

**IRISH
AGRÉMENT
BOARD**



BUILDING PRODUCT CERTIFICATION

CERTIFICATE No. 03/0190

Klober Limited, Ingleberry Road, Shepshed, Loughborough,
Leicestershire LE12 9DE, United Kingdom
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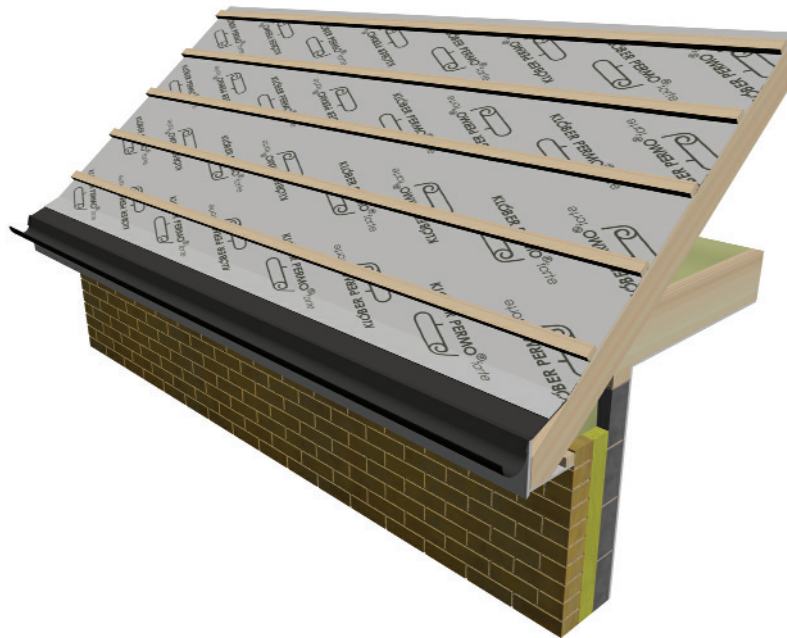
Permo Forte Roof Tile Underlay in ventilated and non-ventilated pitched roof systems

Souscouche de couverture en ardoises ou en tuiles
Unterlage für Schieferdach oder Ziegeldach

The Irish Agrément Board is designated by Government to issue European Technical Approvals.

Irish Agrément Board 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 2002**.

The Irish Agrément Board operates in association with the **National Standards Authority of Ireland (NSAI)** as the National Member of UEAtc.



PRODUCT DESCRIPTION

This Certificate relates to Permo Forte Roof Tile Underlay, which is a spunbonded polypropylene fabric underlay for use in slated or tiled pitched roofs.

USE:

Permo Forte Roof Tile Underlay is manufactured for use under slates or tiles on open rafter (unsupported) or fully supported pitched roofs. The underlay may be used in the following roof systems:

1. Conventional cold roof system
2. Non-ventilated in a cold roof system
3. Ventilated in a warm roof system
4. Non-ventilated in a warm roof system.

The installation of these roof systems using Permo Forte Roof Tile Underlay is described in Section 2.4 of this certificate.

Permo Forte Roof Tile Underlay provides a barrier which:

- Prevents the ingress of wind-blown rain, dust and snow.

- Minimises the wind load generated under wind gusts acting on slates and tiles when installed in accordance with this certificate.
- Offers superior 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.

This Certificate is a confirmation of BBA Certificate No. 00/3749 Permo Forte Roof Tile Underlay in non-ventilated cold pitched roof systems (2nd issue) issued by the British Board of Agrément, PO Box 195, Bucknalls Lane, Garston, Watford, Herts., WD25 9BA

MANUFACTURE

The product is manufactured by:

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

MARKETING

The product is marketed by:

Klober Ltd
Ingleberry Road, Shepshed, Loughborough
Leicestershire, UK
Tel: 00 44 1509 500660
Fax: 00 44 1509 600061

and

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Dublin 24
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PART

1

CERTIFICATION

1.1 ASSESSMENT

In the opinion of the Irish Agrément Board (IAB), Permo Forte Roof Tile Underlay is satisfactory for the purpose defined above, and meets the requirements of the Building Regulations 1997 to 2002 as indicated in Section 1.2 of this certificate.

1.2 BUILDING REGULATIONS 1997 to 2002

REQUIREMENT:

Part D - Materials and Workmanship

D3 - Permo Forte Roof Tile Underlay, as certified in this Irish Agrément Board (IAB) certificate, is a proper material, fit for its intended use (see Part 4 of this certificate).

D1 - Permo Forte Roof Tile Underlay, used in accordance with this Irish Agrément Board (IAB) certificate, meets the requirements for materials and workmanship.

Part A – Structure

A1 - Loading

Tests indicate that a roof incorporating Permo Forte Roof Tile Underlay meets the requirements provided the installation complies with the conditions set out in Section 2.4 and Part 3 of this Irish Agrément Board (IAB) certificate.

Part B – Fire Safety

B4 - External Fire Spread

Permo Forte Roof Tile Underlay will not prejudice the external fire resistance of the roof, as indicated in Section 4.1 of this Irish Agrément Board (IAB) certificate.

Part C – Site Preparation and Resistance to Moisture.

C4 - Resistance to Weather and Ground Moisture

Permo Forte Roof Tile Underlay meets the requirements when installed as indicated in Section 2.4 of this Irish Agrément Board (IAB) certificate.

Part F – Ventilation

F2 - Condensation in Roofs

Permo Forte Roof Tile Underlay will provide water vapour permeability in excess of that quoted as a minimum for a vapour permeable underlay in *I.C.P. 2: 2002 Irish Code of Practice for slating and tiling* and hence, movement of moisture vapour can take place through the underlay.

The design guidelines contained in the Section 2 of the Technical Guidance Document to Part F of the Building Regulations 1997 to 2002 and in Section 8.4 of BS 5250: 2002 *Code of Practice for control of condensation in buildings*, must be met.

In a non-ventilated roof system where Permo Forte Roof Tile Underlay is installed in accordance with this Irish Agrément Board (IAB) certificate, the underlay can prevent excessive condensation in a roof or in a roof void above an insulated ceiling as is required by Part F of the Building Regulations 1997 to 2002.

Permo Forte Roof Tile Underlay can be treated as a vapour permeable underlay 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 Roof Tile Underlay, roofs incorporating insulation can meet the requirements of Part L of the Building Regulations 1997 to 2002.

Where the Permo Forte 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, ventilation should be arranged for as shown in diagram 6D of TGD to Part F of the Building Regulations 1997 to 2002; in these circumstances it will be necessary to install a vapour control layer at the warm side of the insulation.

In a non-ventilated roof system where Permo Forte Roof Tile Underlay is installed in accordance with this Irish Agrément Board (IAB) certificate and manufacturer's instructions and the ceiling has to be fixed to the soffit of the rafters as in dormer roof construction, it is likely to be necessary to install a vapour control layer at the warm side of the insulation.

2.1 PRODUCT DESCRIPTION

Permo Forte Roof Tile Underlay is a watertight, vapour permeable, flexible underlay intended for use as an unsupported/supported underlay beneath slates or tiles, constructed in accordance with I.C.P. 2: 2002 Irish Code of Practice for slating and tiling.

2.2 MANUFACTURE

Permo Forte Roof Tile Underlay is a four layer construction, comprising two spunbonded polypropylene fabric layers and a polypropylene mesh fused together around a microporous plastic film. The upper layer of the underlay is light grey in colour and the lower layer is white

The physical characteristics of Permo Forte Roof Tile Underlay are given in Table 1.

2.2.1 Ancillary Items

Ancillary items available are
 Butylon – butyl adhesive tape
 Tacto – double-sided adhesive tape
 Flecto – single-sided adhesive tape
 Klober Eaves Carrier – a uPVC detail used to protect the edge of the underlay from the effects of ultra-violet light ageing and as a run-off into the gutter

2.2.2 Quality Control

Quality control checks are carried out on the incoming raw materials, during production and on the finished product. Quality control checks include visual inspection and checks on roll and membrane weights, dimensions (length, width, thickness), tensile strength, tear resistance, water vapour permeability and water penetration resistance (hydrostatic head).

2.3 DELIVERY, STORAGE AND MARKING

Permo Forte Roof Tile Underlay is supplied in 50-metre rolls, shrink-wrapped in polythene with a label bearing the company name and the product name

Rolls should be stored on their sides on a 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 creosote.

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

Table 1
Physical Characteristics of Permo Forte Roof Tile Underlay

Material	Spunbond Polypropylene, LLDPE
Colour	Light grey, upper surface White, lower surface
Roll Width (m)	1.5
Roll Length (m)	50
Roll Weight (kg)	14
Thickness (mm)	0.68
Water Vapour Resistance (MNs/g)	0.2
Water Vapour Permeability – Temperate Climate (g/m ² /day)	1034
Hydrostatic Head (mm of H ₂ O)	>1500
Resistance to wind load (Kpa)	2.5 with 300mm batten spacing and 600mm rafter centres
Tensile Strength (N/50mm)	MD 386 ± 10% CD 262 ± 10%
Tensile Elongation (%)	MD 15% CD 16%
Tear Resistance (N)	MD 190 CD 122

2.4 INSTALLATION PROCEDURE

2.4.1 General

Permo Forte Roof Tile Underlay must be installed and fixed in accordance with this certificate and the manufacturer's/distributor's instructions, a copy of which should accompany each roll, and the recommendations of I.C.P. 2: 2002 Code of Practice for slating and tiling.

2.4.2 Installation

Installation of Permo Forte Roof Tile Underlay can be carried out in all conditions normal to pitched roofing work. In roof construction it is important to remember that Permo Forte Roof Tile Underlay is the second line of defence in excluding water penetrating the roof. For this reason the following list of criteria must be met to comply with the requirements of this certificate.

2.4.2.1 General installation criteria for Permo Forte:

- Where the length of the roof slope measured on plan exceeds 6m, Permo Forte Roof Tile Underlay should only be used if slate or tile manufacturer's guidance is sought on detailing.
- Ensure that Permo Forte Roof Tile Underlay is laid parallel to the eaves with the light grey side and product name uppermost, and not damaged.
- Where Permo Forte Roof Tile Underlay becomes damaged for whatever reason, it is imperative that it is suitably

repaired with a new piece of the same material or, if the damage is only minor, with Klobber Flecto adhesive tape. All penetrations to the underlay, such as vent pipes and chimneys should also be sealed with Klobber Flecto adhesive tape to ensure complete protection of the interior.

- It is imperative that persons working on the roof do not use the underlay for supporting themselves or the slates/tiles independently of the roof.
- Overlaps of the underlay should be provided in accordance with the minimum dimensions given in Table 2, which are taken from I.C.P. 2: 2002 Irish Code of Practice for slating and tiling.
- Where underlay 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.
- Moisture content of battens at time of fixing should not exceed 22%.
- Where timbers on roofs are to be treated with wood preservative, it is essential that manufacturer's guidance be sought in relation to possible chemical attack on the roofing underlay.
- When tacking roof underlay to the rafters it is recommended that a 3mm diameter X 20mm long extra large head clout/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. Where hips and valleys occur on roofs, lay an additional strip of underlay at least 600mm wide, running continuously from eaves to ridge.
- For duo pitch roofs not requiring ridge ventilation, underlay from each side of the ridge should overlap the other side by at least 225mm. Where proprietary ventilating ridge systems are specified, detailing of the underlay should be in accordance with the manufacturer's recommendations.
- Where used unsupported, the underlay should be draped with a deflection of approximately 10mm between rafters to permit free drainage of water into the gutter.
- Where used fully supported on decking or insulation, counterbattens should be used and the guidelines from BS 5250:2002 should be followed.
- Once Permo Forte Roof Tile Underlay is installed, it should not be exposed to UV light for more than four months as it will degrade if exposed long-term to UV light. At the eaves a Klobber Eaves Carrier UV-light-resistant underlay support tray or equivalent protection must be installed onto which the underlay can be lapped and sealed with Klobber Tacto Double Sided tape.

- Permo Forte Roof Tile Underlay is not suitable for use in flat roof construction.
- Figure 1 shows Permo Forte installed on a non-ventilated cold roof structure. Figure 2 shows Permo Forte installed on a non-ventilated warm roof structure.

2.4.2.2 Installation Criteria for Non-ventilated roof designs in relation to condensation risk.

The Permo Forte Roof Tile Underlay has a significantly higher water vapour permeability than that of conventional roof underlay and therefore does not have to rely upon air movement beneath the underlay to minimise the risk of damage through condensation. However it is essential that the amount of water vapour generated in the dwelling below is limited. The following measures will help to reduce the build up of water vapour.

- All penetrations into the roof space must be properly sealed and loft hatches made convection tight by means of a compressible draught seal.
- The dwelling below the roof must be ventilated in accordance with section F1 of TGD to Part F of the Building Regulations 1997 to 2002 for the dispersal and rapid dilution of water vapour.
- All water tanks in the loft space must be covered and all pipe work lagged.
- Extractor fans must be used in rooms that may experience high humidity, such as kitchens, utility rooms and bathrooms. The ventilation rates of the fans should be in accordance with the Building Regulations 1997 to 2002.
- A vapour control layer should be installed on the warm side of the insulation in both cold roof designs and warm roof designs.
- All penetrations, e.g. pipe work, electrical fittings to the loft space must be sealed.

To allow water vapour to disperse above the underlay, counter battens and tiling battens of minimum thickness 25mm each should be used where the space beneath the underlay is not ventilated. This airspace is open to the atmosphere, between the roof covering and the underlay and no eaves or ridge ventilation is required. As the ventilation of this airspace is dependent on gaps between the tiles or slates it may not be adequate where these are tightly jointed. In this case full ventilation (at eaves and ridge) of this airspace may be required.

The insulation is laid horizontally on a vapour barrier at ceiling level and must be pushed into the eaves and against the underlay to ensure that there are no gaps present.

Table 2. Minimum Overlaps (According to I.C.P. 2: 2002)

Roof Pitch	Horizontal lap (mm)		Vertical lap (mm)
	Partially Supported	Fully Supported	
Pitch < 22.5°	225	150	100
22.5° < pitch < 35°	150	100	100
Pitch > 35°	100	75	100

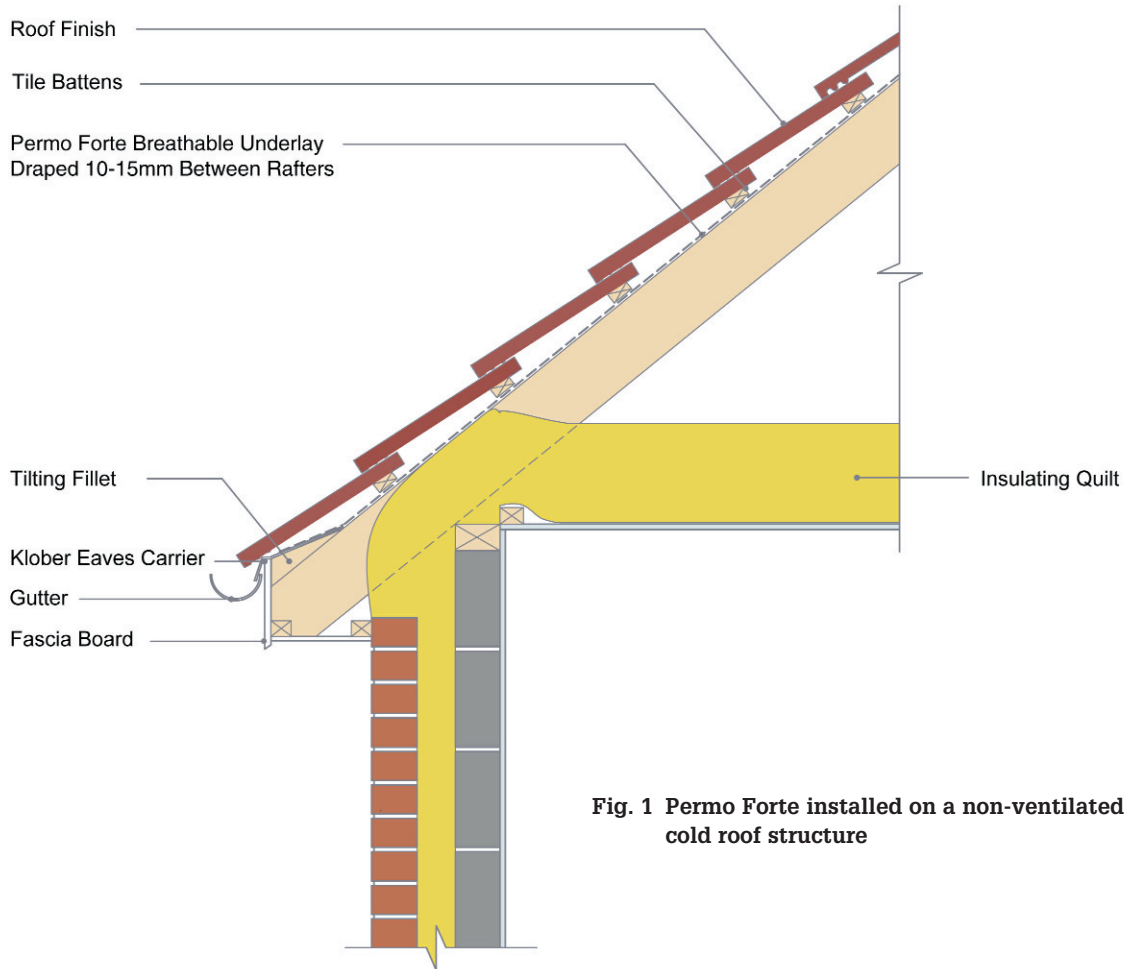


Fig. 1 Permo Forte installed on a non-ventilated cold roof structure

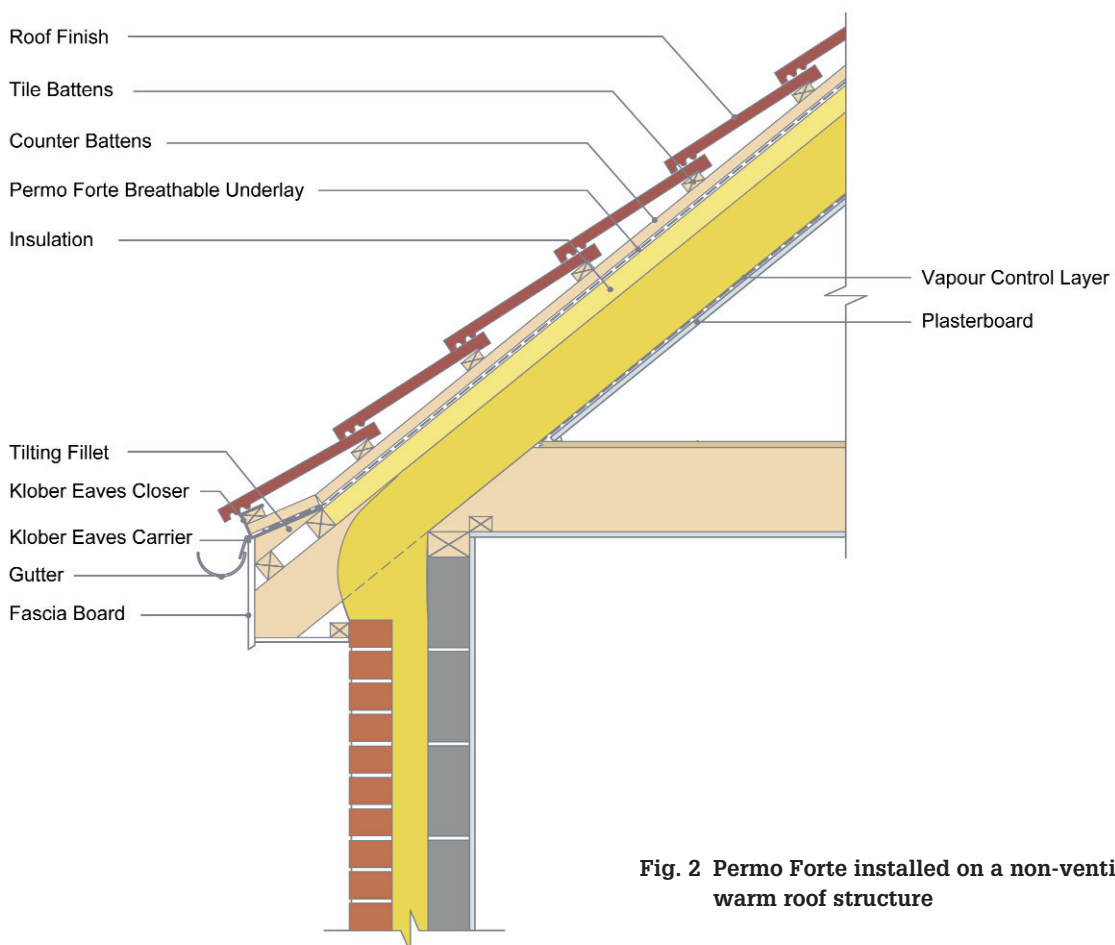


Fig. 2 Permo Forte installed on a non-ventilated warm roof structure

3 GENERAL

3.1 Permo Forte Roof Tile Underlay provides a satisfactory underlay in slated and tiled pitched roofs constructed in accordance with *I.C.P. 2: 2002 Irish Code of practice for slating and tiling*.

3.2 STRENGTH

Permo Forte Roof Tile Underlay will resist the loads associated with the installation phase of the roof.

Permo Forte Roof Tile Underlay has adequate resistance to wind uplift forces in most locations in Ireland.

3.3 WEATHERTIGHTNESS

Tests confirm that Permo Forte Roof Tile Underlay will resist the passage of water and wind-blown snow and dust into the interior of a building under all conditions to be found in a roof constructed to *I.C.P. 2: 2002 Irish Code of practice for slating and tiling*.

The underlay 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

Where Permo Forte Roof Tile Underlay is installed with ventilation, particular attention should be given to

ensure that there is adequate ventilation to the roof space at eaves and where required at ridge levels in accordance with Part F of the Building Regulations 1997 to 2002. Ridge vents must be flashed and sealed to the underlay to ensure that the roof space is ventilated at all times.

In conventional ventilated roof systems where the ceiling has to be fixed to the soffit of the rafters and insulation is fitted between rafters, as in dormer roof construction, a continuous ventilation space of at least 50mm should be arranged for as shown in Diagram 6D of TGD to Part F of the Building Regulations 1997 to 2002; in these circumstances it will be necessary to install a vapour control layer at the warm side of the insulation.

Where Permo Forte Roof Tile Underlay is installed in a non-ventilated cold or warm roof system, the risk of condensation is equivalent to, or less than, that for conventionally ventilated cold roof systems meeting the criteria of *BS 5250: 2002 Code of Practice for control of condensation in buildings*.

It is essential that roofs be constructed so as to minimise the risk of moisture vapour entering the attic space and forming 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.

4.1 BEHAVIOUR IN FIRE

Permo Forte Roof Tile Underlay has a class B2 fire rating, with similar properties in relation to fire as traditional underlays, and so will present no additional fire hazard to a roof structure in which it is incorporated.

Tests indicate that there is a risk of fire spread if Permo Forte Roof Tile Underlay is accidentally ignited during maintenance works, etc. (e.g. by a roofer or plumber's torch). As with all types of sarking material, care must be taken during building and maintenance to avoid the material becoming ignited. It should not come in contact with hot chimney surfaces as per clauses 2.15 to 2.17 of the TGD to Part J of the Building Regulations 1997 to 2002.

Toxicity is negligible when used for a roofing application.

4.2 WATER PENETRATION

Permo Forte Roof Tile Underlay, when used in accordance with this certificate, presents no significant risk of water penetration.

4.3 WATER VAPOUR PENETRATION AND CONDENSATION RISK

Permo Forte Roof Tile Underlay has a significantly higher water vapour permeability than that quoted as a minimum for conventional roof underlays in *I.C.P. 2: 2002 Irish Code of practice for slating and tiling* and, hence, movement of moisture vapour can take place through the underlay.

4.4 DURABILITY AND MAINTENANCE

Permo Forte roof underlay, once installed in accordance with this certificate, manufacturer's instructions and relevant codes of practice is virtually unaffected by conditions normally found in a roof space and will have a design life comparable with that of the roof and in accordance with *BS 7543: 1992 Guide to the durability of building elements, products and components*. The durability of the roof 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 down pipes should be unblocked and cleaned.

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

- Water penetration resistance
- Water vapour resistance
- Water vapour permeability
- Wind Resistance
- Tensile strength
- Tear strength
- Dimensional accuracy
- Dimensional stability
- Efficiency of the construction process

4.6 OTHER INVESTIGATIONS

- Existing data on product properties in relation to fire, toxicity, environmental impact and the effect on mechanical strength/stability and durability were assessed.
- 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.
- Site visits were conducted to assess the adequacy of storage practices and the practicability of installation and the history of performance in use of the product.
- Driving rain resistance was assessed.
- A condensation risk analysis was performed.

PART

5

CONDITIONS

5.1 CONDITIONS OF CERTIFICATION

The National Standards Authority of Ireland (“NSAI”) following consultation with the Irish Agrément Board (“IAB”) has assessed the performance and method of installation of the system and the quality of the materials used in its manufacture and certifies the system 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 so long as:

- (a) the specification of the product is unchanged;
- (b) the Building Regulations, 1997 to 2002 and any other regulation or standard applicable to the product/process/system, its use or installation remain 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 system continues to be manufactured, installed, used and maintained in accordance with the description, specifications and safety recommendations set out in this certificate.

5.2 The IAB mark and certification number may only be used on or in relation to the system in respect of which a valid certificate exists. If the certificate becomes invalid, the certificate holder must not use the IAB mark and certification number and must remove them from products already marked.

5.3 In granting this certificate, the NSAI makes no representation as to:

- (a) the presence or absence of patent rights subsisting in the product/process/system; or
- (b) the legal right of the certificate holder to market, install or maintain the product/process/system; 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 or 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, 1989 or of any other current or future statute or 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.

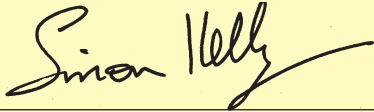
5.7 Where reference is made in this certificate to any Act of the Oireachtas, regulation made thereunder, statutory instrument, code of practice, national standards, manufacturer’s instructions or similar publication, it shall be construed as reference to such publication in the form in which it is in force at the date of this certification.

THE IRISH AGRÉMENT BOARD

This Certificate No.03/0190 is accordingly granted by the NSAI on behalf of The Irish Agrément Board to Klover Limited.

Date of Issue: September 2003

Signed: _____



Chief Executive, NSAI

Readers may check that the status of this Certificate has not changed by contacting the Irish Agrément Board, NSAI, Glasnevin, Dublin 9. Ireland.

Telephone: (01) 807 3800.

Telefax: (01) 807 3842.

www.nsaie



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