



NSAI
Agrément

**IRISH AGRÉMENT BOARD
CERTIFICATE NO. 03/0190**

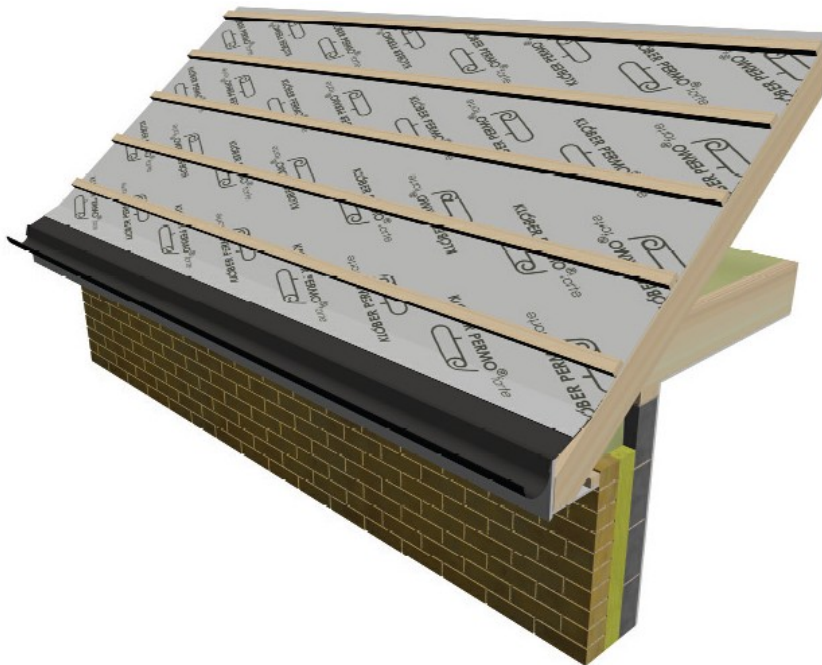
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Permo Forte NG & Permo Light NG Roof Tile Underlays

Souscouche de couverture en tuiles Unterlage für Ziegeldach

NSAI Agrément (Irish Agrément Board) is designated by Government to issue European Technical Approvals.

NSAI Agrément Certificates establish proof that the certified products are '**proper materials**' suitable for their intended use under Irish site conditions, and in accordance with the **Building Regulations 1997 to 2017**.



PRODUCT DESCRIPTION:

This Certificate relates to Permo Forte NG and Permo Light NG Roof Tile Underlays which are spunbonded polypropylene fabric underlays for use in slated or tiled pitched roofs.

This Certificate certifies compliance with the requirements of the Building Regulations 1997 to 2017.

USE:

Permo Forte NG and Permo Light NG Roof Tile Underlays are manufactured for use under slates or tiles on open rafter (unsupported) or fully supported pitched roofs.

The function of the underlay is to isolate the building from water ingress that may penetrate the roof coverings such as wind driven rain. In addition, the low vapour resistance of the underlays can, when correctly incorporated into a

designed roofing system, assist with the satisfactory management of water vapour within the roof system.

Permo Forte NG and Permo Light NG Roof Tile Underlays provide a barrier which:

- Prevents the ingress of windblown rain, dust and snow.
- Has adequate strength to resist wind load when installed in accordance with this Certificate.
- Offers resistance to tearing during installation.
- Remains flexible at low ambient temperatures.
- Facilitates the control of harmful surface and interstitial condensation in the roof by allowing the safe dispersal of water vapour, when installed in accordance with this Certificate.
- Reduces heat loss caused by air movement through the attic space once installed with no ventilation.



This Certificate is a confirmation of BBA Certificate No. 00/3749 issued by the British Board of Agrément, PO Box 195, Bucknalls Lane, Garston, Watford, Herts., WD25 9BA.

MANUFACTURE:

The products are manufactured by:

Klober GmbH & Co.,
Scharpenberger Str. 72-90,
D-58256 Ennepetal,
Germany.

MARKETING:

The products are marketed by:

Klober Ltd.,
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And

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1.1 ASSESSMENT

In the opinion of NSAI Agrément, Permo Forte NG and Permo Light NG Roof Tile Underlays if used in accordance with this Certificate can meet the requirements of the Building Regulations 1997 to 2017, as indicated in Section 1.2 of this Irish Agrément Certificate.

1.2 BUILDING REGULATIONS 1997 to 2017

REQUIREMENTS:

Part D – Materials and Workmanship

D3 – Permo Forte NG and Permo Light NG Roof Tile Underlays, as certified in this Certificate, are comprised of ‘proper materials’ fit for their intended use (see Part 4 of this Certificate).

D1 – Permo Forte NG and Permo Light NG Roof Tile Underlays, as certified in this Certificate, meet the requirements of the building regulations for workmanship.

Part A - Structure

A1 – Loading

Tests indicate that roofs incorporating Permo Forte NG and Permo Light NG Roof Tile Underlays meet the requirements provided the installations comply with the conditions set out in Section 2.4 and Part 3 of this Certificate.

Part B – Fire Safety

B4 – External Fire Spread

Part B Vol 2 – Fire Safety

B9 – External Fire Spread

Permo Forte NG and Permo Light NG Roof Tile Underlays will not prejudice the external fire resistance of the roof, as indicated in Section 4.1 of this Certificate.

Part C – Site Preparation and Resistance to Moisture

C4 – Resistance to Weather and Ground Moisture

Permo Forte NG and Permo Light NG Roof Tile Underlays meet the requirements when installed as indicated in Section 2.4 of this Certificate.

Part F – Ventilation

F2 – Condensation in Roofs

Permo Forte NG and Permo Light NG Roof Tile Underlays will provide water vapour permeability significantly in excess of that quoted as a minimum for conventional roof tile underlays in BS 5534:2014+A1:2015 *Slating and tiling for pitched roofs and vertical cladding – Code of practice*, and hence, movement of moisture vapour will take place through the underlays.

Where the Permo Forte NG and Permo Light NG Roof Tile Underlay is installed with ventilation, the design guidelines contained in Section 2 of the TGD to Part F of the Building Regulations 1997 to 2017 and Annex H of BS 5250:2011+A1:2016 *Code of practice for control of condensation in buildings*, must be met when installing this product

Where the Permo Forte NG and Permo Light NG Roof Tile Underlay is installed with ventilation and the ceiling has to be fixed to the soffit of the rafters as in dormer roof construction, a continuous ventilation space of at least 50mm should be arranged as shown in Diagram 11 of TGD to Part F of the Building Regulations 1997 to 2017. In these circumstances, it will be necessary to install a vapour control layer on the warm side of the insulation in all cases.

Permo Forte NG and Permo Light NG Roof Tile Underlays can be treated as vapour permeable underlays when considering the ventilation requirements of the roof.

Part L – Conservation of Fuel and Energy

L1 – Conservation of Fuel and Energy

Based on the measured vapour resistance of Permo Forte NG and Permo Light NG Roof Tile Underlays, roofs incorporating insulation can meet the requirements of Part L of the Building Regulations 1997 to 2017.

2.1 PRODUCT DESCRIPTION

Permo Forte NG and Permo Light NG Roof Tile Underlays are watertight, vapour permeable, flexible membranes intended for use as underlays on unsupported or supported pitched roofs, constructed in accordance with SR 82:2017 *Slating and tiling – Code of practice*.

2.2 MANUFACTURE

Permo Forte NG and Permo Light NG Roof Tile Underlays are of four layer construction, comprising two spunbonded polypropylene fabric layers and a polypropylene mesh fused together around a microporous plastic film.

The nominal characteristics of the products are given in Table 1.

2.2.1 Quality Control

Quality control checks are carried out on the incoming raw materials, during production and on the finished product. These checks include visual inspection and checks on dimensions (length, width), weight, tensile strength and elongation, tear resistance and hydrostatic head (water penetration resistance).

2.3 DELIVERY, STORAGE AND MARKING

Permo Forte NG and Permo Light NG Roof Tile Underlays are supplied in rolls and delivered to site individually wrapped in polythene. A technical leaflet bearing the product name, NSAI Agrément logo and Certificate number, is included with each roll.

Rolls should be stored on a flat level, smooth, clean, dry surface and be kept under cover to protect from long-term exposure to UV light. Care must be taken to avoid contact with solvents and with materials containing volatile organic components such as coal tar, and timbers newly treated with solvent based preservative (creosote). Reasonable precautions must be taken in handling the rolls to prevent damage, such as tears or perforations, occurring before and during installation, and prior to the application of the roof covering.

The rolls must not be exposed to a naked flame or other ignition source.

2.4 INSTALLATION

2.4.1 General

Permo Forte NG and Permo Light NG Roof Tile Underlays must be installed and fixed in accordance with this Certificate, the Certificate holder's instructions, and the relevant

recommendations of SR 82:2017 and BS 5534:2014+A1:2015.

2.4.2 Installation Procedure

Installation of Permo Forte NG and Permo Light NG Roof Tile Underlays can be carried out in all conditions normal to pitched roofing work. In roof construction it is important to remember that the Permo Forte NG and Permo Light NG Roof Tile Underlays are the second line of defence in excluding water penetrating the roof. For this reason the requirements of BS 5534:2014+A1:2015, SR 82:2017 and the following list of criteria must be met to comply with the requirements of this Certificate:

- At the eaves, an eaves carrier felt i.e. 500mm wide strip of type 5U felt, to meet specifications of IS EN 13707:2013 *Flexible sheets for waterproofing – Reinforced bitumen sheets for roof waterproofing – Definitions and characteristics* must be used. This eaves carrier felt should be dressed 50mm into the gutter and the Permo Forte NG and Permo Light NG Roof Tile Underlays must overlap the eaves carrier felt as outlined in Table 2. In an open eaves construction, the use of eaves guards is recommended. The provision of a tilting fillet/continuous ply support or proprietary eaves ventilation tray is also required to avoid water being trapped behind the fascia board (see Figure 4).
- Installation commences by unrolling the underlay horizontally across the rafters, starting at the eaves and working towards the ridges of the roof. The coloured side should be uppermost.
- When used unsupported, a nominal 10mm drape should be provided between supports to allow a drainage path for moisture and prevent excessive deflection under wind loads (see Figure 1).
- When tacking the underlay to the rafters it is recommended that a 3mm diameter x 20mm long extra large head felt nails of copper, aluminium alloy or galvanised steel be used. The underlay should be tacked at the head of the sheet only, at centres not exceeding 1200mm. It is important that all tacking nails be covered by the overlap of the next underlay course so that the minimal headlap is maintained between the tacks and the lower edge of the overlapping underlay.

- Overlaps of the underlay should be in accordance with BS 5534:2014+A1:2015 Annex A Figure 2, with lap secured by battens (see Table 2).

Characteristic	Permo Forte NG	Permo Light NG
Thickness	0.95 mm	0.71 mm
Mass per unit area	145 g/m ²	145 g/m ²
Roll length	50	50
Roll width	1.1, 1.5	1.1, 1.5
Colour:		
• Upper	Light grey	Light grey
• Lower	White	White
Tensile strength*:		
• Longitudinal	450 N/50mm	275±20 N/50mm
• Transverse	370 N/50mm	230±20 N/50mm
Elongation*:		
• Longitudinal	20 %	60 %
• Transverse	15 %	70 %
Tear resistance*:		
• Longitudinal	320 N	180 N
• Transverse	340 N	180 N
Watertightness*:		
• Unaged	W1	W1
• Aged	W1	W1
Water vapour transmission*	0.03 S _d	0.03 S _d

Table 1: Nominal Characteristics

Roof Pitch	Min horizontal lap		Vertical lap
	Partially Supported	Fully Supported	
≥35°	100 mm	75 mm	100 mm
15° to 34°	150 mm	100 mm	100 mm
12.5° to 14°	225 mm	150 mm	100 mm

Table 2: Minimum Overlaps

- Where overlaps do not coincide with a batten, consideration should be given to either including an extra batten at the overlap or increasing the underlay overlap to coincide with the next batten.
- Batten gauges should not exceed that recommended by the tile/slate manufacturer for the particular tile/slate being used. In areas where the wind speed is greater than 48 m/s SR 82:2017 should be followed.
- Moisture content of battens at time of fixing should not exceed 22%. Where timbers on roofs have been treated with wood preservative due to high moisture content of timbers, it is essential that manufacturer's guidance be sought in relation to chemical attack from preservative on roofing underlay.
- Nails for use with battens, counterbattens and boarding (sarking boarding) should be zinc-coated in accordance with IS EN 10230-

1:2000 *Steel wire nails – Loose nails for general applications.* Refer to BS 5534:2014+A1:2015 Cl 4.12.1.2 for details, and also SR 82:2017 Cl 4.11.

- Permo Forte NG and Permo Light NG Roof Tile Underlays are not designed to withstand the weight of operatives or tiles being loaded out. Battens must therefore be installed as work progresses from eaves to ridge for achieving support for feet and avoiding damage to the underlay surface. No materials or implements should be resting on the underlay. Where pressure on the underlay over a rafter is unavoidable, it should be noted that the underlay does not offer substantial grip, particularly at overlaps or when wet.
- Where the underlay becomes damaged for whatever reason, repairs can be carried out by overlaying the damaged area with a layer of additional material ensuring a 150mm overlap all round, ensuring that the up-slope side is overlapped by the next highest horizontal run of underlay, and secured under a batten.
- Standard methods of workmanship should be used to apply the underlay at penetrations and abutments. It must be ensured that the underlay is turned up at least 50mm at all abutments to be overlapped by the flashings, and that it overlaps the lining tray by at least 100mm at the back face of any abutment.
- Penetrations by soil and vent pipes etc. must be dealt with as follows. The underlay must be star-cut carefully to prevent tears, closely fitted over the pipe, ensuring that all the tabs project upwards along the pipe, and then the tabs taped around the circumference of the pipe using a suitable jointing tape approved by the Certificate holder. A proprietary collar must be fitted over the pipe to protect the tape.
- Courses of underlay over a hip should be overlapped by at least 150mm. Each course should overlap the membrane course on the adjacent elevation of the roof.
- Hips and valleys should be covered with an additional 600mm wide strip of the underlay running continuously from eaves to hip. In valleys, the 600mm wide strip of underlay must be laid over the gutter bed but under the main roof underlay, and held down by valley battens when used. The main roof underlay must be dressed over the valley battens in this case.

- For duo pitch roofs not requiring ridge ventilation, underlay from each side of the ridge should overlap the other side by at least 225mm. For mono pitch roofs, the underlay should extend over the mono ridge and the top fascia board by at least 100mm. Where proprietary ventilating ridge systems are specified, detailing of the underlay should be in accordance with the Certificate holder's recommendations.
- When used in warm roof design, when the underlay is in direct contact with the insulation between the rafters, a vapour control layer (500 gauge polythene or equivalent) should be installed on the warm side of the insulation. The roof should be counter-battened to allow a 50mm unobstructed air path between the membrane and the tiles.
- Reference should be made to BS 5250:2011+A1:2016 Annex H for counter batten and ventilation requirements on tiled and slated roofs.
- Battens and counter battens should be used when the membrane is to be fully supported (e.g. warm roofs or roofs using a sarking board). This will allow any moisture accessing the main system to drain away unhindered by the battens. In these instances where no drape is provided, for additional security against water leakage through nail holes where underlays are not self-sealing, batten tapes or other sealants approved by the Certificate holder should be used.
- When close fitting man-made slates are to be installed as the roof covering, which constitute an impermeable external covering, counter battens shall be used. In addition, ventilation should be provided above the underlay in the form of ridge tile and eaves ventilation (see Figure 3). Reference should be made to BS 5250:2011+A1:2016 Section H.4.3. In case of doubt, the advice of the Certificate holder should be sought.
- Once the Permo Forte NG and Permo Light NG Roof Tile Underlay is installed, it should be covered by the finished roof covering as soon as practicable to minimise the effects of long term exposure to UV light.
- Permo Forte NG and Permo Light NG Roof Tile Underlays are not suitable for use in flat roof construction.
- When used in a cold roof design and where the insulation is laid on top of the ceiling, it is essential that a vapour control layer be used on the warm side of the insulation, and all perforations for pipes, electric cables etc. should be sealed. Continuity of the vapour control layer should be maintained at the perimeter of the ceiling to minimise moisture from the dwelling circumventing the vapour control layer. Ideally the vapour control layer should connect with the vapour control layer or airtight layer in the external walls.
- Other appropriate measures include:
 - Ventilating the dwelling below for the dispersal and rapid dilution of water vapour, particularly in rooms that may experience high humidity (such as kitchens, utility rooms and bathrooms).
 - Covering and insulating all water tanks in the loft space and lagging pipe work.
 - Sealing penetrations in the ceiling and making loft hatches convection-tight by using a compressible draught seal.
 - Ensuring that there is continuity of joining with walls (and behind wall linings) at sealing perimeters.
 - Ensuring that masonry wall cavities do not interconnect with roof cavities.



Figure 1: Cold Roof detail with permeable roof covering

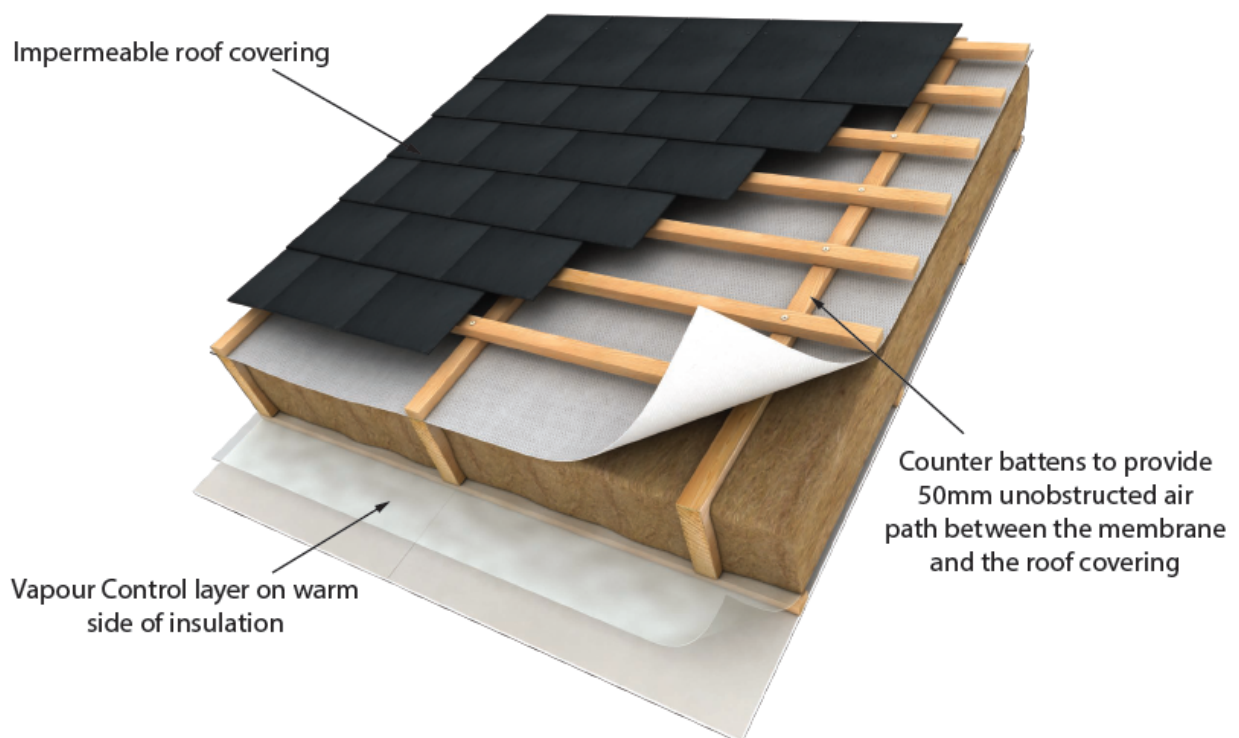


Figure 2: Warm Roof detail with impermeable roof covering

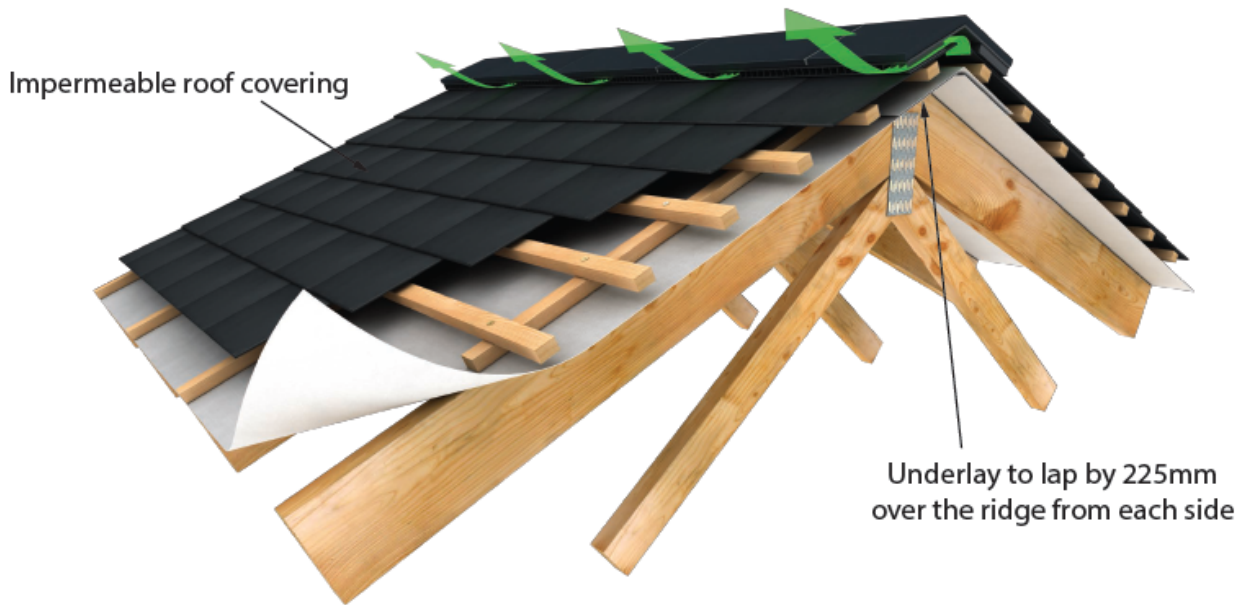


Figure 3: Cold Roof detail with impermeable roof covering - Ridge Detail

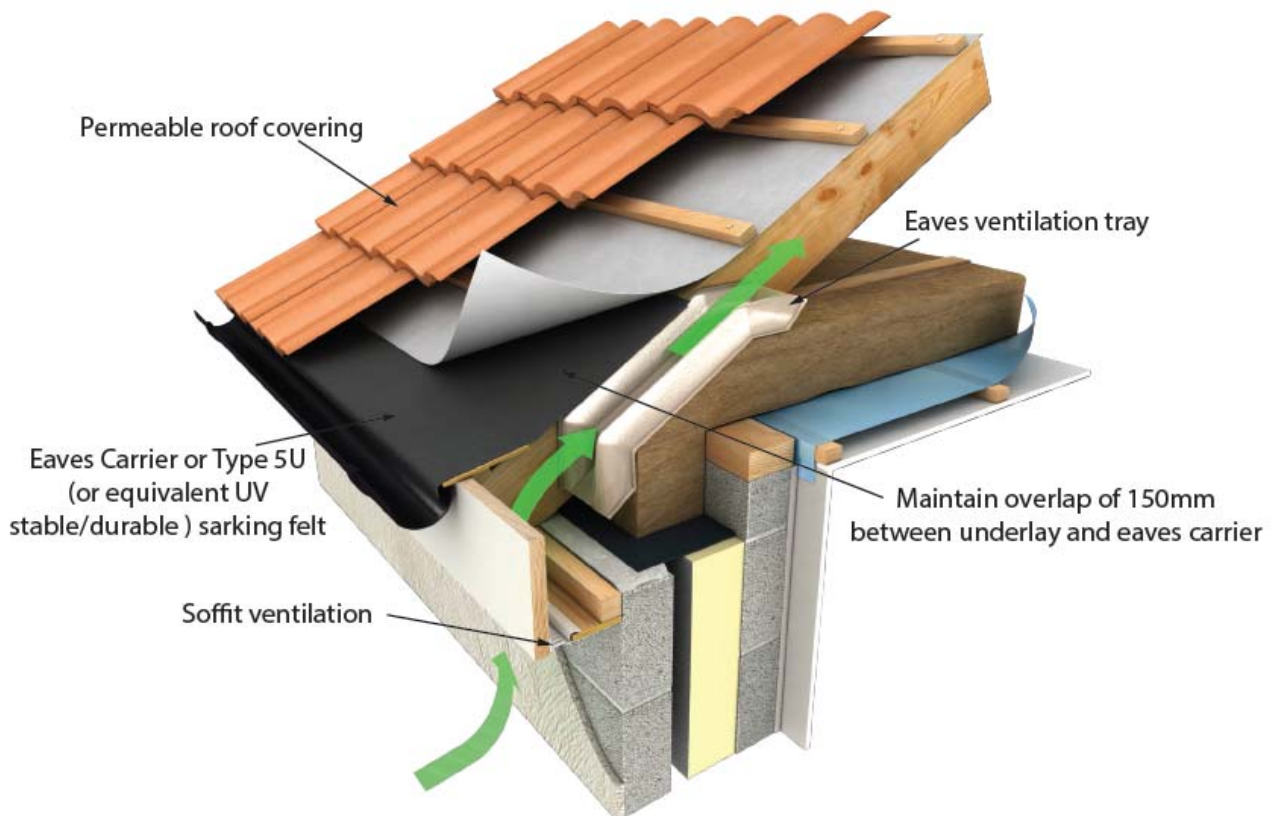


Figure 4: Cold Roof detail with permeable roof covering - Eaves Detail

3.1 GENERAL

Permo Forte NG and Permo Light NG Roof Tile Underlays provide a satisfactory underlay in pitched roofs constructed in accordance with SR 82:2017, BS 5534:2014+A1:2015, BS 5250:2011+A1:2016 and BS 8000-6:2013 *Workmanship on building sites – Code of practice for slating and tiling of roofs and walls*.

3.2 WIND LOADING

Permo Forte NG and Permo Light NG Roof Tile Underlays will resist the loads associated with the installation phase of the roof.

3.2.1 Unsupported

Permo Forte NG and Permo Light NG Roof Tile Underlays are satisfactory for use in unsupported systems as described in Table 3 of this Certificate (see also Figure 4). The classifications show in Table 3 are based on the simplified approach for obtaining design wind pressure and required uplift resistance as defined in BS 5534:2014+A1:2015 Appendix A Cl. A7. These details are valid where a well-sealed ceiling is present and the roof has a ridge height $\leq 15\text{m}$, a pitch between 12.5° and 75° , and a site altitude $\leq 100\text{m}$ where the topography is not significant.

When building and site conditions are outside these limitations, the design wind pressure p_u should be calculated in accordance with Equation H.13 of BS 5534:2014+A1:2015 in order to determine the required wind uplift resistance. Calculated values can then be compared to the wind uplift resistances in Table 4 of this Certificate in order to select a suitable roof underlay and batten spacing.

Per Equation H.13 of BS 5534:2014, the design wind pressure $p_u = f_u \times q_p$, where:

$f_u = 0.75$ when a well-sealed ceiling is present;

$f_u = 0.90$ when no ceiling or no well-sealed ceiling is present;

$f_u = 1.10$ when no ceiling or no well-sealed ceiling is present on a permanent dominant opening on an external face of the building;

q_p = is the peak velocity pressure from IS EN 1991-1-4:2005 AMD 1:2010 *Eurocode 1: Actions on structures – Part 1-4: General actions – Wind actions (including Irish National Annex)*.

See BS 5534:2014+A1:2015 Cl H.6 for all other considerations.

3.2.2 Supported

Permo Forte NG and Permo Light NG Roof Tile Underlays, when fully supported, have adequate resistance to withstand typical uplift forces.

The products may be used at any batten gauge in all wind zones when laid over nominally air-tight sheet sarking, for example OSB board, plywood and insulation for warm-roof designs. They can also be used when slates and tiles are nailed directly into the sarking board.

Poorly fitted sarking boards such as square-edged butt-joints are not considered to be airtight and as a result the underlay should be treated as unsupported in those situations.

3.3 WEATHERTIGHTNESS

Tests confirm that Permo Forte NG and Permo Light NG Roof Tile Underlays will resist the passage of water, wind-blown snow and dust into the interior of a building under all conditions to be found in a roof constructed to SR 82:2017, BS 5534:2014+A1:2015 and BS 8000-6:2013.

Permo Forte NG and Permo Light NG Roof Tile Underlays have been classified as having a resistance to water penetration of Class W1 in accordance with IS EN 13859-1:2014 *Flexible sheets for waterproofing – Definitions and characteristics – Part 1: Underlays for discontinuous roofing*. A Class W1 is the highest resistance to water penetration classification described in the standard.

The underlays may be used to provide temporary waterproofing to the structure of the building prior to the installation of slates or tiles. It is however recommended that this period of time be kept to a minimum in accordance with the manufacturer's guidance.

3.4 VENTILATION/CONDENSATION

For design purposes the water vapour transmission (s_d value) is given in Table 1 of this Certificate. When this value for each membrane is divided by the vapour permeability of still air (0.2gm/MNs) this will give the vapour resistance of each membrane. As all values are less than 0.25MNs/g, the Permo Forte NG and Permo Light NG Roof Tile Underlays may be regarded as Type LR membranes for roofs designed in accordance with BS 5534:2014+A1:2015 and BS 5250:2011+A1:2016 Annex H.

In pitched roofs where the insulation follows the line of the pitch, ventilation must be provided above the insulation. This ventilation gap can be above or below the Permo Forte NG and Permo Light NG Roof Tile Underlays. For all roof coverings, a continuous unobstructed 50mm ventilation gap can be provided in the space between the underlay and the insulation, or

alternatively above the underlay and under the roof covering.

Ventilation of the space above the insulation may not be required provided that the roof coverings are air permeable.

The general principle when designing a roof system that can successfully manage moisture, whether the source of the moisture is from the external environment or if the source arises internally from occupants, bathrooms, cooking etc, is that the most vapour tight layer is located on the inside of the roof structure and all subsequent outer layers become increasingly vapour permeable as we move towards the roof coverings.

In pitched roofs where the insulation follows the line of the ceiling, attic ventilation must be provided in accordance with TGD to Part F of the Building Regulations 1997 to 2017. The optimum size and disposition of vents should be determined by the size and shape of the loft; large and/or complex roofs may require vents at both high and low levels. Further design guidance can be found in BS 5250:2011+A1:2016.

A vapour control layer should be installed on the warm side of the insulation unless a hygrothermal analysis to IS EN ISO 13788:2001 *Hygrothermal performance of building components and building elements – Internal surface temperature to avoid critical surface humidity and interstitial condensation – Calculation methods (Glazer)*, or IS EN 15026:2007 *Hygrothermal performance of building components and building elements – Assessment of moisture transfer by numerical simulation (Wufi)* deems it to be unnecessary.

It is essential that roofs be constructed so as to prevent moisture penetration and the formation of condensation. In accordance with good building construction practice, all openings for services and trap doors should be draught sealed, and trap doors should not be located in bathrooms, shower rooms or kitchens.

The risk of condensation is highest in new-build construction during the first heating period, where there is high moisture loading owing to wet trades such as cast concrete slabs or plaster. Additional ventilation should be provided during this period, including the opening of doors and windows. The risk diminishes as the building dries out naturally.

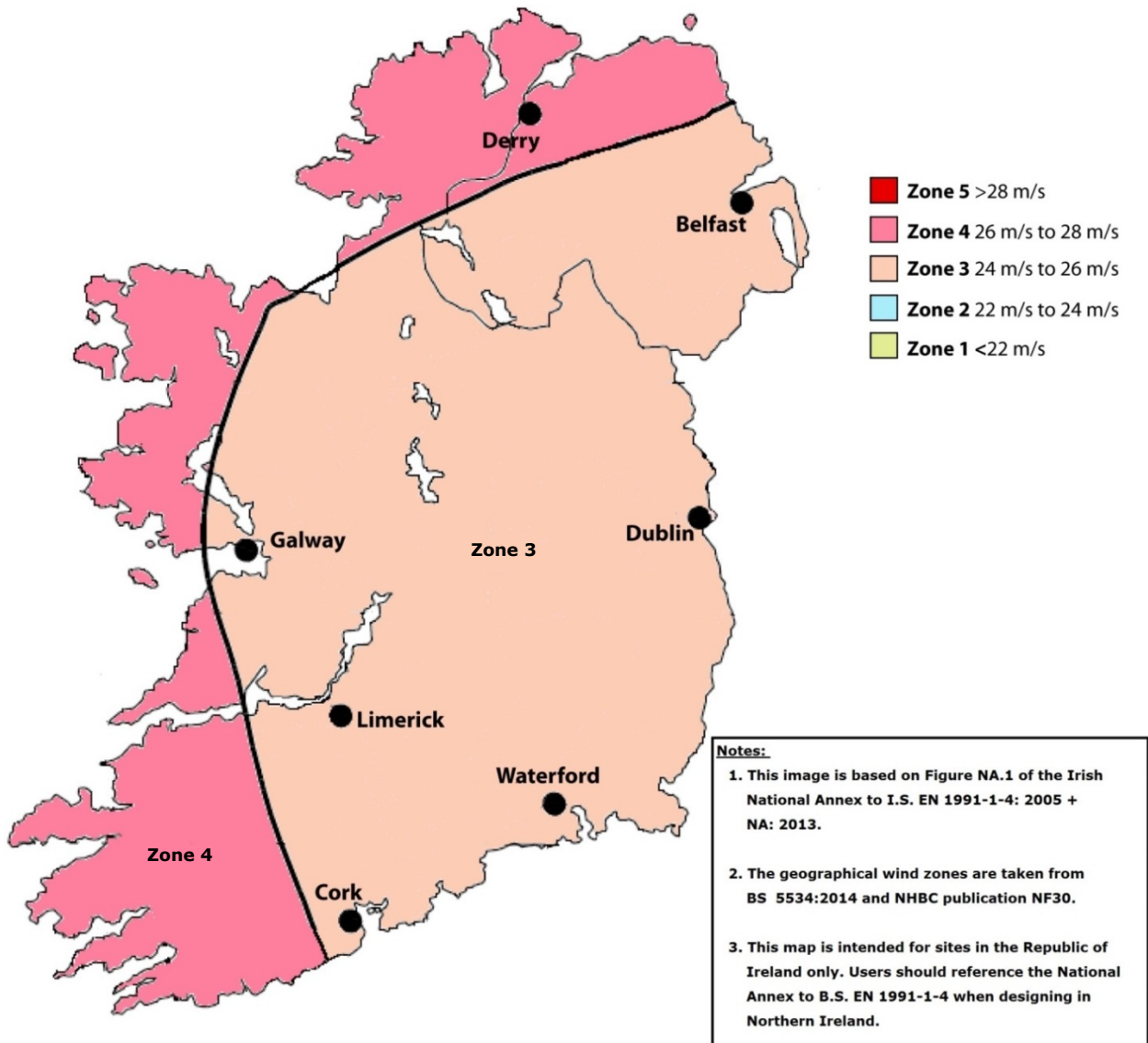


Figure 5: Design wind speeds for geographical wind zones in Ireland

4.1 BEHAVIOUR IN FIRE

Permo Forte NG and Permo Light NG Roof Tile Underlays have similar properties in relation to fire to polythene sheets and so will present no additional fire hazard to a roof structure in which they are incorporated. When tested in accordance with IS EN 13501-1:2007 + A1:2009 *Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests*, the products achieved Class E classification.

Tests indicate that Permo Forte NG and Permo Light NG Roof Tile Underlays have the risk of fire spread when used unsupported, should the material be accidentally ignited during maintenance works, etc. (e.g. by a roofer or plumbers torch). As with all types of sarking material, care must be taken during building and maintenance to avoid the material becoming ignited.

When the product is used in a fully supported situation, the reaction to fire will be determined by the supporting deck.

Permo Forte NG and Permo Light NG Roof Tile Underlays being combustible materials must be separated from chimneys and flues as indicated in CI 2.5.6, CI 3.8.2 and CI 3.11.1 of TGD to Part J of the Building Regulations 1997 to 2017.

If a fire does occur, the contribution of toxic gas attributed to the membrane is negligible.

4.2 WATER PENETRATION

Permo Forte NG and Permo Light NG Roof Tile Underlays, when used in accordance with this Certificate, present no significant risk of water penetration.

4.3 WATER VAPOUR PENETRATION AND CONDENSATION RISK

Permo Forte NG and Permo Light NG Roof Tile Underlays have a significantly higher water vapour permeability than that quoted as a minimum for conventional roof tile underlays in BS 5534:2014+A1:2015, and hence movement of moisture vapour can take place through the underlay for water vapour egress by convection thereby reducing condensation risk.

4.4 DURABILITY AND MAINTENANCE

Permo Forte NG and Permo Light NG Roof Tile Underlays when installed in accordance with this Certificate, manufacturer's instructions and relevant codes of practice, are virtually unaffected by conditions normally found in a roof

space and will have a design life comparable with that of traditional roof tile underlays, provided that they are not exposed to sunlight for long periods during the installation phase. The durability of the underlay will be dependent on the performance of the roof covering (slates/tiles) and this could be compromised if the roof is not routinely maintained or is subjected to inappropriate traffic. Such maintenance would involve building owners having their roofs inspected annually, preferably in late autumn. Inspection should include checking for missing, damaged or loose slates/tiles and their accessories or flashings. Clogged gutters or downpipes should be unblocked and cleaned.

4.5 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING:

Table 4 gives a summary of the technical investigations carried out on Permo Forte NG and Permo Light NG Roof Tile Underlays

4.6 OTHER INVESTIGATIONS

- (i) Existing data on product properties in relation to fire, toxicity, environmental impact and the effect on mechanical strength/stability and durability were assessed.
- (ii) The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.
- (iii) Site visits were conducted to assess the practicability of installation and the history of performance in use of the product.
- (iv) Driving rain resistance was assessed.
- (v) A condensation risk analysis was performed.

4.7 CE MARKING

The Certificate holder has taken responsibility of CE marking Permo Forte NG and Permo Forte Light in accordance with the Construction Products Regulation No. 305/2011 and harmonised European Standard EN 13859-1:2014 and EN 13859-2:2014. An asterisk (*) appearing in this Certificate indicates that data shown is an essential characteristic of the product and declared in the manufacturer's Declaration of Performance (DoP). Reference should be made to the latest version of the DoP for current information on any essential characteristics declared by the manufacturer.

Product	Wind Uplift Pressure ⁽²⁾		
	345mm Batten Gauge Battened Lap	250mm Batten Gauge Battened Lap ⁽¹⁾	345mm Batten Gauge With Taped Laps
Permo Forte NG	1507 Pa	2901 Pa	Not tested
Permo Light NG	1217 Pa	2542 Pa	Not tested
<p>1. Underlays with a wind uplift resistance at a 250mm batten gauge that meet the minimum design wind pressure of 820Pa (Zone 1) are deemed to satisfy the requirements for use at 100mm batten gauge in all wind zones (Zones 1 to 5, see Figure 5).</p> <p>2. Mean of test results.</p>			
Product	Geographical Wind Zones		
	345mm Batten Gauge Battened Lap	250mm Batten Gauge Battened Lap ⁽¹⁾	345mm Batten Gauge With Taped Laps
Permo Forte NG	Zones 3 and 4*	Zones 3 and 4*	Not tested
Permo Light NG	Zones 3 and 4*	Zones 3 and 4*	Not tested
<p>1. The above classifications are valid where:</p> <ol style="list-style-type: none"> A well-sealed ceiling is present; The roof has a ridge height $\leq 15\text{m}$; A pitch between 12.5° to 75°; A site altitude $\leq 100\text{m}$; Where topography is not significant. <p>2. When outside the limitations of Note 1 above, the design wind pressure, p_{ur}, should be calculated in accordance with BS 5534:2014+A1:2015+A1:2015 (Equation H.13) in order to determine the required wind uplift resistance. Calculated values can then be compared to wind uplift resistances published above in order to select a suitable roof underlay and batten spacing.</p> <p>* Only zones 3 and 4 exist in Ireland. See Figure 5 for details.</p>			

Table 3: Test results for wind uplift resistance to BS 5534:2014+A1:2015

5.1 National Standards Authority of Ireland ("NSAI") following consultation with NSAI Agrément has assessed the performance and method of installation of the product/process and the quality of the materials used in its manufacture and certifies the product/process to be fit for the use for which it is certified provided that it is manufactured, installed, used and maintained in accordance with the descriptions and specifications set out in this Certificate and in accordance with the manufacturer's instructions and usual trade practice. This Certificate shall remain valid for five years from date of issue so long as:

- (a) the specification of the product is unchanged.
- (b) the Building Regulations 1997 to 2017 and any other regulation or standard applicable to the product/process, its use or installation remains unchanged.

- (c) the product continues to be assessed for the quality of its manufacture and marking by NSAI.
- (d) no new information becomes available which in the opinion of the NSAI, would preclude the granting of the Certificate.
- (e) the product or process continues to be manufactured, installed, used and maintained in accordance with the description, specifications and safety recommendations set out in this certificate.
- (f) the registration and/or surveillance fees due to NSAI are paid.

5.2 The NSAI Agrément mark and certification number may only be used on or in relation to product/processes in respect of which a valid Certificate exists. If the Certificate becomes invalid the Certificate holder must not use the NSAI Agrément mark and certification number

and must remove them from the products already marked.

5.3 In granting Certification, the NSAI makes no representation as to;

- (a) the absence or presence of patent rights subsisting in the product/process; or
- (b) the legal right of the Certificate holder to market, install or maintain the product/process; or
- (c) whether individual products have been manufactured or installed by the Certificate holder in accordance with the descriptions and specifications set out in this Certificate.

5.4 This Certificate does not comprise installation instructions and does not replace the manufacturer's directions or any professional or trade advice relating to use and installation which may be appropriate.

5.5 Any recommendations contained in this Certificate relating to the safe use of the certified product/process are preconditions to the validity of the Certificate. However the NSAI does not certify that the manufacture or installation of the certified product or process in accordance with the descriptions and specifications set out in this Certificate will satisfy the requirements of the Safety, Health and Welfare at Work Act 2005, or of any other current or future common law duty of care owed by the manufacturer or by the Certificate holder.

5.6 The NSAI is not responsible to any person or body for loss or damage including personal injury arising as a direct or indirect result of the use of this product or process.

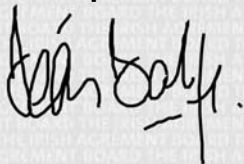
5.7 Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made thereunder, Statutory Instrument, Code of Practice, National Standards, manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it is in force at the date of this Certification.

NSAI Agrément

This Certificate No. **03/0190** is accordingly granted by the NSAI to **Klober Ltd** on behalf of NSAI Agrément.

Date of Issue: **September 2003**

Signed



Seán Balfe
Director of NSAI Agrément

Readers may check that the status of this Certificate has not changed by contacting NSAI Agrément, NSAI, 1 Swift Square, Northwood, Santry, Dublin 9, Ireland. Telephone: (01) 807 3800. Fax: (01) 807 3842. www.n sai.ie

Revisions: August 2007, January 2018

- Inclusion of Permo Light
- References to Building Regulations and standards updated, product specification updated to reflect manufacturer's DoP.