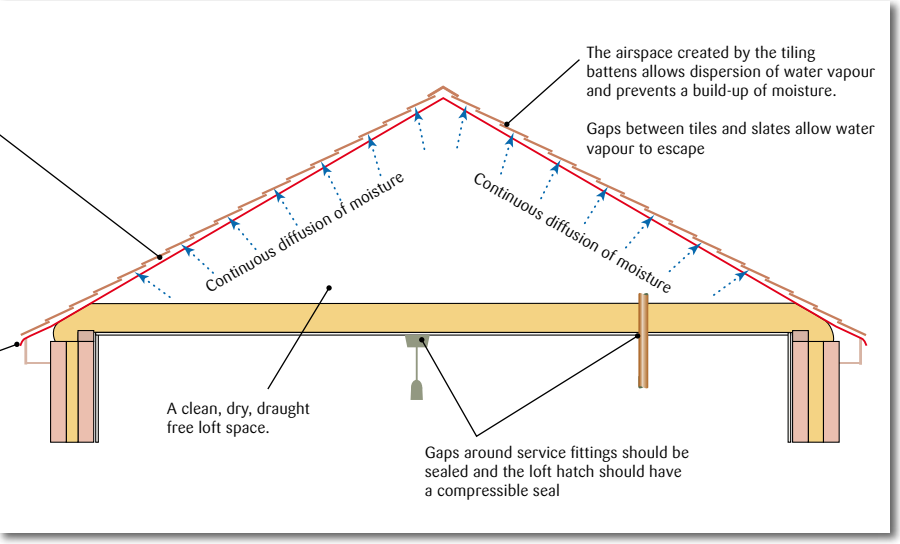
Cross ventilation of the roof is essential to avoid the build up of water vapour in the roof. The ventilation rate varies with the wind speed and temperature



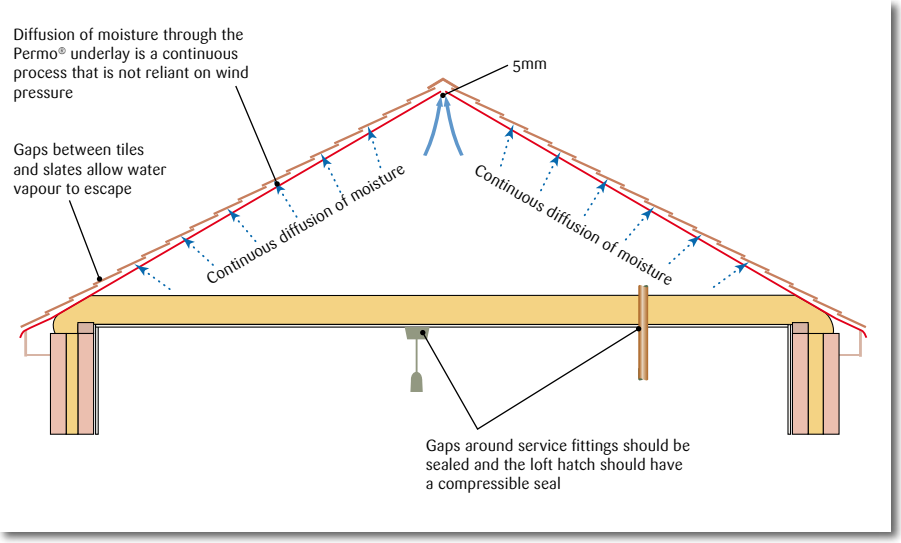
The cold ventilated pitched roof with type LR underlay, as per third party accreditation guideline in BS5250

The loft space is not ventilated to the outside air - diffusion of moisture through the Permo® underlay is the means of removing water vapour from the roof. This is a continuous process that is not reliant on wind pressure

Any snow or wind driven rain that penetrates the outer roof covering runs safely down the Permo® underlay and drains into the gutter

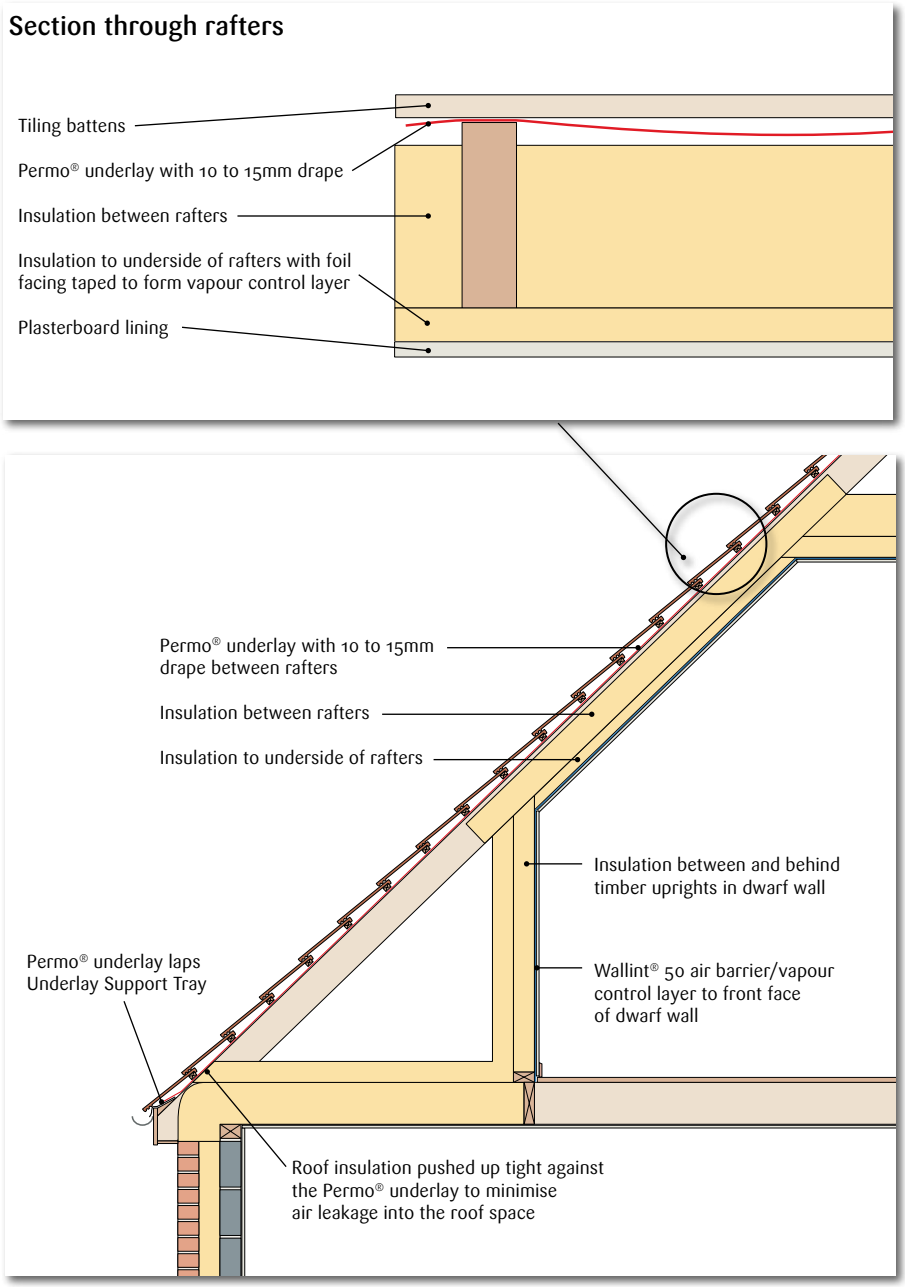


Cold pitched roof with Permo® air-open or vapour-permeable underlay with ridge opening - as per the recommendations in BS 5250: 2002



Pitched roofs – Typical application details

Typical room-in-the-roof construction with a hybrid partial fill roof structure



Room-in-the-roof

There is no requirement for roof ventilation when Permo® underlay is used. This helps to simplify detailing and the installation of thermal insulation.

The insulation between the rafters stops 10mm minimum from the top of the rafters, allowing the Permo® underlay to drape between the rafters.

A vapour control layer, such as Wallint® 10 eco or a foil backed plasterboard is recommended for this construction, unless the insulation board installed on the underside of the rafters has a high vapour resistance and all joints are sealed – in this case a separate vapour control layer may not be required.

Permo® - air open & vapour permeable underlays

The benefits of Permo® membranes

Air open and vapour permeable "breathable" roofing underlays

- No ventilation accessories needed for Permo® air/forte/light
- Waterproof and wind tight
- Easy and economic installation
- High tear and tensile strength underlay
- Environmentally friendly - recyclable
- Last as long as the outer roof covering
- In a sealed roof system will reduce heat loss through the roof

Features

- High vapour permeability allows water vapour to escape from the roof structure
- Waterproof to protect against wind driven rain and snow
- Can be draped unsupported over rafters or laid directly over insulation or sarking boards
- Excellent nail tear and tensile strength
- Range of underlays for use with all types of roof covering, including tiles, slates and standing seam metal roofs
- Will last the lifetime of the roof construction
- Recyclable
- Remain flexible at low temperatures

High vapour permeability

Permo® underlays have a very low resistance to water vapour, effectively preventing the build-up of condensation within the roof structure.

Waterproof

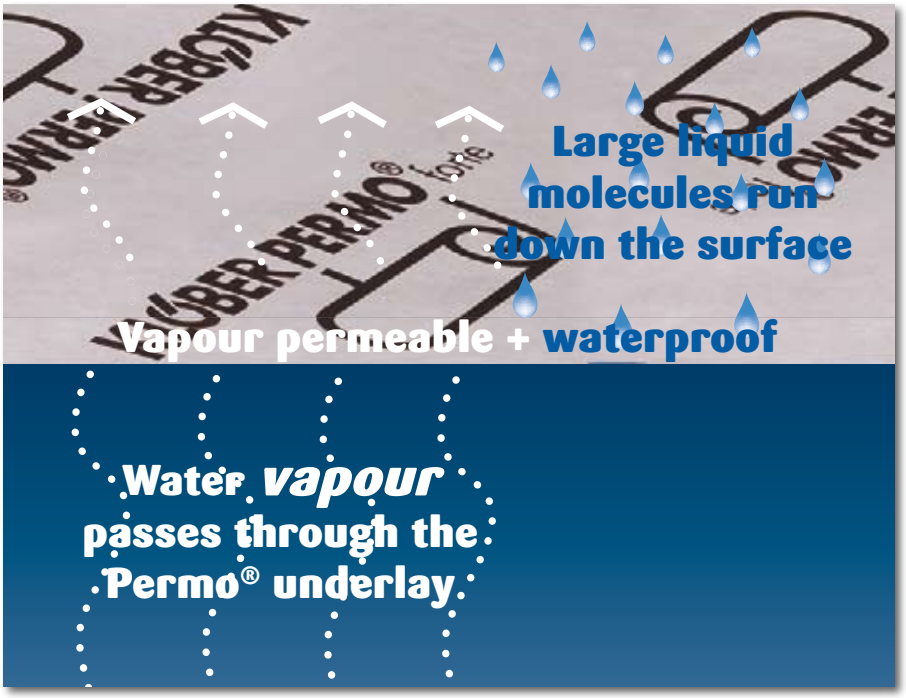
Permo® underlays are impervious to any wind driven rain or snow that gets blown through the roof covering, even when in direct contact with timber rafters and insulation.

Windproof

When installed according to manufacturers' instructions, Permo® underlays provide a continuous wind-proof layer, ensuring insulation materials maintain their optimum thermal efficiency by minimising air infiltration.

Strong and durable

Although much lighter than bitumen felts, Permo® underlays are extremely tough. They have excellent tear and nail strength, yet remain flexible even at low temperatures. They are extremely resistant to ageing.



What is a vapour permeable underlay?

BS 5250: 2002 defines a vapour permeable underlay as a pitched roof underlay that meets the recommendations of BS 5534: 2003 and is vapour permeable with a vapour resistance of less than 0.25 MNs/g. Permo® underlays are made from outer and inner layers of spunbondedpolypropylene with a microporous inner layer. In the case of Permo® forte a reinforcement mesh has been added to make it an extremely strong 4-layer vapour permeable underlay. These materials have a molecular structure that is sufficiently fine to prevent liquid water penetration, but open enough to allow the diffusion of water vapour.

If a building has recently been constructed and is still going through the drying out process, in some very rare occasions during very cold weather, condensation might occur on the underside of the Permo® underlay.

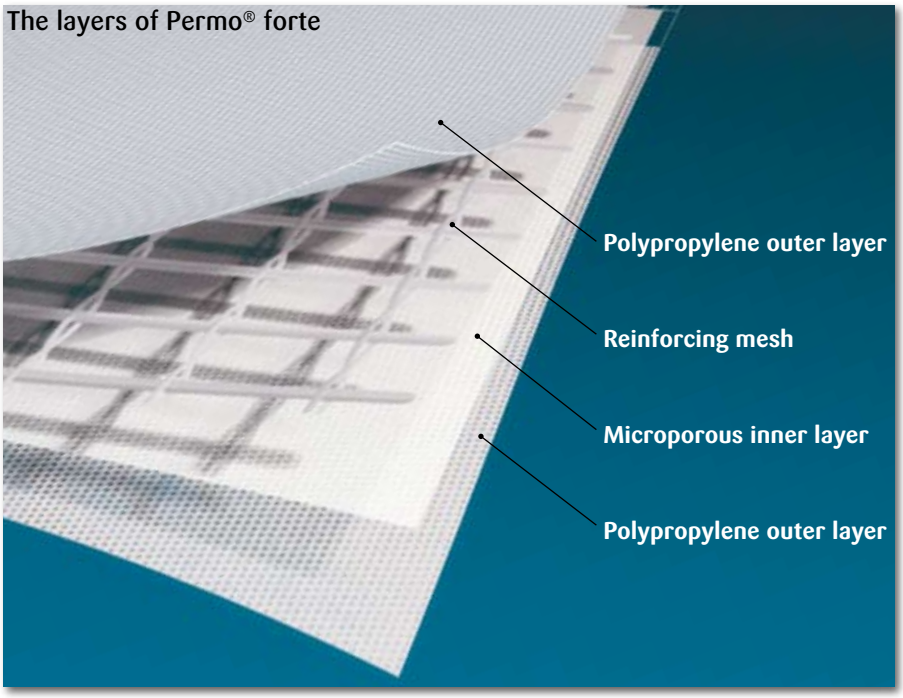
This would only apply to a new or refurbished building that contained a large amount of water in its construction process. Timbers exposed to heavy rainfall and not fully dried out prior to the Permo® underlays being applied could also exacerbate the condensation risk.

This problem is only temporary and when the drying out stage has been completed it never re-occurs. This condensation problem in new build can also occur in conventionally ventilated roof structures.

Recent research into the ventilation of batten spaces and air permeability of roof finishes has confirmed that for finishes such as concrete tiles, clay tiles and natural slates. The batten cavity is sufficiently ventilated to remove moisture vapour and no provision need be made for additional ventilation.

However, if the roof finish is classed as tight fitting, we recommend that counter battens should be used and ventilation should be provided at high and low level to ventilate the counter batten cavity. These ventilation openings should be 25,000mm² per metre at low level and 5,000mm² per metre at high level.

Permo® - air open & vapour permeable underlays



FAQs

"Can Permo® underlays be used in re-roofing works?"
Yes, once a Roofing Contractor has used a Permo® underlay he never switches back to traditional roofing underlays and ventilation.

"Can an underlay be placed directly over insulation boards?"
Yes, Permo® underlays do not attract water by capillary action or suffer from 'tenting'. With the Permo® underlay in this position, counter battens must be used to allow rainwater and melted snow to drain below the tiling battens.

"Is ventilation required to the batten space in a non-vented pitched roof?"
Recent research carried out has proven that on a concrete/clay and natural slate roof the batten spaces are naturally ventilated. If a tight fitting roof finish is being used then we recommend that the batten spaces be ventilated.

"How long can Permo® be left exposed before the final roof covering is applied?"
Permo® underlays have four months resistance to UV sunlight, however as they are only designed as temporary waterproofing barriers we do recommend that the outer roof covering is applied as soon as possible.

Suitability of Permo® products

	Non-ventilated cold pitched roof*	Cold ventilated pitched roof	Non-ventilated hybrid partial fill	Warm pitched roof Supported below counter battens	Warm pitched roof Unsupported below counter battens	Profiled metal cladding supported insulation boards	Standing seam metal cold or warm roofs	Direct nailing into sarking boards	Wall insulation
Permo® air	✓	✓	✓	✓	✓	✓	✗	✓**	✗
Permo® forte	✓	✓	✓	✓	✓	✓	✗	✓	✗
Permo® light	✓	✓	✓	✓	✓	✓	✗	✗	✗
Permo® sec	✗	✗	✗	✗	✗	✗	✓	✗	✗
Permo® frame	✗	✗	✗	✗	✗	✗	✗	✗	✓

* Complying with BBA Certificate 00/3749 & 07/4435
**Can be used on sarking boards providing a 2mm gap is left between sarking board

KLÖBER

Environment

Permo® is produced without the use of adhesives, fillers or toxic additives. No CFCs or HCFCs are used in its manufacture and it is 100% recyclable. Permo® is manufactured using a process that has environmental approval EMAS 14001.

KLOBER PERMO
is a recyclable material

Compatibility

Permo® underlays can be used with all commonly used roofing materials, insulants and plastics. They are not affected by timber preservatives or their solvent carriers once these have dried. However, they should not come into contact with timber preservatives in a liquid state, or freshly treated timber which has not fully dried out.

Long term performance

Tests carried out by the BBA included measurements of the effect of heat ageing, UV light exposure and accelerated dust/debris accumulation and found no discernable reduction in performance.

Approvals

Klober's Permo underlays meet the requirements of BS5534:2002. All are classed as low resistant underlays to BS5534:2002

Certifications

All Klober underlays are CE certified. Permo® air, forte and light all hold BBA certification for use on unventilated cold and warm roofs.
Permo® forte and light also holds IAB certification for unvented cold pitched roof systems.

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE No 99/3622
CERTIFICATE No 00/3749
CERTIFICATE No 07/4435

IRISH AGRÉMENT BOARD
BUILDING PRODUCT CERTIFICATION
03/0190

Guarantee

KLOBER offers a full 15 year guarantee on Permo® underlays.

Typical constructions

Unsupported underlays

Permo® underlays are laid parallel to the eaves and draped between the rafters as traditional tiling underlays. The Permo® underlay should drape between 10 and 15mm to allow drainage below the tiling battens (see detail 1). Permo® underlays can also be draped over counter battens in boarded and warm roofs (see details 3 and 7).

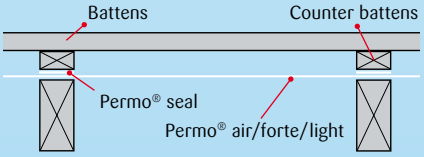
Supported underlays

Whenever rigid insulation or timber boarding is fixed directly onto the rafters, counter battens must be used. An exception to this is the Scottish practice of direct nailing slates to soft-wood sarking (see details 4 and 10).

Counter battens can either be fixed directly onto the boarding with the Permo® underlay draping over the counter battens (see details 3 and 7) or the Permo® underlay can be laid directly over the boarding or insulation and the counter battens fixed on top (see details 2, 5 and 6).

Permo® forte and Permo® air can be used where no slating battens are used and slates are directly nailed into sarking boards as is common in Scotland. (see details 4 and 10). The sarking boards should be 10mm x 150mm wide and have 2mm gaps between.

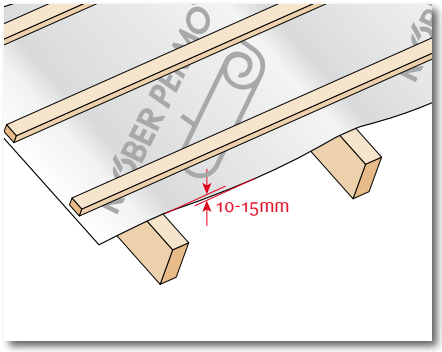
Ventilation to meet the requirements of BS 5250: 2002 must be provided below OSB or plywood boarding when installed directly onto the rafters.
On a roof with slates or tiles installed below their recommended roof pitch, resulting in the Permo® underlay in some cases acting as a primary barrier to water penetration, we recommend that the Permo® underlay is pulled taught over the rafters and the installation of counter battens followed by the tiling battens.



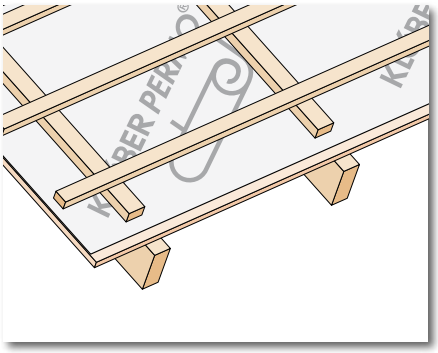
To provide a water tight seal around the counter batten nail and its penetration through the Permo® underlay, we recommend that Permo® seal is applied to the back of the counter batten, or directly onto the Permo® underlay prior to their fixing to the rafters.

Cold pitched roofs

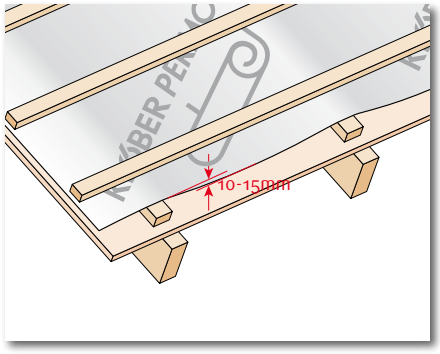
Cold pitched roofs are insulated at ceiling level. The Permo® membrane performs as a tiling underlay below the outer roof finish and when draped will direct any moisture that enters the batten space down to the eaves gutters.
No ventilation at high or low level is required for these types of roof structures provided the guidelines set out in BBA certificates 00/3749 and 07/4435 are followed. However, if a high level ventilation option is preferred, as per BS 5250: 2002, please refer to page 16.
Counter battens are needed when sarking or plywood boarding is installed directly onto the rafters, except for direct nailed slating into timber sarking. The counter battens allow the tiling battens to be fixed clear of the Permo® underlay allowing a drainage path for any moisture ingress. At the eaves the loft insulation can be pushed up to the underside of the Permo® underlay.



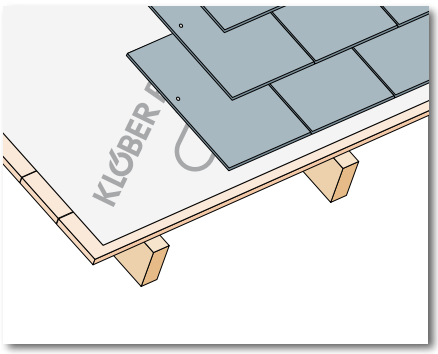
1. Traditional cold roof with Permo® underlay draped between rafters



2. Ventilated boarded roof with Permo® underlay below counter battens



3. Ventilated boarded roof with Permo® underlay draped over counter battens



4. Boarded roof - Scottish practice with no tiling battens – use Permo® air/forte for this application

FAQs

"Are counter battens needed where Permo® underlay is unsupported over rafters?"
Provided there is space for the underlay to drape 10-15mm, counter battens are not needed.

"Are counter battens required when the Permo® underlay is fully supported?"
Yes, counter battens are always required where the underlay is fully supported.

"Can Permo® be installed draped over counter battens?"
Yes, see details 3, 7 and 9.

"Can Permo® be laid over sarking boards without the use of battens and counter battens, as is traditional for slating in Scotland?"
Yes, but the sarking should be 150mm wide boards with 2mm gaps between. See details 4 and 10.

Typical constructions

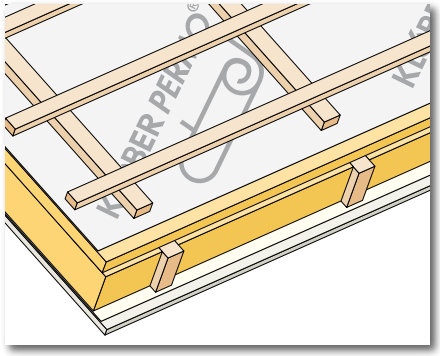
Warm pitched roofs

Warm pitched roofs are insulated at rafter level. Insulation is usually installed either:

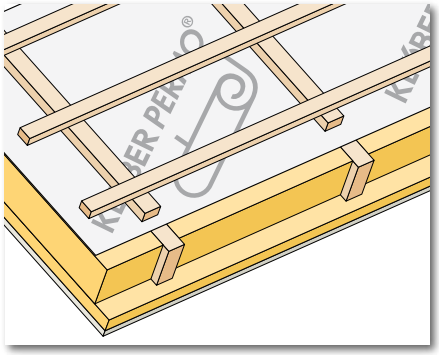
- entirely above the rafters (9)
- above and between the rafters (5 & 7)
- between and below the rafters (6 & 8)
- entirely between the rafters (10)
- entirely above the rafters and between counter battens (9)

The Permo® underlay can be laid directly on insulation or sarking boards without risk of 'tenting'.

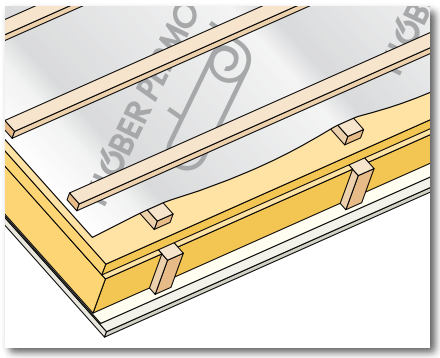
The Permo® underlay may be draped over counter battens provided that there is a minimum 10mm gap between the top of the insulation or boarding and the top of the counter batten.



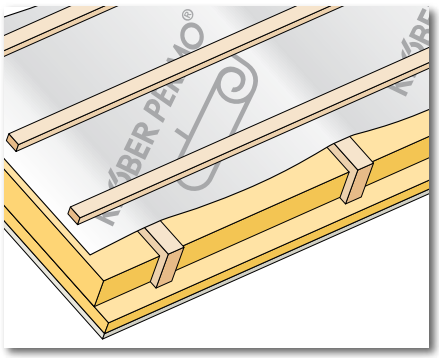
5. Traditional warm roof with insulation over and between rafters and optional Wallint® 10 eco air barrier/vapour control layer



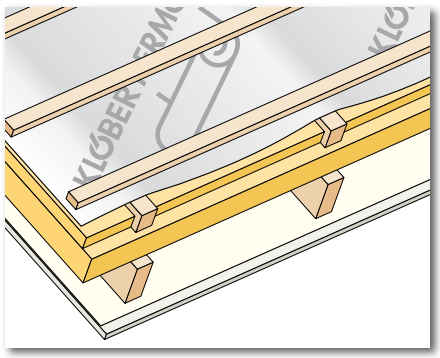
6. Warm roof with insulation between and below rafters.



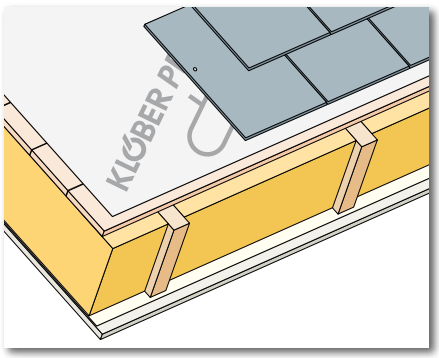
7. Traditional warm roof with Permo® underlay draped over the counter battens



8. Where insulation stops at least 10mm below the top of the rafters, the underlay may be draped between the rafters to avoid the need for counter battens



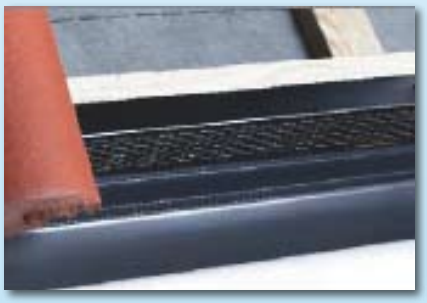
9. Insulation above the rafters and between 50mm deep counter battens with the Permo® underlay draped



10. Warm boarded roof - Scottish practice with no tiling battens – use Permo® air/forte for this application

Underlay Support Tray

Permo® underlays, like all other roofing underlays, are not suitable for long term exposure to sunlight. An Underlay Support Tray is recommended to terminate the underlay at the eaves. Klober's Underlay Support Tray is made of UV-resistant PVCu and is simply nailed or stapled to the lower rafters. The Permo® underlay is lapped over the Underlay Support Tray to provide an effective run-off detail. Once the roof finish has been installed, the Permo® underlay remains covered and protected from over-exposure to sunlight.



Eaves Closer

A simply installed, one-piece perimeter closure detail for counter batten systems only.
Klober's Eaves Closer is made from PVCu and is available in five sizes. It is nailed directly to either the counter battens or to the lowest tiling batten (as shown above).
The close spaced mesh provides an effective barrier to insects and birds, yet maintains air flow and moisture run-off between the underlay and the roof finish.
The Eaves Closer can only be used when the counter battens are fixed over the Permo® underlay.

Typical eaves details

Installation - warm roof Below counter battens

Once the fascia board and tilting fillet have been fixed, nail the Underlay Support Tray in place at the eaves. Lay the first layer of Permo® underlay horizontally across the roof, pulled taught, with with the bottom edge lapping the Underlay Support Tray by 150mm. Fix along rafter centres. After fixing each roll length, nail (at maximum 300mm centres) counter battens at rafter centres. The counter battens to end at the roll's upper lap line. Nail the Eaves Closer to the counter battens/edge batten. Nail tiling battens to the counter battens at centres required for specified roof finish. Use the battens as secure footholds to position and fix next roll. Repeat, working up the roof. Horizontal and vertical laps to be in accordance with BS 5534: 2003.

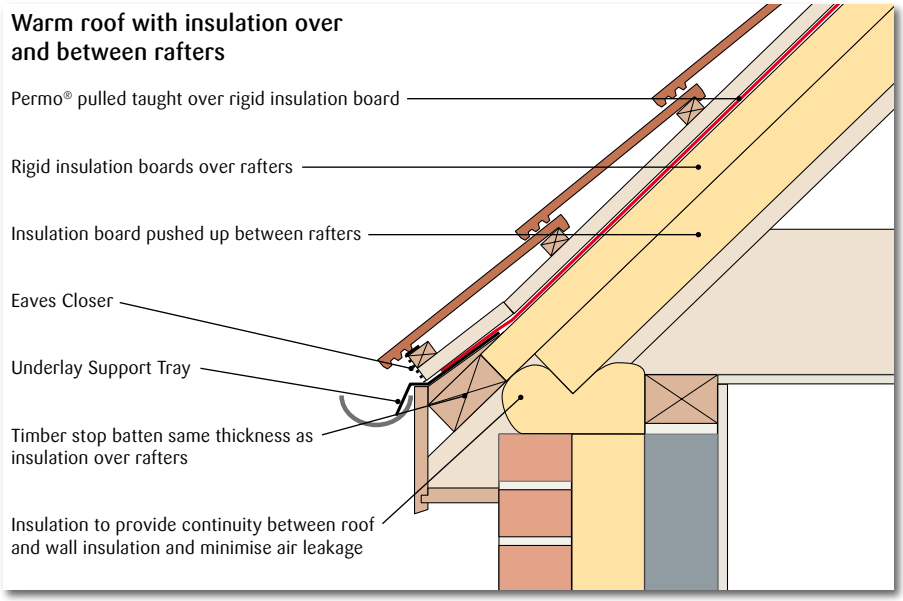
Above counter battens

Once the counter battens and tilting fillet have been fixed, nail the Support Tray in place at the eaves. Lay the first layer of Permo® underlay with the bottom edge lapping the Support Tray by 150mm. Drape the Permo® underlay over the counter battens 10-15mm and fix into counter battens. Nail tiling battens to the counter battens at centres required for specified roof finish. Use the battens as secure footholds to position and fix next roll. Repeat, working up the roof.

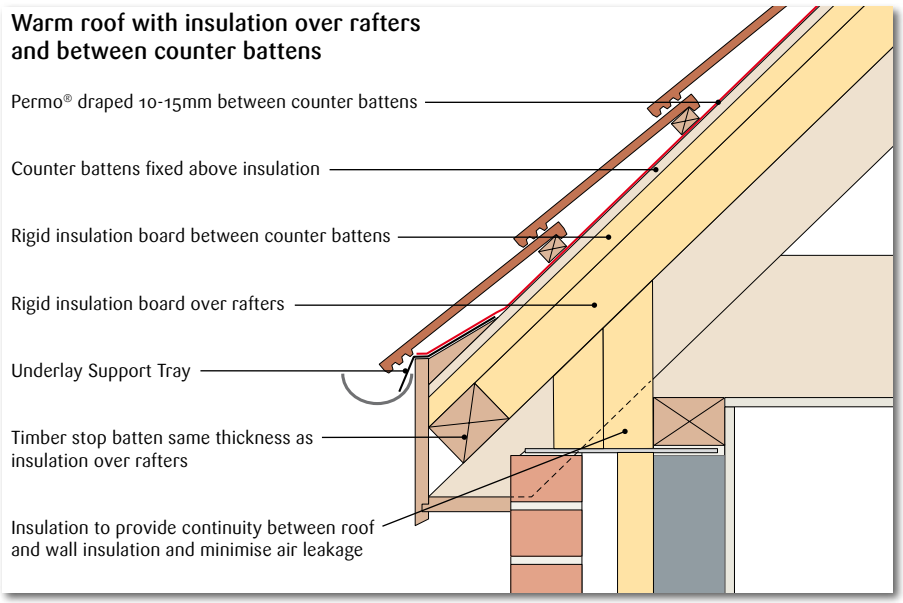
Insulation between and below rafters

If insulation is fully filling the depth of rafters, counter battens must be used. In a partial insulation fill system a gap of at least 10mm must be provided between the insulation and the under-side of the Permo® underlay. This allows the underlay to drape the required minimum amount and counter battens are not required.
A vapour control layer is recommended unless the insulation board on the underside of the rafters has a high vapour resistance - in this case a separate vapour control layer may not be required. We recommend that gaps and joints in the insulation boards or the vapour control layer are sealed prior to the internal linings being installed.

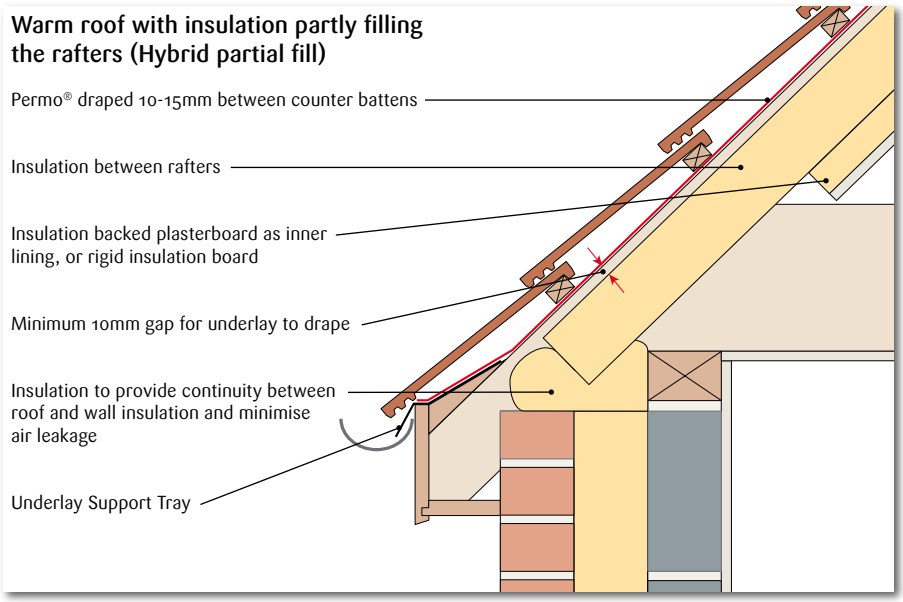
Warm roof with insulation over and between rafters



Warm roof with insulation over rafters and between counter battens

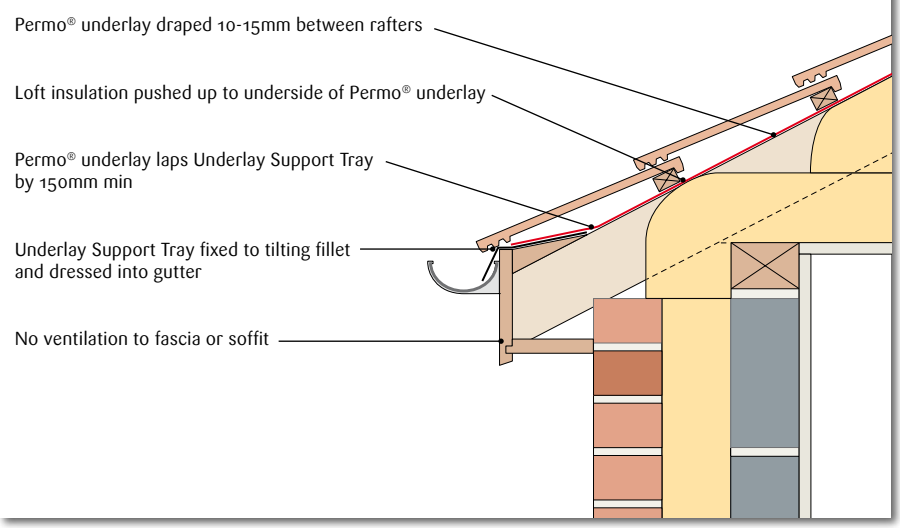


Warm roof with insulation partly filling the rafters (Hybrid partial fill)

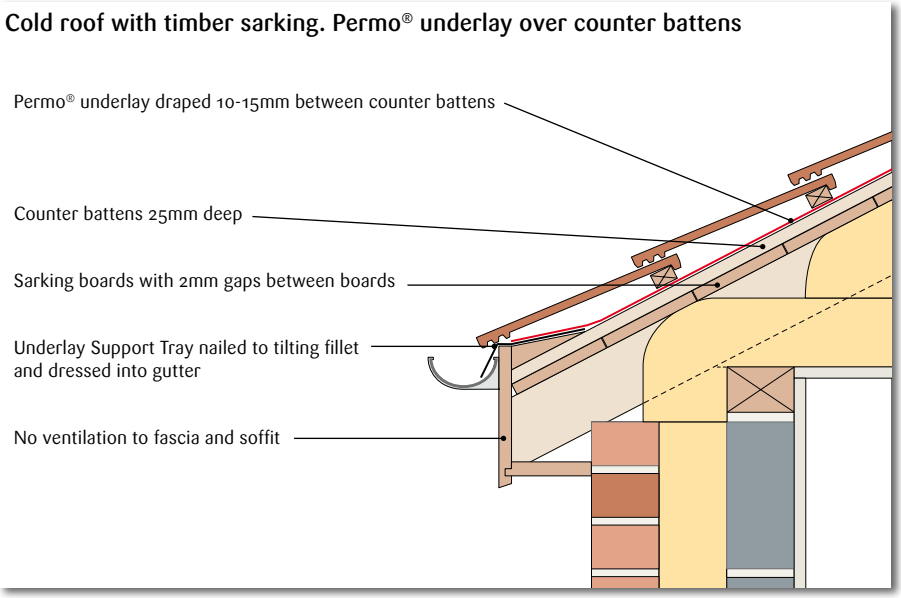


Typical eaves details

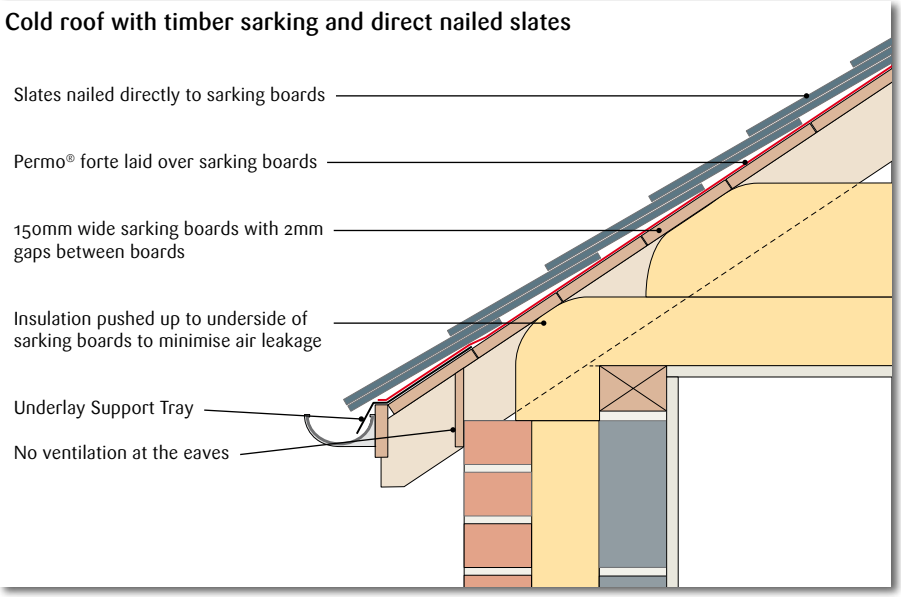
Cold roof with unsupported underlay



Cold roof with timber sarking. Permo® underlay over counter battens



Cold roof with timber sarking and direct nailed slates



Installation - cold roof

Lay the first layer of Permo® underlay with the bottom edge lapping the Underlay Support Tray by 150mm. Drape the Permo® underlay over the rafters 10-15mm and fix along rafter centres with non-ferrous nails or staples at maximum 300mm centres.

Once the first layer is in place, fix the tiling battens to the rafters, taking care not to fix above the marked 150mm lap-line along the first layer's upper edge. This line marks the position for the overlap of the next roll up the roof which is then laid in place and fixed. Horizontal laps to be 150mm minimum, vertical laps 300mm minimum to occur over a rafter. Laps to be in accordance with BS 5534: 2003.

Repeat the sequence, working up the slope until the roof is covered against the weather.

Use the tiling battens as secure foot-holds to lay the roof finish following traditional details and practice.

Over counter battens

The installation over counter battens follows the same sequence as set out above for installation over rafters. Scottish practice Permo® air/forte should be laid horizontally over the sarking boards and either nailed with galvanised clout nails at maximum 300mm centres or stapled with non-ferrous staples. Horizontal laps should be 150mm, or in accordance with BS 5534: 2003

Position the slates directly over the Permo® air/forte underlay and nail into the sarking boards in the traditional way.

Typical ridge detail

Ridges
To follow the new recommendations for cold pitched roofs detailed in the amended BS 5250: 2002, we recommend that you select one of the three options listed below when installing Permo® air, Permo® forte or Permo® light in a cold roof construction:

1. Non-ventilated option
If a non-ventilated cold roof structure is preferred, we recommend that the complete roof construction should fully comply with recommendations stated in our BBA certificate Nos.07/4435, 00/3749 and 99/3622.

2. Ventilated option - dry ridge
A dry ventilated ridge, such as Uni-Dry Ventilated Ridge or Roll-Fix® Kit is installed as per our instructions in conjunction with Permo® air/forte/light.

This option provides a quick and easy installation of ridge tiles providing a watertight and secure, maintenance free ridge line.

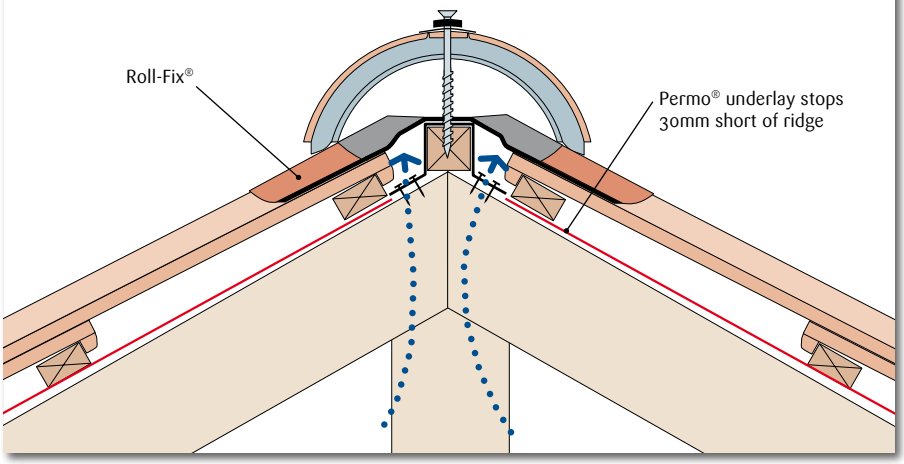
3. Ventilated Option - mortared ridge
If you are using a mortared ridge, to comply with the new guidelines we recommend that the Permo® air/forte/light is opened at the ridge as per our detail shown opposite.

If either the dry or mortared ridge details is chosen and the ceiling below the roof structure is well sealed, then BS 5250: 2002 does not require any low level eaves ventilation to be provided.

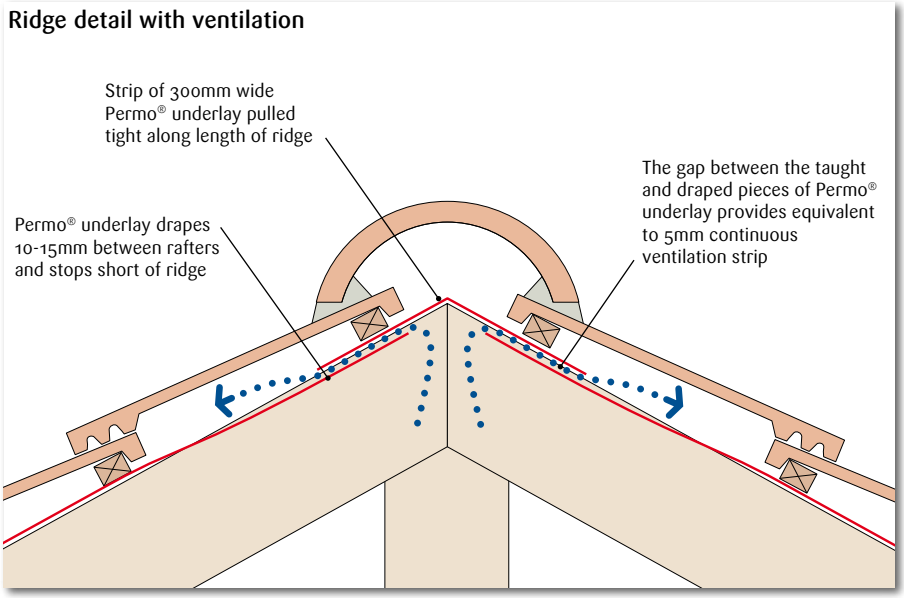
Occupational health
In normal installation and use Permo® underlays do not constitute a hazard under COSHH Regulations. Working with or cutting Permo® underlays does not give off any fumes, fibres or dust that are normally hazardous to health.

Recommendations as to the use of materials and working details and methods are given in good faith as a general guide and as a service to building designers, contractors and manufacturers, based on the accumulated experience and knowledge of Klober.

Typical ridge detail using Klober Roll-Fix® Kit



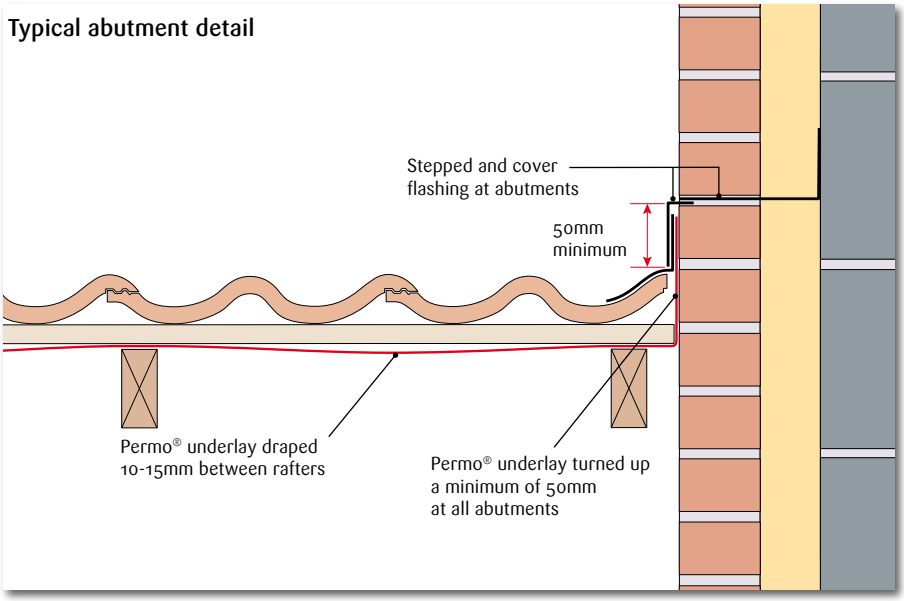
Ridge detail with ventilation

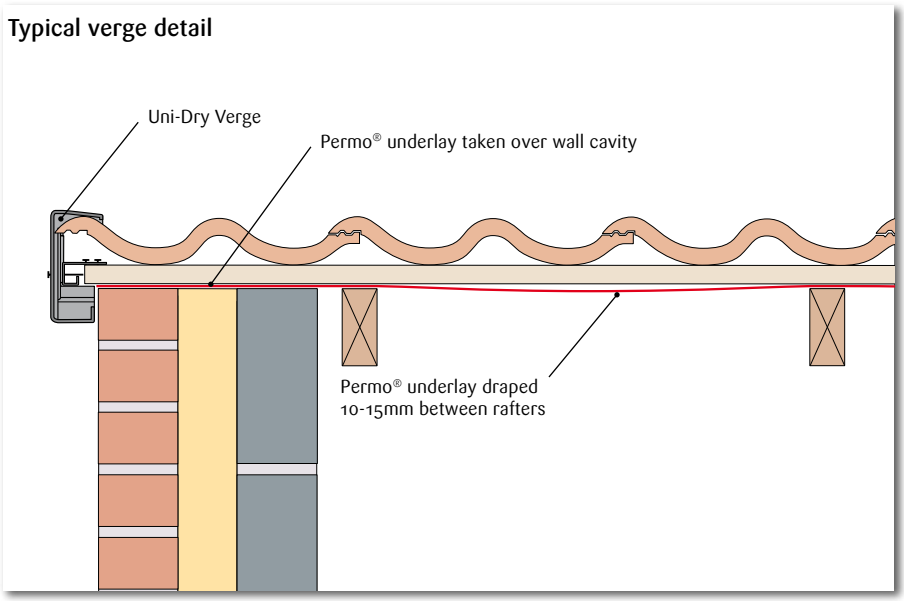


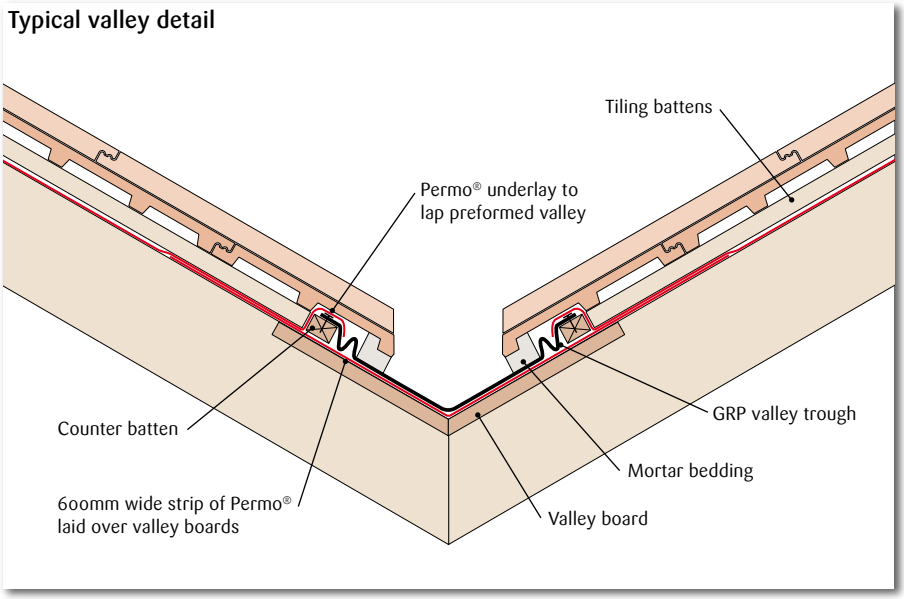
Site safety
On projects to which the Construction (Design and Management) Regulations apply, the installer must ensure that full and appropriate Health and Safety measures are taken when working at height on pitched roofs.
Prior to the commencement of work on a project, such Health and Safety precautions as are considered necessary by the installer should be submitted to and agreed by the project's appointed Planning Supervisor.

Safe handling
Permo® is a flexible underlay, easy to handle and work with. A roll of Permo® (maximum weight approximately 14kg) can be lifted and carried by one person and should not present a risk of injury, provided that safe lifting and handling practices are observed. No special tools are needed. All Permo® underlays can be cut using a sharp bladed knife and are either nailed or stapled to the timber work of the roof structure.

Typical abutment detail







Abutments

At any abutment, such as a chimney stack, raised gable, or dormer turn the Permo® underlay up at least 50mm. Dress over the roof finish using traditional flashing and soaker details as appropriate to complete the weatherproofing to the abutment.

Verges

The Permo® underlay should extend over the wall cavity.
Where bargeboards are used, the Permo® underlay should be fixed to the flying rafter.
Further guidance on the installation of roofing underlays can be found in BS 5534: 2003.

Valleys

A 500mm wide strip of Permo® underlay should be laid up the valley directly over the valley boards prior to the valley lining being laid.
The Permo® underlay is then dressed over the water trough of a GRP Valley or onto the tilting fillet in a lead valley.

Hips

The Permo® underlay from one side should be carried over the hip junction so that it laps over onto the Permo® underlay on the other side by not less than 150mm from the centre of the hip junction. For additional protection a capping strip of Permo® underlay can then be laid over this.

Rooflights

With a minimum upstand of 50mm, the Permo® underlay should be neatly cut and fitted around the kerb, then taped into position using Tacto® adhesive tape applied all round the rooflight. Follow details, incorporating proprietary weathering components, as supplied by the rooflight manufacturer, to complete the installation.

Permo® air

Product features & benefits

- Air open & vapour permeable
- **Over 13% more breathable than any other 'air open' underlay on the market**
- Lowest vapour resistance of all breathable membranes
- Being both air open & vapour permeable further minimises the risk of condensation forming, particularly during the drying out period of a building
- No ventilation required
- Available in 2 widths: 1.5 x 50m & 1m x 50m
- Hydrophobically treated
- Type LR underlay
- Strong 3 layer material
- 15 year guarantee
- Recyclable
- UV stable for 4 months
- Batten spacing 350mm
- Superior nail tear strength

Area of application

Suitable for:

- Cold and warm roof applications

Material

Permo® air is a strong 3 layer product consisting of UV stabilised PP fleece and a high performance Meltblown layer.

Colours

Outer surface- dark blue
Inner surface- grey

Roll sizes

50 x 1.0m (50m²)
50 x 1.5m (75m²)

Roll weights

50 x 1.0m	8.6 kg
50 x 1.5m	13 kg

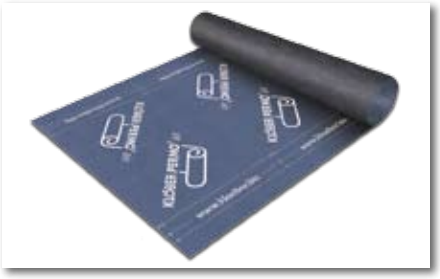
Packaging

20 rolls/pallet

Product codes

50m x 1.0m	KU0045-1
50m x 1.5m	KU0045-15

Permo® air is the most breathable air open low resistance underlay on the market. It is the ideal solution where there is a high risk of condensation forming in the roofspace.



Installation

Permo® air should be laid in accordance with our installation details and BBA certificates.

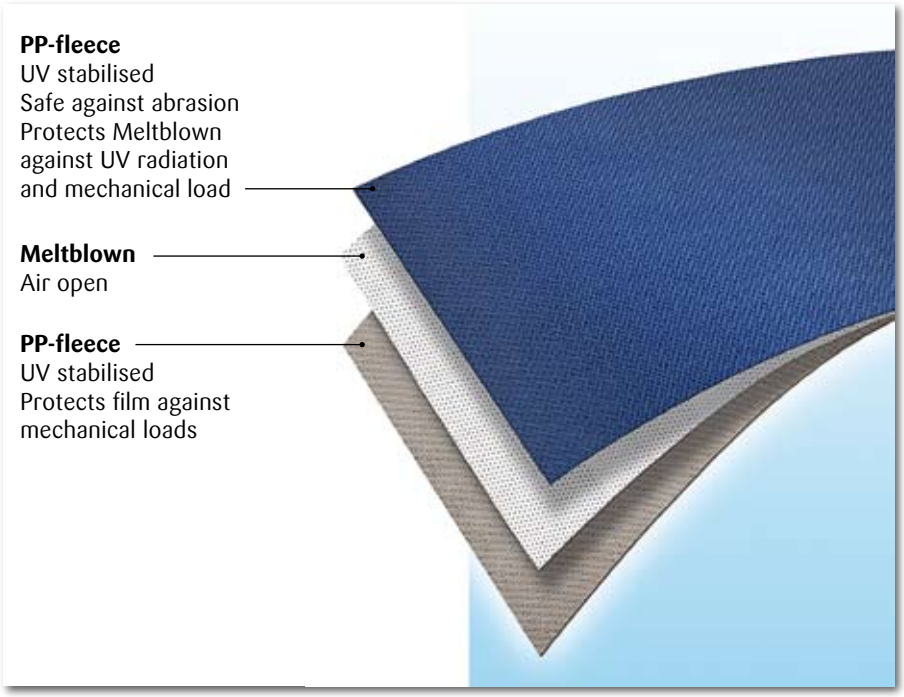
Advantages of air open underlays

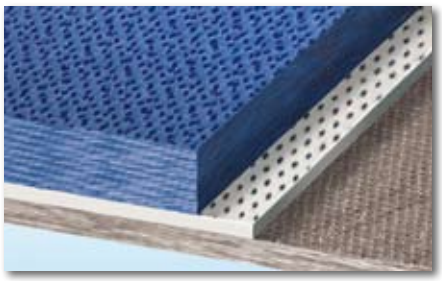
Extremly humid roof conditions can be a result out of:

1. Climate (Extreme regional weather conditions – e.g very cold)
2. New buildings with high levels of construction material moisture
3. Weak spots in the insulation
4. High level of moisture due to behaviour of house owner

If all these aspects come together or if single ones reach a critical level, high levels of ventilation are an essential requirement to prevent condensation.

Permo® air





3-layer product with high performance Meltblown layer
UV stabilised

Air open performance
Highest vapour transmission as air open

Technical data	BBA
Weight, EN 1849-2	160 g/m²
Water vapour transmission s_d-Value, BS 3177	2736 g/m²/day
Water vapour resistance, BS 3177	0.08 MNs/g
Resistance to water penetration, EN 1928	W1
Resistance to air penetration/wind loads	>2.5 kPa
Tensile strength longitudinal, BS EN 12311-1	366 N/5cm
Tensile strength transverse, BS EN 12311-1	252 N/5cm
Resistance to tearing (nail shank) longitudinal, BS EN 12310-1	230 N
Resistance to tearing (nail shank) transverse, BS EN 12310-1	282 N
	CE
Reaction to fire, EN 13501-1, EN 11925-2	E
Resistance to temperature	-40°C to + 80°C
UV exposure, EN 13859-1	4 months

Certifications
CE certified

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE No 07/4435

Related products
To protect the Permo® air at the eaves and to prevent ponding, Underlay Support Trays are available along with a range of adhesive tapes. Eaves closers are available for counterbattened roof structures.
Wallint® 50 and Wallint® solar air barriers and vapour control layers

KLÖBER

Permo® forte
Permo® forte SK²

Product features & benefits
- Very strong and robust vapour permeable underlay
- 4 layer material with grid
- BBA, IAB & CE approved for cold & warm roofs
- UV stable for 4 months
- Double hydrophobically treated
- Allows the roof structure to breathe, yet fully waterproof
- Counterbattens only required on fully supported applications
- Limits air leakage in a sealed roof application
- Type LR underlay
- Permo forte SK² has a double integral tape - creating a strong & durable airtight seal to reduce energy loss. This avoids the use of a separate tape, making installation faster.

Area of application
Suitable for cold and warm roofs

Material
Strong laminated sheet material, with outer layers of polypropylene, an inner layer of microporus polyethylene film and re-inforcement mesh.

Colour
Grey

Roll sizes
50 x 1.5m (75m²)
25 x 1.5m (37.5m²)
50 x 1.1m (55m²)

Roll weights
13kg, 10kg, 6.5kg

Packaging (per pallet)
50 x 1.5m/1.1m	20 rolls
25 x 1.5m	35 rolls

Product codes
50 x 1.5m	KU0044-04
25 x 1.5m	KU0044-04-25
50 x 1.1m	KU0044-04-05
Permo® forte SK²	
50 x 1.5m	KU0044-11

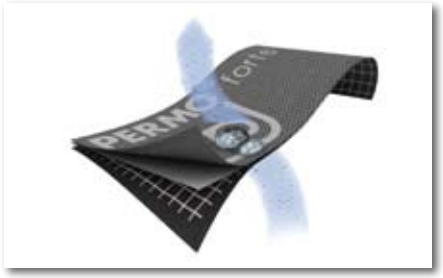
For 25 x 1.5m & 50 x 1.1m codes please contact the sales office

Certifications
CE certified

BBA CERTIFICATE No 99/3622 CERTIFICATE No 00/3749

IRISH AGRÉMENT BOARD BUILDING PRODUCT CERTIFICATION
Certificate no. 03/0190

Related products
- Underlay Support Trays
- Adhesive tapes for joining vertical laps & repairs
- Eaves closers for counterbattened roofs



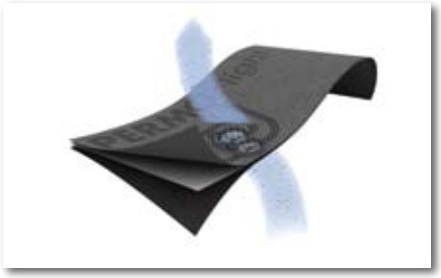
Permo® forte is an extremely strong 4-layer vapour permeable underlay with a built-in safety grid. It is suitable for all pitched roofs.

Installation
Permo® forte should be laid in accordance with our installation details and BBA/IAB Certificates.

Permo® forte SK² has a double integral tape at the laps. This creates a very effective and secure airtight seal, reducing energy loss.
- Glue-on-glue connection creates perfect seal
- Problems laying in wet/dusty conditions avoided because both strips protected by release paper

Technical data	BBA
Thickness	0.6 mm
Weight	175 g/m²
Water vapour resistance BS 3177	0.2 MNs/g
Water vapour permeability BS3177	1034 g/m²/day
Water vapour transmission s_d-Value EN ISO 12572	< 0.02 m
Water column	> 2 m
Tensile strength longitudinal, BS 2782-3	386 N/5cm
Tensile strength transverse, BS 2782-3	262 N/5cm
Nail tear strength longitudinal, MOAT 27:5.4.1	190 N
Nail tear strength transverse, MOAT 27:5.4.1	122 N
	CE
Fire Rating	E
Temperature	-40°C to + 80°C
UV exposure	4 months

Permo® light
Permo® light SK²



Permo® light is a strong 3-layer vapour permeable roofing underlay suitable for warm and cold pitched roofs.

Installation
Permo® light should be laid in accordance with our installation details and BBA/IAB Certificates.

Permo® light SK² has a double integral tape at the laps. This creates a very effective and secure airtight seal, reducing energy loss.

- Glue-on-glue connection creates perfect seal
- Problems laying in wet/dusty conditions avoided because both strips protected by release paper

Technical data	BBA
Thickness	0.5 mm
Weight	145 g/m²
Water vapour resistance BS 3177	0.18 MNs/g
Water vapour transmission BS3177	1149 g/m²/day
Water column	> 2 m
Tensile strength longitudinal, BS 2782-3	264 N/5cm
Tensile strength transverse, BS 2782-3	210 N/5cm
Nail tear strength longitudinal, MOAT 27:5.4.1	116 N
Nail tear strength transverse, MOAT 27:5.4.1	96 N
	CE
Fire Rating	E
Temperature	-40°C to + 80°C
UV exposure	4 months

Product features & benefits
- Robust vapour permeable underlay
- 3 layer material
- BBA, IAB & CE approved for cold & warm roofs
- UV stable for 4 months
- Hydrophobically treated
- Allows the roof structure to breathe, yet fully waterproof
- Counterbattens only required on fully supported applications
- Limits air leakage in a sealed roof application
- Type LR underlay
- Permo light SK² has a double integral tape - creating a strong & durable airtight seal to reduce energy loss. This avoids the use of a separate tape, making installation faster.

Area of application
Suitable for cold and warm roofs

Material
Permo® light is a strong laminated sheet material, with outer layers of polypropylene, and an inner layer of microporus polyethylene film

Colour
Grey

Roll sizes
50 x 1.5m (75m²)
50 x 1.1m (55m²)

Roll weights
11 kg
8.5 kg

Packaging (per pallet)
20 rolls

Product codes
50 x 1.5m KU0043-04
50 x 1.1m KU0043-04-05

Permo® light SK²
50 x 1.5m KU0043-11

For 50 x 1.1m please contact the sales office

Certifications
CE certified

BBA CERTIFICATE No 99/3622 CERTIFICATE No 00/3749

IRISH AGRÉMENT BOARD BUILDING PRODUCT CERTIFICATION
Certificate no. 03/0190

Related products
- Underlay Support Trays
- Adhesive tapes for joining vertical laps & repairs
- Eaves closers for counterbattened roofs

KLÖBER

Permo® sec

Product features & benefits

- Covers irregularities within roof deck that could de-form metal roof covering
- Fully waterproof secondary barrier to moisture penetration
- Fully vapour permeable
- Acoustic value of 8db helps reduce the transmission of external structure borne sounds eg rain hammer
- Will not bond with the underside of the outer covering in hot conditions
- Allows movement between the outer covering and the structural deck
- Prevents condensation that occurs on the underside of the metal roof covering from re-entering the roof structure. Any build-up of moisture between the outer metal roof covering and the Permo sec will be channelled safely to the eaves due to the nature of the 8mm mesh outer layer
- Offers protection against external moisture that may penetrate the outer roof covering
- Provides an air space below zinc coverings to allow protective oxidation to form
- Can be used as a temporary water proofing barrier. However, it is recommended that the outer covering is applied as quickly as possible

Area of application

Suitable for:

- roof pitches over 3°
- Can be laid over rigid insulation or timber boarding

Material

Outer layer of polypropylene mesh bonded to a vapour permeable membrane. 5 layer fleece foil combination of polyolefin, hydrophobic treatment and PP monofilament mesh.

Colours

Outer surface - anthracite

Inner surface - white

Roll sizes

25 x 1.5m (37.5m²)

Roll weight

21 kg

Packaging

4 rolls/pallet

Product codes

KU0027

Certifications

CE certified

Related products

Adhesive tapes for sealing and repairing

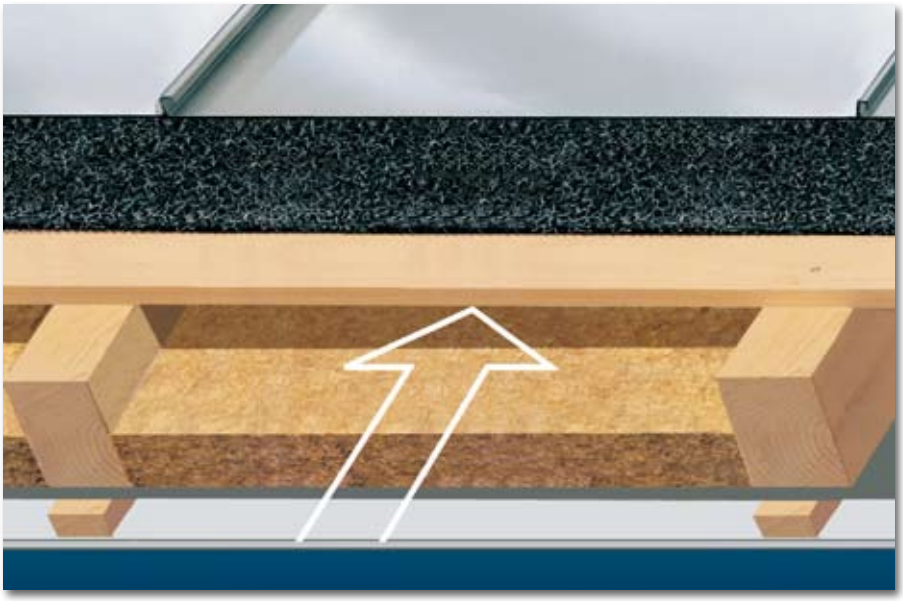
Permo® sec is a vapour permeable waterproofing barrier that is installed as a separating layer between copper, zinc, aluminium and stainless steel standing seam roof finishes and the supporting deck.

Installation

The product is laid between the timber deck/insulation and the outer metal roof covering and can either be laid horizontally or vertically and is fixed using non-ferrous staples or flat head clout nails on the overlap. Permo® sec should be laid in accordance with our full installation instructions.

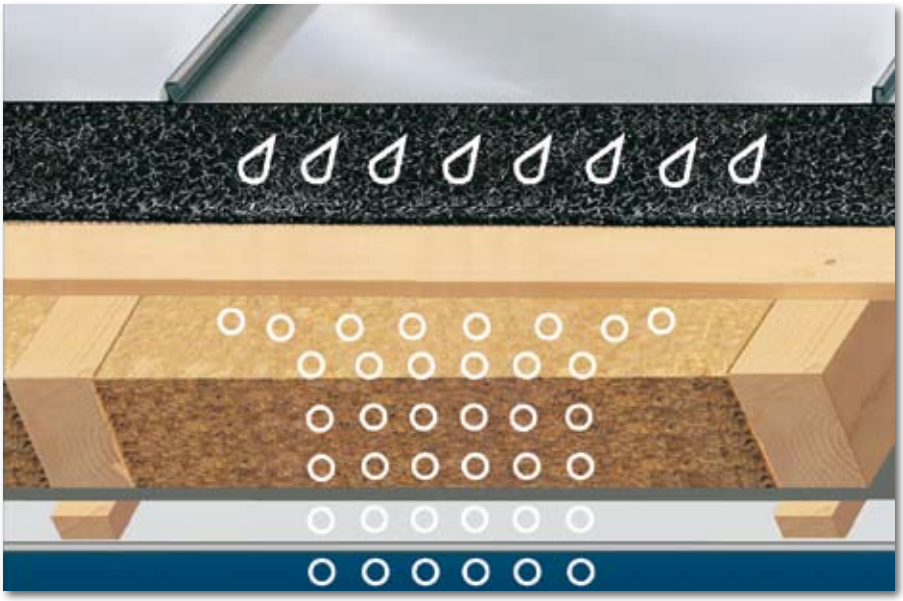
Technical data	CE
Thickness	8.5 mm
Weight, EN 1849-2	550 g/m²
Water vapour transmission s_d-Value, EN 12572	0,03 m
Water column, EN 20811	>3000 mm
Resistance to water penetration, EN 1928	W1
Resistance to air penetration	<0,1 m³/m² h 50 Pa
Tensile strength longitudinal, EN 12311-1	320 N/5cm
Tensile strength transverse, EN 12311-1	290 N/5cm
Elongation longitudinal, EN 12311-1	5%
Elongation transverse, EN 12311-1	5%
Resistance to tearing (nail shank) longitudinal, EN 12310-1	280 N
Resistance to tearing (nail shank) transverse, EN 12310-1	340 N
Reaction to fire, EN 13501-1, EN 11925-2	E
Resistance to temperature	-30°C to + 80°C
Melting point	>200°C
Acoustic damping value	8db
UV exposure EN 13859-1	4 months

Permo® sec



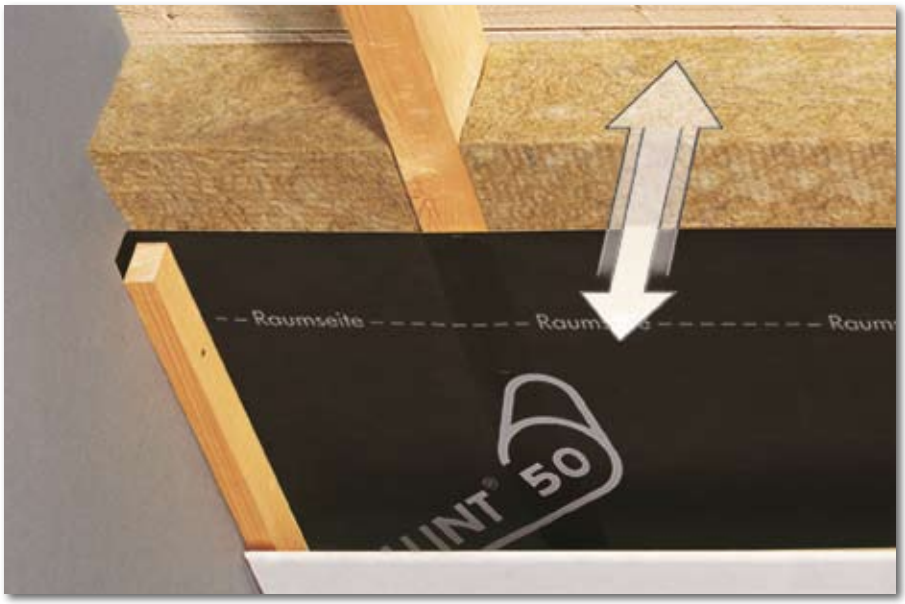
Ventilated metal roof

- Partial fill insulation
- If ply wood or OSB is used as the timber support deck, the space below must be ventilated in accordance with BS5250: 2002
- Ventilation is not required if 150mm wide timber boards with 2mm gaps between are used as the supporting deck
- We recommend that an air barrier/ vapour control layer such as Wallint® 50 is installed on the warm side of the roof structure



Un-ventilated metal roof

- The insulation is either installed on top of the rafters or inbetween fully filling the depth of rafter
- Timber boards 150mm wide with 2mm gaps between each board must be used if the insulation is installed between the rafters
- Ply wood or OSB boards can be used if the insulation is installed on top of the rafters
- We recommend that an air barrier/ vapour control layer such as Wallint® 50 is installed on the warm side of the roof structure



Vapour Control

- Wallint®50 is an air barrier/ vapour control layer that is installed on the warm side of the construction and will prevent large volumes of water vapour from entering the roof structure from the inside, particularly during the drying out stage of a new building development. Full sealing at laps and abutments is necessary using Klober adhesives.

Wallint® 50

Product features & benefits

- Use in conjunction with Klober's other airtightness products to minimise energy loss
- Prevents large volumes of water-vapour entering a construction from the interior, particularly during the drying-out period
- Provides support for insulation boards or quilts
- Meets requirements of BS9250

Also remember to seal:

- Laps between underlays using tapes, eg Permo® TR, Tacto®
- Around penetrations using tape, eg Easy-Form® tape
- To rough surfaces using a sealant eg Pasto®
- Around any pipes with a Pipe Sealing Collar and tape

Area of application

Suitable for:

- The inner face of an insulated roof
- Walls (incl timber frame) & cold and warm roof applications
- Ceilings & walls of rooms-in-the-roof, and on the ceilings below non-habitable lofts

Material

Composite PP-spun fleece with coating

Colour

Black

Roll sizes

50 x 1.5m (75m²)

Roll weights

9.5kg

Packaging (per pallet)

20 rolls

Product codes

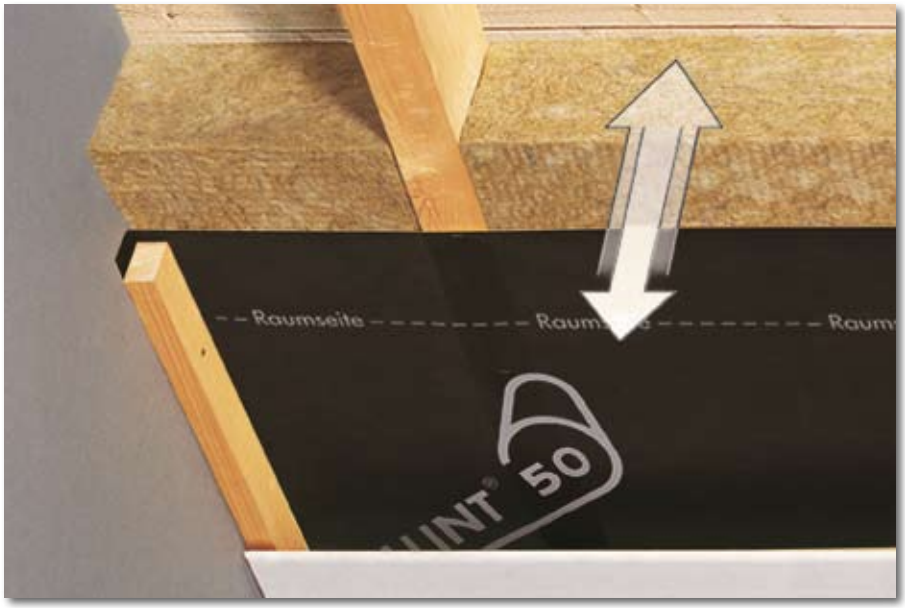
KU0065

Certifications

CE certified

Related products

- Pasto® sealant
- Permo® TR universal tape
- Tacto double-sided tape
- Pipe sealing collar



Klober's **Wallint® 50** is a combined air barrier and vapour control layer. It has a vapour resistance of 250MNsg, meeting the requirements of BS9250 (Code of Practice for design of the airtightness of ceilings in pitched roofs). As even thicker layers of insulation are installed to comply with more demanding Building Regulations, so it becomes increasingly important to provide an air barrier and vapour control layer on the warm side of the insulation. Wallint® 50 has been especially developed for this purpose.

Installation

Before Wallint® 50 is installed, check the moisture content of the timbers is less than 20%. Fix on the warm side of the insulation and rafters, with the printed smoother surface facing inwards. At either edge of the structure, leave a 150mm overlap to allow Wallint® 50 to be sealed to adjoining walls. Roll-out with a horizontal headlap of 150mm. Fix to rafters/ceiling joists using non-corrosive fixings eg staples. Ensure laps are sealed using a tape eg Permo® TR. Ensure that Wallint® 50 is sealed at all abutments/junctions using either tape eg Permo® TR or Pasto® sealant. If parging, first turn Wallint® 50 down the face of the wall, fix plaster stop bead on top of Wallint® 50 and then parge on top. Any holes or tears in the air barrier/vapour control layer should be repaired with Permo® TR tape. Where pipes pass through use Klober's Pipe Sealing Collar and tape edges to Wallint® 50 to achieve an airtight seal. Wallint® 50 should cover the entire internal timber frame area of the rooms in the roof and, where applicable, link with vapour control layer in the wall below to form a continuous air barrier. For refurbishment projects, Wallint® 50 should be laid vertically either from ridge to eaves or vice versa. This is to allow small sections of the roof to be worked on. Joins should be taped using Permo® TR and sealed at the eaves using Pasto® or Permo® TR.

Technical data	CE
Reaction to fire EN 13501-1, EN 11925-2	E class
Resistance to water penetration EN 1928	W1
Water vapour transmission EN 1931 (sd value)	50m
Water vapour transmission after ageing EN 1296, EN 1931	passed
Tensile strength longitudinal EN 12311-2	200 N/50 mm
Tensile strength transverse EN 12311-2	160 N/50 mm
Elongation longitudinal EN 12311-2	60%
Elongation transverse EN 12311-2	65%
Resistance to tearing (nail shank) longitudinal EN 12310-1	165 N
Resistance to tearing (nail shank) longitudinal EN 12310-1	175 N
Resistance to air penetration	< 0.1 m³/m² h 50Pa
Resistance to temperature	- 40 / +80 °C

Additional technical data

Water vapour transmission	250 MNsg

Wallint® solar

Wallint® solar is Klober's new reflective air barrier and vapour control layer. With a vapour resistance of over 500 MNsg, it far exceeds the requirements set out in BS9250 (Code of Practice for design of the airtightness of ceilings in pitched roofs). Its reflective surface reduces heat loss through the roof. Moreover, when combined with other products in Klober's airtightness range it will help you minimise energy loss.

Installation

Before Wallint® solar is installed, check the moisture content of the timbers is less than 20%. Fix on the warm side of the insulation and rafters, with the reflective surface facing the interior and a services void. At either edge of the structure, leave a 150mm overlap to allow Wallint® solar to be sealed to adjoining walls. Roll-out with a horizontal headlap of 150mm. Fix to rafters/ceiling joists using non-corrosive fixings eg staples. Ensure that laps are sealed using a tape eg Permo® TR, that it is sealed at all abutments/junctions using either tape eg Permo® TR or Pasto® sealant. If parging, first turn Wallint® solar down the face of the wall, fix plaster stop bead on top of Wallint® solar and then parge on top. Any holes or tears in the air barrier/vapour control layer should be repaired with Permo® TR tape. Where pipes pass through use Klober's Pipe Sealing Collar and tape edges to Wallint® solar to achieve an airtight seal. Wallint® solar should cover the entire internal timber frame area of the rooms in the roof and, where applicable, link with vapour control layer in the wall below to form a continuous air barrier. For refurbishment projects, Wallint® solar should be laid vertically either from ridge to eaves or vice versa. This is to allow small sections of the roof to be worked on. Joins should be taped using Permo® TR and sealed at the eaves using Pasto® or Permo® TR.

Technical data	CE
Reaction to fire EN 13501-1, EN 11925-2	E class
Resistance to water penetration EN 1928	W1
Water vapour transmission EN 1931 (sd value)	>100m
Tensile strength longitudinal EN 12311-2	600 N/50 mm
Tensile strength transverse EN 12311-2	550 N/50 mm
Elongation longitudinal EN 12311-2	40%
Elongation transverse EN 12311-2	50%
Resistance to tearing (nail shank) longitudinal EN 12310-1	250 N
Resistance to tearing (nail shank) longitudinal EN 12310-1	300 N
Resistance to air penetration	0.003 m^3/m^2 h 50Pa
Resistance to temperature	- 40 / +80 °C
Additional technical data	
Water vapour transmission	>500 MNsg

Product features & benefits

- Use in conjunction with Klober's other airtightness products to minimise energy loss
- As even thicker layers of insulation are installed to comply with more demanding Building Regulations, so it becomes increasingly important to provide an air barrier and vapour control layer on the warm side of the insulation.
- Reflective surface increases construction's thermal resistance when facing into the services void or room
- Vapour resistance of >500 MNsg, far exceeding requirements of BS9250
- Prevents large volumes of water-vapour entering a construction from the interior, particularly during the drying-out period
- Provides support for insulation boards or quilts

Also remember to:

- Use Permo® TR tape to seal laps etc – its transparency helps Wallint® solar maintain its low emissivity properties
- Seal around penetrations using tape eg Easy-Form® tape
- Seal to rough surfaces using a sealant eg Pasto®
- Seal around any pipes with a Pipe Sealing Collar and tape

Area of application

Suitable for:

- The inner face of an insulated roof
- Walls (incl timber frame) & cold and warm roof applications
- Ceilings & walls of rooms-in-the-roof, and on the ceilings below non-habitable lofts

Material

Composite woven, non-woven, foil

Colour

Outside - silver

Roll sizes

50 x 1.5m (75m^2)

Roll weights

13.5 kg

Packaging (per pallet)

20 rolls

Product codes

KU0063

Certifications

CE certified

Related products

- Pasto® sealant
- Permo® TR universal tape
- Tacto double-sided tape
- Pipe sealing collar

Permo® frame

Product features & benefits

- Strong vapour permeable timber frame wall membrane
- Waterproof
- UV stable for 4 months
- Allows the wall structure to breathe
- Available in 4 standard colours
- Bespoke colours & customer logos available on request, subject to minimum quantities
- Windtight and draught-free
- Highly vapour permeable with no risk of condensation build up
- Can be used with any cladding
- Protects timber and insulation during construction
- Can be fixed directly to insulation or sheathing with no 'tent' effect
- Joints can be sealed with Tacto or Permo® Pro HD adhesive tape
- Environmentally friendly – recyclable
- Protects the ply or OSB sheathing and the timber frame from external moisture ingress, yet allows the wall structure to breathe
- Protects the building fabric during the construction process
- Limits air leakage from the completed building
- Resistant to the passage of water and wind-blown dust and snow

Area of application

Permo® frame is a vapour permeable membrane specifically designed for use on timber and steel framed walls. It can be used in factory pre-assembled panels and on site assembled frames. It can also be used to support the insulation in a suspended timber ground floor.

Permo® frame is a single-layer, vapour-permeable membrane for use on timber framed walls and behind vertical cladding.

Design considerations

The risk of condensation forming in timber and steel framed constructions depends on the difference in temperature and relative humidity between the inside and outside and the vapour resistance of the layers of the construction.

A few key design points help to minimise the condensation risk:

- remove moisture from kitchens and bathrooms at source
- provide a vapour control layer on the warm side of the insulation
- seal the vapour control layer so that there is no air infiltration into the insulation layer behind it
- select materials with decreasing vapour resistance towards the outside of the wall

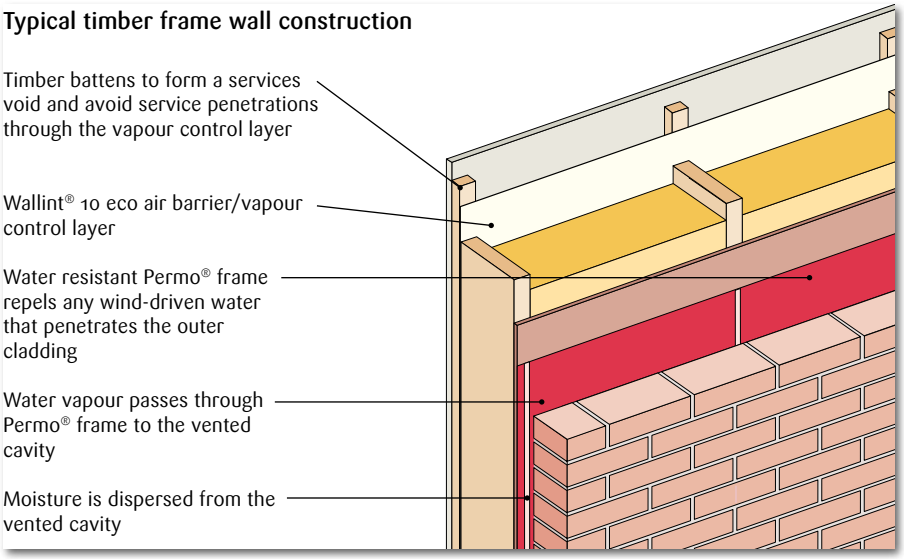
The vapour control layer should have a vapour resistance at least 6 times more than the sheathing board. Wallint® 10 eco makes an ideal air barrier/vapour control layer. To avoid services, such as electrical cables and socket outlets, penetrating the vapour control layer, Klober recommend a services void is formed by fixing timber battens to the studs, as shown in the drawing on the following page.

Ideally, the outer sheathing should have a low vapour resistance to minimise the risk of water vapour being trapped in the insulation layer.

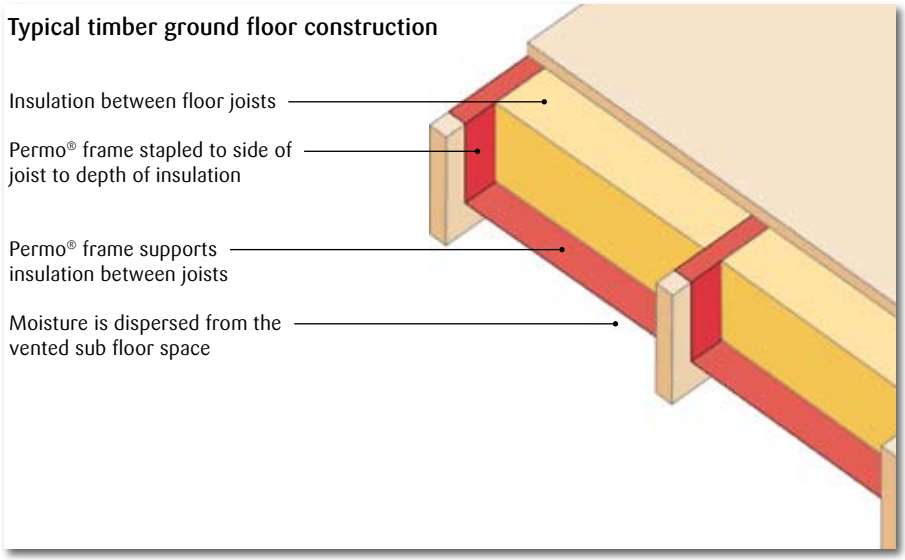
Klober can provide a condensation risk analysis of your design construction using the methods set out in BS 5250: 2002.

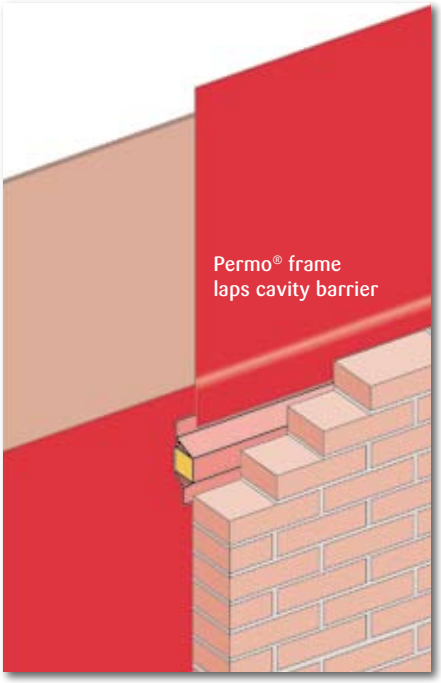
Permo® frame

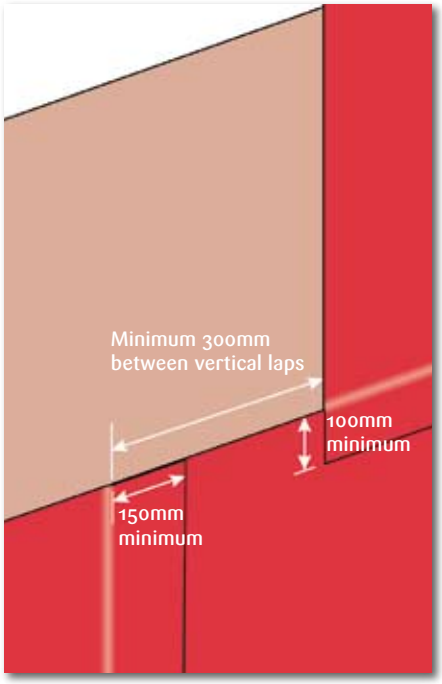
Typical timber frame wall construction



Typical timber ground floor construction







Material

Permo® frame is a strong non woven spun bonded polypropylene sheet material. It exceeds the requirements for a material as defined in BS4016: 1997.

Colours

Anthracite
Dark blue
Green
Red
Customer logos available on request, subject to minimum order

Roll sizes

1.5 x 50m	75m² (anthracite only)
2.7 x 100m	270m²

Roll weights

1.5m	7.5 kg
2.7m	27 kg

Product codes

2.7m

Anthracite	KU0059-2-1-27-10
Dark blue	KU0059-4-5-27-10
Green	KU0059-4-6-27-10
Red	KU0059-2-4-27-10

1.5m

Anthracite	KU0059-1-1-15-10

Certifications

CE certified

BBA Certificate No 02/3958

IRISH AGRÉMENT BOARD BUILDING PRODUCT CERTIFICATION
Certificate no. 05/0227

A Member of UKTFA

IRISH TIMBER FRAME MANUFACTURERS' ASSOCIATION

Related products

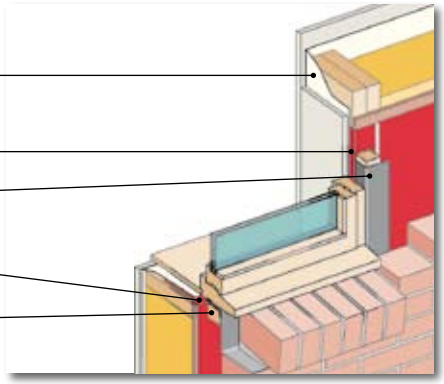
Klober also manufacture a range of adhesive tapes for sealing and repairing breather membranes for walls.

Permo® frame

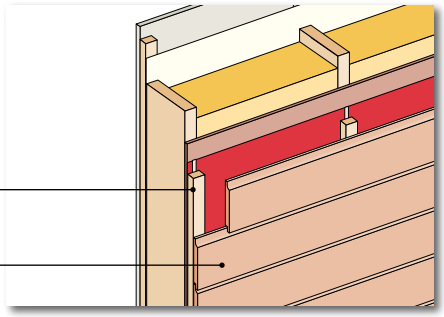
Installation

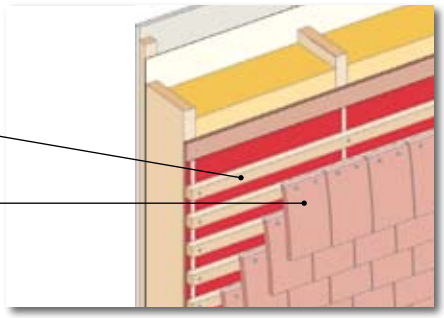
Permo® frame should be laid in accordance with our installation details.
Permo® frame provides a complete barrier to moisture and must be installed to channel water to the outside. The upper layers must overlap the lower layers and also lap and cavity trays.
Unroll Permo® frame horizontally and fix to the outside of the frame. Ensure the membrane covers the lowest frame member by a minimum of 25mm. At external corners return the membrane at least 300mm.
Form 100m horizontal laps and 300mm vertical laps. Stagger vertical laps by a minimum of 300mm. Optionally, tape and seal laps with Tacto® adhesive tape.
All tears and rips within the Permo® frame must be repaired using Permo® HD tape.
Nail or staple Permo® frame, using non corrosive fixings, to every stud at maximum 300mm centres.
At window openings turn the Permo® frame into the opening, fix to the reveals and trim.
Permo® frame is strong and durable in normal use, but should not be exposed to sunlight for more than four months. On very exposed sites and tall buildings, or if cladding may be delayed, Klober recommend that any battening is fixed immediately, with edge battens fixed all round the perimeter to help prevent lifting and damaging of the membrane in extreme conditions.

Typical details



Cladding options

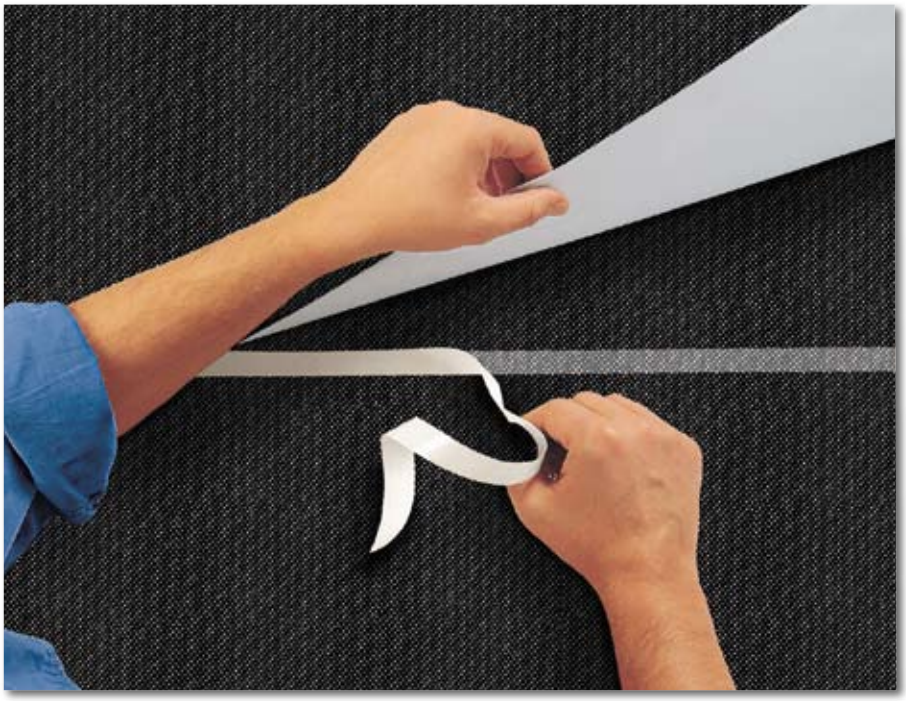




Note: Klober recommend that 19mm deep counter battens are used on sites that are severely exposed.

Technical data	BBA
Weight	100 g/m²
Water vapour resistance BS 3177	0.06 MNs/g
Water vapour permeability BS3177	3465 g/m²/day
Water vapour transmission s_d-Value EN ISO 12572	<0.017 m
Water column	230 mm
Tensile strength longitudinal, BS EN 12311-1	195 N/5cm
Tensile strength transverse, BS EN 12311-1	205 N/5cm
Nail tear strength longitudinal, BS EN 12310-1	187 N
Nail tear strength transverse, BS EN 12310-1	167 N
	CE
Reaction to fire, EN 13501-1, EN 11925-2	E
Resistance to temperature	-40°C to + 80°C
UV exposure, EN 13859-1	4 months

Tacto® tape



Tacto® can be used to adher underlays & vapour control layers/air barriers to both smooth and irregular surfaces as well as sealing laps in the underlay/vcl. By creating an airtight seal it will help reduce energy loss through the roof.

Technical data

Adhesive	Acrylic
Solvent	None
Installation temperature	>5°C
Temperature stability	-40 to +80°C
UV resistance	4 months
Resistance to ageing	Acrylic adhesive does not dry out or become brittle. It remains permanently elastic & adhesive.
Shelf life	12 months at 30°C or less

Product features & benefits

- Double-sided
- Fibre-reinforced tape with high-tack acrylic adhesive
- Creates air and wind-tight seals
- Highly resistant to changes in temperature & weather
- Highly durable

Area of application

Suitable for:

- Sealing laps between underlays or vapour control layers/air barriers
- Adhering underlays & vcls/air barriers to both smooth and irregular surfaces, eg plasterboard, roof lights & roof vents
- Timber frame: planed/finished or stained
- Absorbent materials: gypsum fibreboard
- Synthetic materials: paper, fleece or similar, PE, PP or hard PVC
- Other surfaces: metal, glass, PUR-foam/styrofoam
- Use both internally & externally
- Roof pitches from 16°

Material

Acrylic adhesive with PE release paper

Colour

Transparent

Dimensions

50m x 20mm wide

Weight (per carton)

4.8kg

Packaging

10 rolls per carton

Product code

KU0111

Related products

- Any Klober underlay
- Wallint® or Wallint® solar vapour control layers/air barriers

Permo® TR tape

Product features & benefits
- Single-sided
- Includes a reinforcement mesh for strength
- Multi-functional tape, used for joining, repairing and creating airtight seals
- Ideal for use with Wallint® solar since it maintains its low emissivity properties
- Extremely durable

Area of application
Suitable for:
- Repairing holes/tears in underlays or vapour control layers/air barriers
- Sealing laps between underlays or vapour control layers/air barriers
- Creating a seal around sealing collars
- Around roof penetrations
- Butt joints
- Timber frame: planed/finished or stained
- Synthetic materials: paper, fleece or similar, PE, PP or hard PVC
- Other surfaces: metal, glass, PUR-foam/styrofoam
- Use both internally & externally
- All pitches of roof

Material
Acrylic adhesive with PE release paper

Colour
Transparent

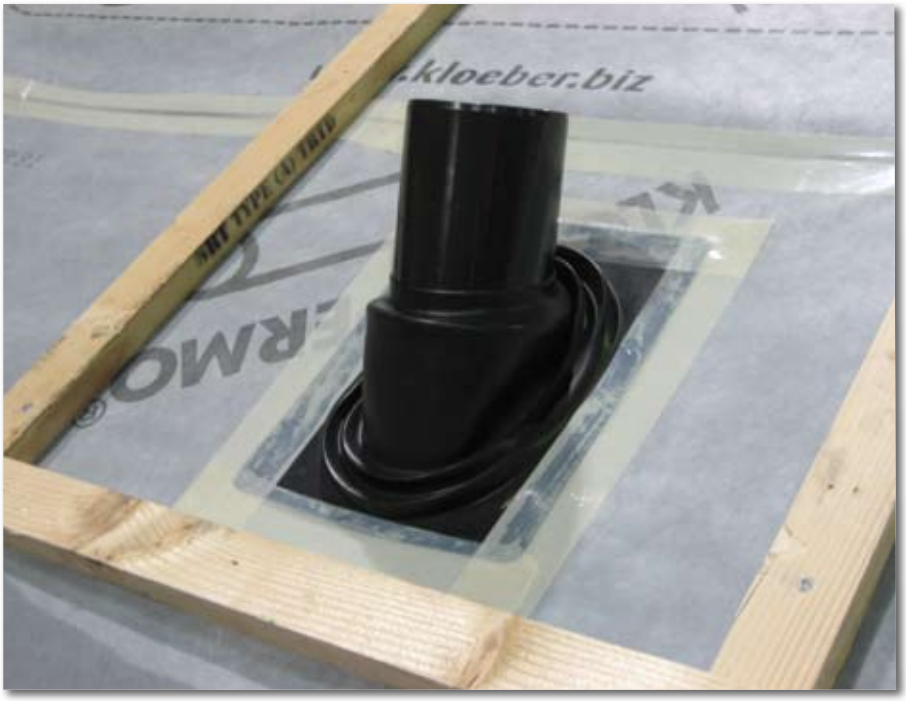
Dimensions
25m x 60mm wide

Weight (per carton)
3.8kg

Packaging
10 rolls per carton

Product code
KU 0121

Related products
- Any Klober underlay
- Wallint® or Wallint® solar vapour control layers/air barriers
- Pipe sealing collar



Permo® TR is an essential product for reducing energy loss through the roof. It is a multi-functional adhesive tape, ideal for creating airtight seals between laps in underlays or vapour control layers/air barriers, repairing holes in underlays/vcls and sealing around pipe sealing collars, as shown above.

Technical data

Adhesive	Acrylic
Solvent	None
Installation temperature	>-10°C
Temperature stability	-40 to +80°C
UV resistance	3 months
Resistance to ageing	Acrylic adhesive does not dry out or become brittle. It remains permanently elastic & adhesive.
Shelf life	12 months at <30°C

Easy-Form® tape

Easy-Form® tape is a multi-functional highly flexible tape. It can be used both inside and outside, creating watertight and airtight seals around penetrations, corners of roof windows or tears in underlays.

Installation

- Measure and cut the appropriate length of tape. Fold in half and crease lengthways down the centre of the tape.
- Peel back one section of the release paper
- Apply this section before peeling back the second section of the release paper
- Shape the Easy-form around the contours

Technical data

Adhesive	Butylon
Exterior surface	Aluminium
Thickness	0.8mm
Installation temperature	+5 to +40°C
Storage temperature	-20 to +30°C
Storage	Store in upright position

Product features & benefits

- Full butylon backing offers excellent adhesion & is highly resistant to ageing
- Can be used for a multitude of applications on the roof
- Quick and easy to use
- Can stretch up to 70% lengthways, allowing tight seals to be created around traditionally difficult areas eg roof windows, pipe penetrations
- Two widths: 60 & 90mm

Area of application

Suitable for use:

- Both inside and outside
- Around roof penetrations eg TV antennae, cables, pipes
- Repairing roofing underlays
- Around corners of skylights

Material

Crepped coated aluminium, PET fleece, complete coating with self-adhesive butylon

Dimensions

60mm wide x 10m long
90mm wide x 10m long

Packaging

6 rolls per carton
49 cartons per pallet

Product codes

60mm x 10m	KW0060
90mm x 10m	KW0090

Colour

Anthracite

Related products

- Permo® air-open and vapour-permeable underlays
- Venduct® tile and slate vents
- Prismax® skylights

Permo® seal

Product features & benefits
- Ideal for using on counterbattens to seal nail penetrations through the underlay
- Can be used on damp and dusty surfaces or battens as well as in cold weather
- Convenient bottle, covering approx. 50m of counterbattens
- Quick to apply

Area of application
On all Permo® vapour-permeable underlays around nail penetrations

Material
Polyurethane

Colour
Grey

Weight
1000g

Coverage
Approx. 50m

Packaging
10 pcs/carton
240 pcs/pallet

Product codes
KU 0129-01

Related products
- Permo® underlays
- Wallint® vapour control layers/ air barriers

Permo® seal is a durable and easy-to-apply sealant, ideal for sealing around nail penetrations and staples on counterbattens.

Technical data

Adhesive	Polyurethane
Solvent	none
Application temperature	7° to 35°C
Temperature stability	-40° to +110°c
UV resistance	durable
Resistance to ageing	durable
Shelf life	12 months between 15° & 25°c

Pasto® sealant

Pasto® is an easy-to-apply sealant, particularly suitable for creating air- and windtight seals between underlays, vapour control layers/air barriers and rough surfaces.

*When using on these rough or uneven surfaces, it is recommended that a batten is fixed at the abutment, as shown in this diagram.

Technical data

Adhesive	MS polymer
Solvent	none
Installation temperature	5 to 40°C
Temperature stability	-40 to +80°C
UV resistance	Highly resistant
Resistance to ageing	Highly resistant
Shelf life	24 months at 20°C or less

Product features & benefits

- A multi-purpose polyurethane gun-applied sealant
- Highly UV resistant

Area of application

Suitable for:

- Sealing holes in plasterboard ceilings where services pass through vapour control layers/air barriers
- Sealing underlays, vapour control layers/air barriers to rough surfaces eg masonry, abutments and chimneys
- Sealing around nails
- Irregular & rough surfaces
- Timber frame: rough sawn, planed/ finished or stained
- Absorbent materials: brick*, sandstone*, concrete* or gypsum fibreboard
- Synthetic materials: paper, fleece or similar, PE*, PP* or hard PVC*
- Other surfaces: metal, glass, PUR-foam
- Humidity of 15° or more
- All pitches of roof
- Use both internally & externally

Material

MS polymer

Colour

Grey

Coverage

310ml tube will cover 10m

Weight (per carton)

6.3kg

Packaging

12 pcs per carton

Product code

KU0128

Related products

- Any Klober underlay
- Wallint® vapour control layers/ air barriers

KLÖBER

Sepa® forte

(formerly Span-tech®)

Sepa® forte is a three-layer non-breathable roofing underlay for use on ventilated pitched roofs.

Product features & benefits

- Very strong lightweight alternative to traditional 1F felt
- 3 layer material
- Not susceptible to noise when windy
- High tensile and nail tear strength
- Marked 100mm and 150mm lap lines
- Absorbent inner layer as recommended in BS5250
- Type HR underlay

Area of application

Suitable for all pitched roofs

Material

Non-woven spunbonded polypropylene

Colours

Outer surface - blue
Inner surface - dark grey

Roll size

45 x 1m (45m²)

Roll weight

7kg

Packaging

42 rolls/pallet

Product code

KU9793-2

Certifications

CE certified

BRE Certification Limited

IRISH AGRÉMENT BOARD
BUILDING PRODUCT CERTIFICATION
Certificate no. 04/0205

Certificate no. 105/03

Related products

To protect Sepa® forte at the eaves and to prevent ponding, Underlay Support Trays are available along with a range of adhesive tapes.

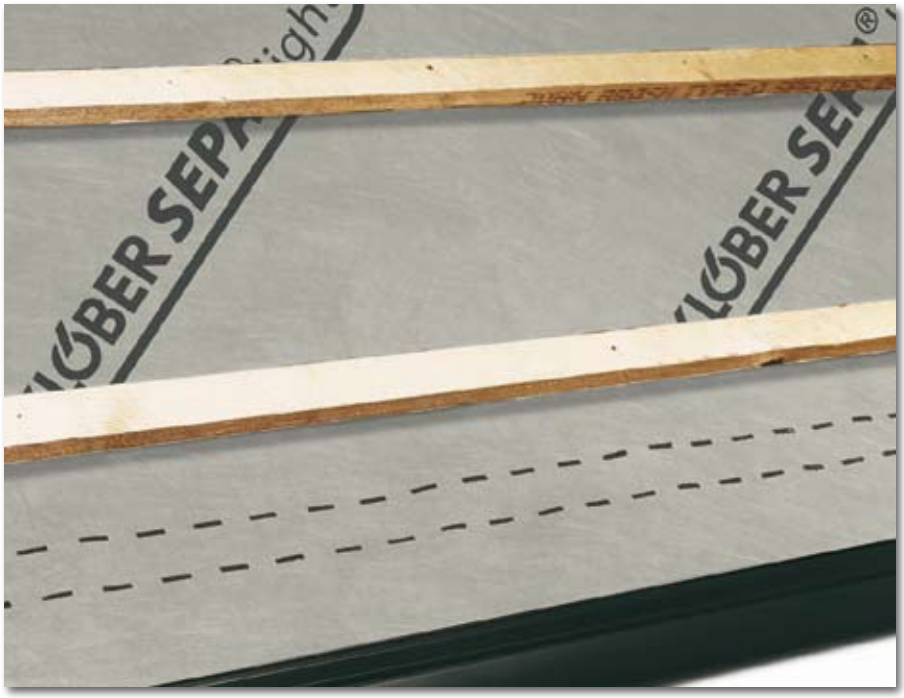
Installation

Sepa® forte should be laid in accordance with our installation instructions, BRE certificate 105/03 and/or IAB certificate 04/0205 and BS5534: 2003.

Technical data	BRE
Thickness	0.6 mm
Weight	155 g/m²
Water Vapour Permeability BS3177	0.21 MNs/g
Water tightness class EN 13859-1	W1
Tensile strength longitudinal, BS EN 12311-1	333 N/5cm
Tensile strength transverse, BS EN 12311-1	289 N/5cm
Nail tear strength longitudinal, BS EN 12310-1	225 N
Nail tear strength transverse, BS EN 12310-1	265 N
Elongation at break longitudinal, BS EN 12311-1	71%
Elongation at break transverse, BS EN 12311-1	80%
Fire Rating	B2
Temperature	-40°C to +80°C
UV Exposure	4 weeks

Sepa® light

(formerly Span-tech® light)



Sepa® light is a three-layer non-breathable roofing underlay for use on ventilated pitched roofs.

Installation

Sepa® light should be laid in accordance with our installation instructions, BRE certificate 119/06 and/or IAB certificate 04/0205 and BS5534: 2003.

Technical data	BRE
Thickness	0.49 mm
Weight	120 g/m²
Water vapour transmision BS EN 1931	1.59 g/m²/day
Water tightness class EN 13859-1	passed
Tensile strength longitudinal, BS EN 12311-1	240 N/5cm
Tensile strength transverse, BS EN 12311	220 N/5cm
Nail tear strength longitudinal, BS EN 12311-1	120 N
Nail tear strength transverse, BS EN 12310-1	120 N
Elongation at break longitudinal, BS EN 12311-1	56%
Elongation at break transverse, BS EN 12311-1	75%
Fire Rating	B2
Temperature	-40°C to +80°C
UV Exposure	4 weeks

Product features & benefits

- Strong lightweight alternative to traditional 1F felt
- 3 layer material
- Not susceptible to noise when windy
- High tensile and nail tear strength
- Marked 100mm and 150mm lap lines
- Absorbent inner layer as recommended in BS5250
- Type HR underlay

Area of application

Suitable for use on ventilated pitched roofs

Material

Non woven spunbonded polypropylene

Colours

Outer surface- grey
Inner surface- dark grey

Roll size

45 x 1m (45m²)

Roll weight

5.6kg

Packaging

42 rolls per pallet

Product codes

KU979145 - single roll

Certifications

CE certified

BRE Certification Limited

Certificate no. 119/06

IRISH AGRÉMENT BOARD
BUILDING PRODUCT CERTIFICATION

Certificate no. 04/0205

Related products

To protect Sepa® light at the eaves and to prevent ponding, Underlay Support Trays are available along with a range of adhesive tapes.

Condensation risk analysis

Technical support

Klober is happy to provide technical advice on how best to incorporate its product ranges into specific building types, or particular forms and techniques of construction, whether for refurbishment or new-build projects. The company offers the following services:

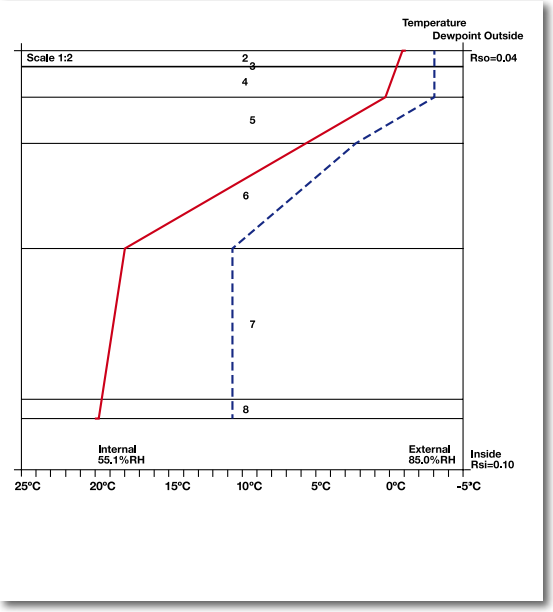
- telephone help-lines: 01509 500671/675
- computerised U-value calculations and condensation risk analysis
- site visits by technical staff
- copies of relevant test reports and certification
- product samples
- technical literature
- help and advice on roof detailing and on meeting the requirements of UK Building Regulations and Building Standards
- CPD Seminars

Recommendations as to methods, use of materials and construction details are based on the accumulated experience and knowledge of Klober and are given in good faith as a general guide and a service to designers, contractors and manufacturers.

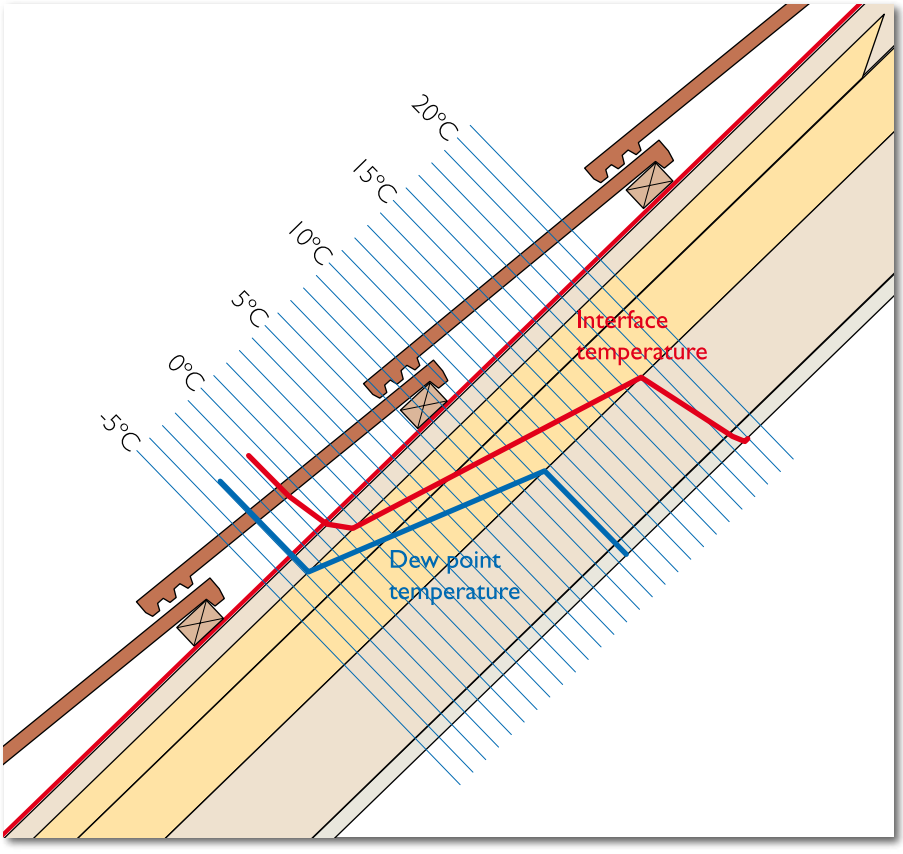
Klober can calculate the condensation risk in any construction incorporating Permo® underlays and Wallint® 10 eco air barrier/vapour control layer. Below we illustrate a typical profile graph, and superimpose the results on a cross section of the construction.

In this example, there is no condensation risk in the construction. If you would like Klober to calculate the condensation risk for your building, simply complete the page on the right and fax it to us.

Condensation risk analysis



Layers in the construction:
1. Outside surface resistance
2. Tiles/batten airspace
3. Permo® forte
4. 20mm unvented airspace
5. 30mm rigid insulation between counter battens
6. 70mm rigid insulation over rafters
7. Unventilated air space between rafters
8. 12.5mm plasterboard
9. Internal surface resistance



Condensation risk analysis

KLÖBER

For a Condensation Risk Analysis this page should be photocopied, completed and faxed to the Technical Services department on: +44 (0)1509 508295

BS 5250 condensation risk calculations

1 Contact information

Name . . . . . Date . . . . . .

Company . . . . . .

Address . . . . . .

. . . . . .

. . . . . Postcode . . . . . .

Telephone . . . . . Fax . . . . . .

BS 5250 condensation risk calculations

. . . . . .

3 Internal conditions – building use *please tick appropriate box – one only*

☐ Domestic – Residential ☐ Public/Community Building ☐ Offices-Commercial

☐ Factory/Warehouse – Heated ☐ School/Educational Facility ☐ Swimming Pool

☐ Sports Facility ☐ Others (please specify) . . . . . .

4 Construction element *please tick appropriate box – one only*

☐ Insulation between rafters ☐ Insulation between and below rafters ☐ Roof-metal cladding

☐ Insulation over rafters ☐ Insulation over and between rafters ☐ Standing seam roof

☐ Insulation over rafters and between counter battens ☐ Wall-metal cladding

☐ Other (please specify) . . . . . .

Rafters/joists . . . . . mm x . . . . . mm at . . . . . mm centres

This method of calculation is not recommended for cold roofs

5 Construction please enter construction layers starting from the outside

Example 1. Tile/slate	1 . . . . .
2. 25 x 38 tiling battens	2 . . . . .
3. Permo® forte	3 . . . . .
4. Non-ventilated airspace	4 . . . . .
5. 170mm glass wool over joists	5 . . . . .
6. 100mm glass wool between joists	6 . . . . .
7. Wallint® 50	7 . . . . .
8. 12.5mm plasterboard	8 . . . . .
9. None	9 . . . . .

Calculations are carried out in accordance with BS 5250: 2002.

KLÖBER

Professional roofing accessories

Klober Ltd.
Ingleberry Road
Shepshed
Loughborough
Leicestershire, LE12 9DE
UK
Tel. +44 (0)1509 500 660
Fax +44 (0)1509 600 061
www.klober.co.uk
info@klober.co.uk

Klöber Benelux PGmbH
Herbesthaler Str. 36
4700 Eupen
Benelux
Tel. +32 (0)87/56 10 56
Fax +32 (0)87/56 12 56
www.kloeber.be
info@kloeber.be

Klöber CZ s.r.o.
Na Příkope 15
110 00 Praha 1
Czech Republic
Tel. +421 (0)2/59 23 43 30
Fax +421 (0)2/59 23 43 31
www.kloeber.cz
info@kloeber.cz

Klöber GmbH & Co. KG
Scharpenberger Str. 72-90
58256 Ennepetal
Germany
Tel. +49 (0)23 33/98 77-0
Fax +49 (0)23 33/98 77-199
Hotline +49 (0)23 33/98 77-164
www.kloeber.de
info@kloeber.de

Klöber - HPi France Sàrl
6, rue de l'Energie
67720 Hoerdt
France
Tel.: +33 (0)3 88 68 20 60
Fax: +33 (0)3 88 68 18 10
www.kloeber-hpi.fr
info@kloeber-hpi.fr

Klöber Italia S.r.l.
Via Miles 9/10
20040 Cavenago di Brianza (MI)
Italy
Tel. +39 (0)2 95 33 53 01
Fax +39 (0)2 95 33 53 00
www.kloeber.it
info@kloeber.it

Klöber - HPi Polska Sp. z.o.o.
ul. 17 Stycznia 45b
02-146 Warszawa
Poland
Tel. +48 (0)22 35 12 900
Fax: +48 (0)22 35 12 901
www.kloeber-hpi.pl
info@kloeber-hpi.pl