

**CERTIFICATE NO. 07/0272**

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## Dalpro® Breathable Roof Tile Underlay

### Souscouche de couverture en tuiles Unterlage für 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 2006**.

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 Dalpro® breathable roof tile underlay for use on tiled or slated pitched roofs. Dalpro® breathable roof tile underlay is manufactured by thermally laminating a water vapour permeable film between two layers of nonwoven polypropylene spunbond.

This Certificate certifies compliance with the requirements of the Building Regulations 1997 to 2006.

Dalpro® is a registered trademark of Don & Low Ltd. Nonwovens.



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#### USE:

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

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

The installation of these roof systems using Dalpro® breathable roof tile underlay is described in Section 2.4 of this certificate.

Dalpro® provides a barrier which:

- Prevents the ingress of windblown rain, dust and snow.
- Minimises the effects of 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 surface and interstitial condensation in the roof by allowing the safe dispersal of water vapour.
- Reduces heat loss caused by air movement through the attic space once installed with no ventilation.

#### MANUFACTURE & MARKETING:

The product is manufactured and marketed by:

Don & Low Ltd. Nonwovens,  
Glamis Road,  
Forfar,  
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## 1.1 ASSESSMENT

In the opinion of the Irish Agrément Board (IAB), Dalpro<sup>®</sup> breathable roof tile underlay if used in accordance with this Certificate can meet the requirements of the Building Regulations 1997 to 2006, as indicated in Section 1.2 of this Irish Agrément Certificate.

## 1.2 BUILDING REGULATIONS 1997 to 2006

### REQUIREMENT:

#### **Part D – Materials and Workmanship**

**D3** – Dalpro<sup>®</sup>, as certified in this Certificate, is comprised of 'proper materials' fit for their intended use (see Part 4 of this Certificate).

**D1** – Dalpro<sup>®</sup>, as certified in this Certificate, meets the requirements of the building regulations for workmanship.

#### **Part A - Structure**

##### **A1 – Loading**

Tests indicate that roofs incorporating Dalpro<sup>®</sup> 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**

Dalpro<sup>®</sup> 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**

Dalpro<sup>®</sup> meets the requirements when installed as indicated in Section 2.4 of this Certificate.

#### **Part F – Ventilation**

##### **F2 – Condensation in Roofs**

Dalpro<sup>®</sup> will provide water vapour permeability significantly in excess of that quoted as a minimum for conventional roof tile underlays in BS 5534-1:2003 *Code of practice for slating and tiling – Design*, and hence, movement of moisture vapour will take place through the underlay.

In a non-ventilated roof system where Dalpro<sup>®</sup> is installed in accordance with this Certificate and the supplied instructions, the underlay can prevent excessive condensation in a roof or in a roof void above an insulated ceiling as is required by the requirement F2 of the Technical Guidance Document to Part F of the Building Regulations 1997 to 2006.

Where the Dalpro<sup>®</sup> underlay is installed with ventilation, the design guidelines contained in Section 2 of the TGD to Part F of the Building Regulations 1997 to 2006 and BS 5250:2002 *Code of practice for control of condensation in buildings* must be met when installing this product.

Dalpro<sup>®</sup> 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 the Dalpro<sup>®</sup> underlay, roofs incorporating insulation can meet the requirements of Part L of the Building Regulations 1997 to 2006.

Where Dalpro<sup>®</sup> 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 6D of TGD to Part F of the Building Regulations 1997 to 2006. In these circumstances it will be necessary to install a vapour control layer on the warm side of the insulation.

## 2.1 PRODUCT DESCRIPTION

Dalpro<sup>®</sup> breathable roof tile underlay is watertight, vapour permeable, flexible membranes intended for use as an underlay on unsupported or supported pitched roofs, constructed in accordance with ICP 2:2002 *Irish code of practice for slating and tiling*.

## 2.2 MANUFACTURE

Dalpro<sup>®</sup> is a composite structure, manufactured via lamination of a water vapour permeable film between two layers on nonwoven polypropylene spunbond to a form breathable roof tile underlay.

The nominal characteristics of the underlay are given in Table 1 below.

	Value/Units
Width	1.0, 1.5 m*
Length	50 m*
Thickness	0.5 mm
Weight	125 g/m <sup>2</sup>
Hydrostatic Head	>200 cm of H <sub>2</sub> O
Colour	Grey* upper surface / White lower surface
* Other roll sizes and pigments are available to order	

**Table 1: Nominal Characteristics**

### 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

Dalpro<sup>®</sup> is supplied in rolls and delivered to site individually wrapped in polythene. A technical leaflet bearing the product name, IAB logo and Certificate number, is included with each roll or available on request. Labels with lot identifiers are attached to each roll for traceability.

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

Dalpro<sup>®</sup> breathable roof tile underlay must be installed and fixed in accordance with this Certificate, the Certificate holder's instructions, and the relevant recommendations of ICP 2:2002 and BS 5534-1:2003.

### 2.4.2 Installation Procedure

Installation of Dalpro<sup>®</sup> can be carried out in all conditions normal to pitched roofing work. In roof construction it is important to remember that the Dalpro<sup>®</sup> 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:

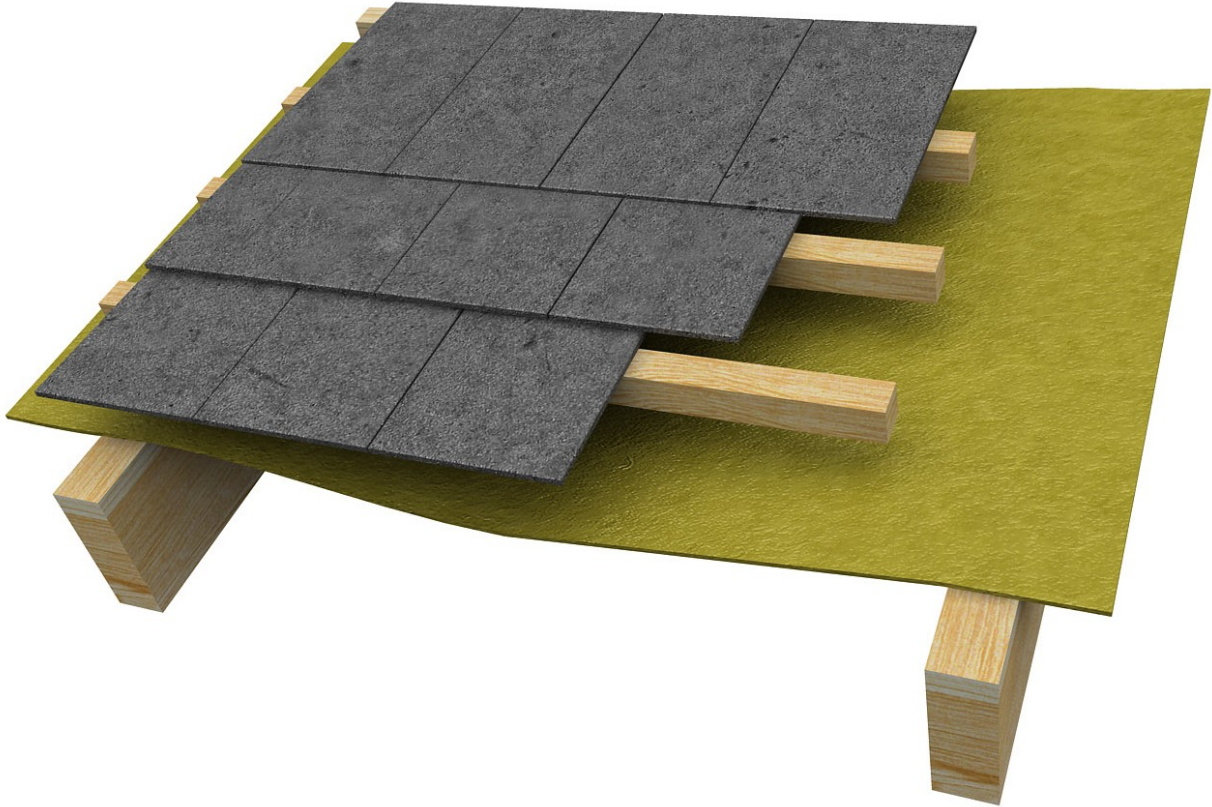
- Installation commences by unrolling the Dalpro<sup>®</sup> underlay horizontally across the rafters, starting at the eaves and working towards the ridges of the roof. The coloured side should be uppermost.
- When tacking the underlay to the rafters it is recommended that a 3mm diameter x 20mm long 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 those stated in Table 2.
- 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.

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

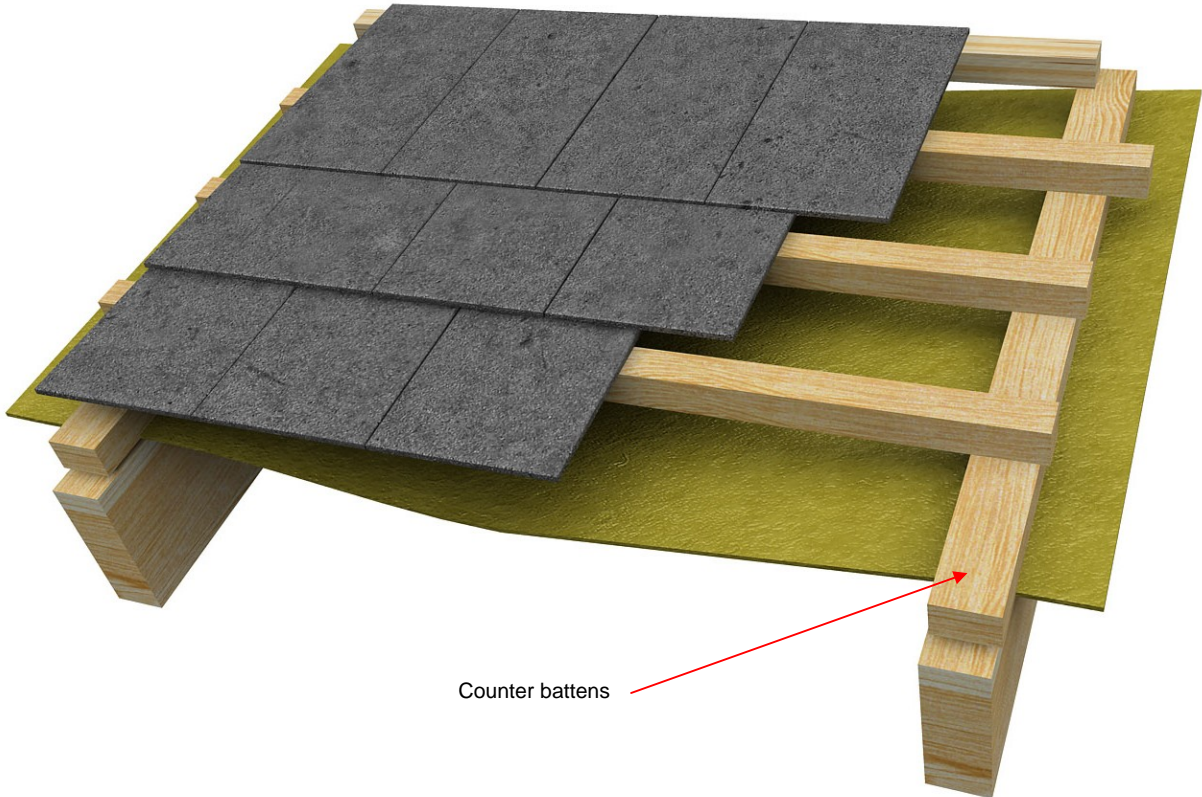
**Table 2: Minimum Overlaps**

- 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 ICP 2:2002 should be followed.

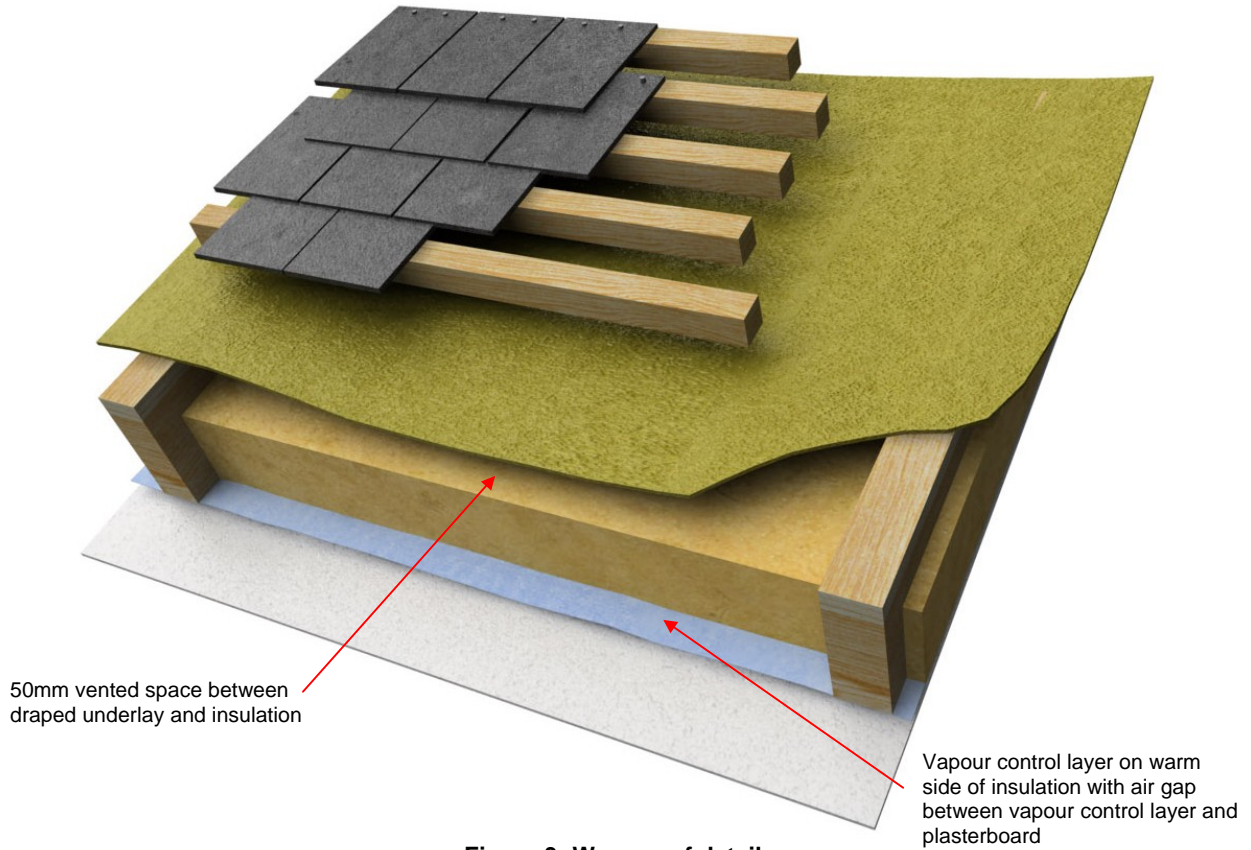
- Moisture content of battens at time of fixing should not exceed 22%. Where timbers on roofs have been treated with wood preservative due to high moisture content of timbers, it is essential that manufacturer's guidance be sought in relation to chemical attack from preservative on roofing underlay.
- At the eaves, the use of a type 5U felt to meet specifications of BS 747:2000 *Specifications for roofing felts* must be used. This felt should be laid typically in accordance with Table 2 and dressed 50mm into the gutter. The provision of a tilting felt/continuous ply support or proprietary eaves ventilation tray is also required to avoid water being trapped behind the fascia board.
- Dalpro® is not designed to withstand the weight of operatives or tiles being loaded out. Where pressure on the underlay over a rafter is unavoidable, it should be noted that the membrane does not offer substantial grip, particularly at overlaps.
- 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.
- Courses of underlay over a hip should be overlapped by at least 150mm. Each course should overlap the underlay course on the adjacent elevation of the roof.
- Hips and valleys should be covered with a 600mm wide strip of the Dalpro® underlay.
- When used in warm roof design, when the membrane 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.
- When used in non-ventilated cold roof design 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, electrical cables etc. should be sealed. The vapour control layer should be turned up around the edge of the insulation and sealed to the walls and soffit to inhibit warm humid air entering the attic.
- After the 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.
- Dalpro® breathable roof tile underlay is not suitable for use in flat roof construction.



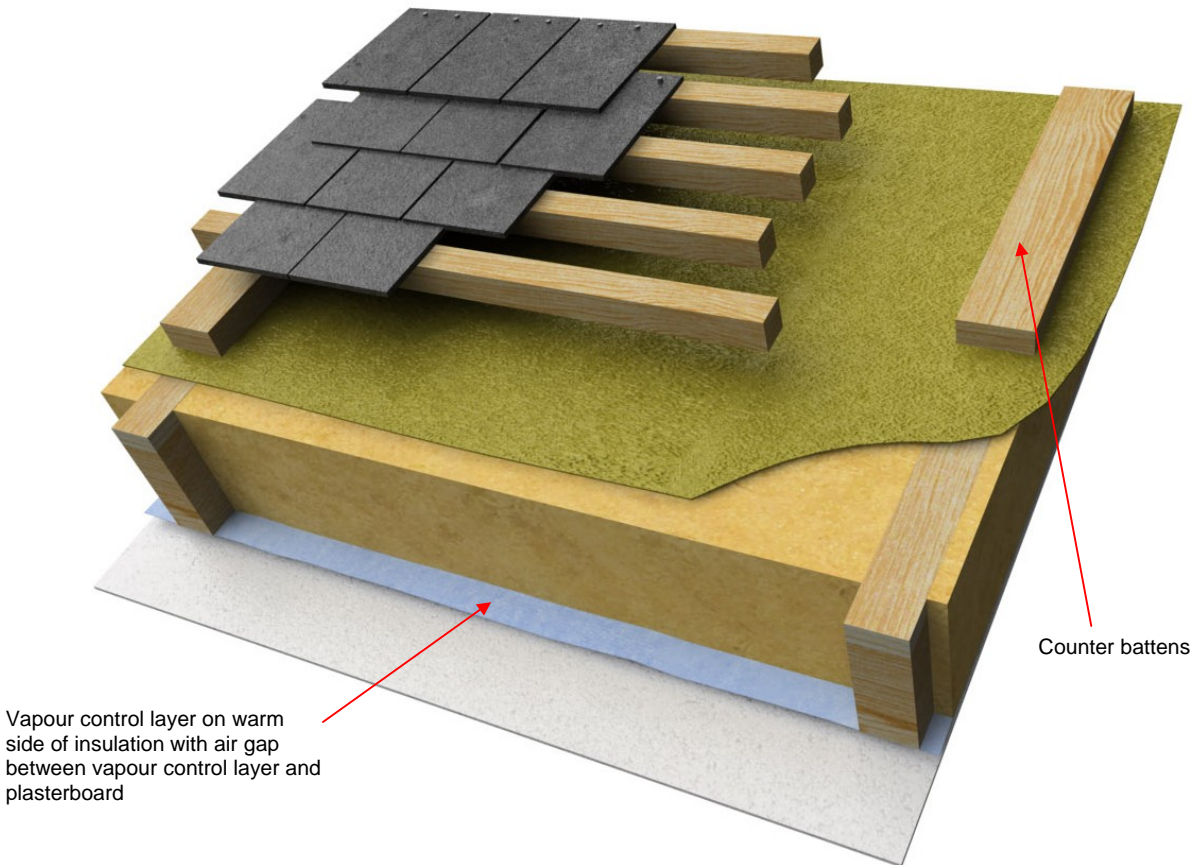
**Figure 1: Cold roof detail**



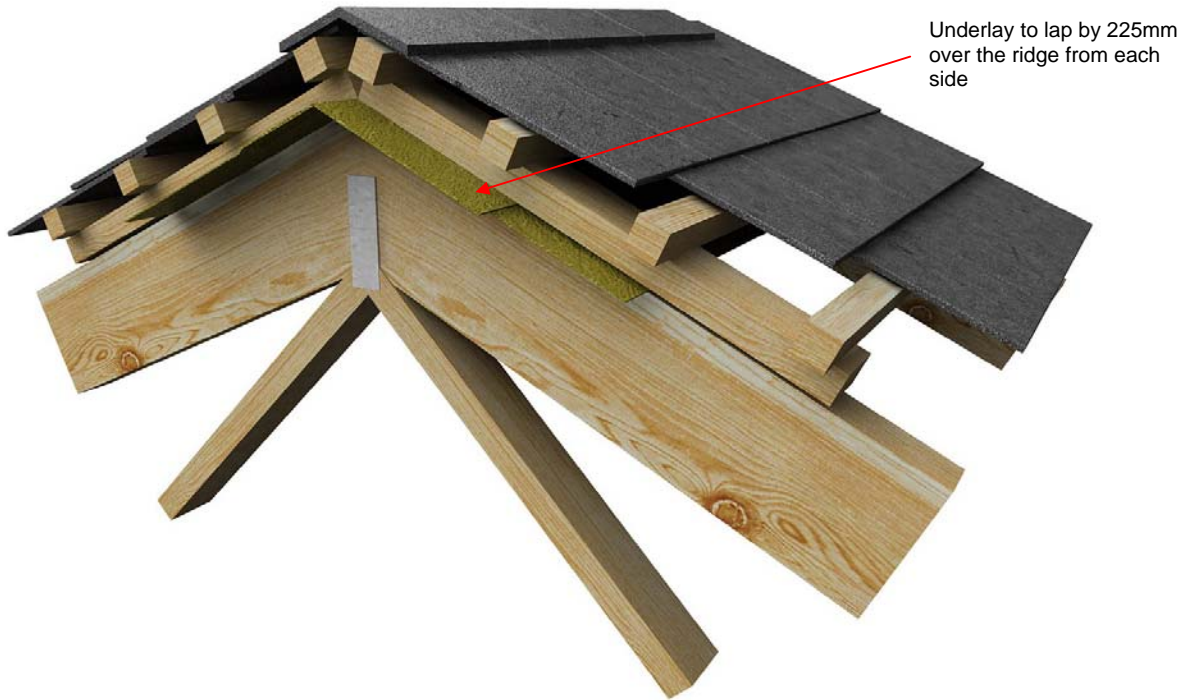
**Figure 2: Cold roof detail with counter battens**



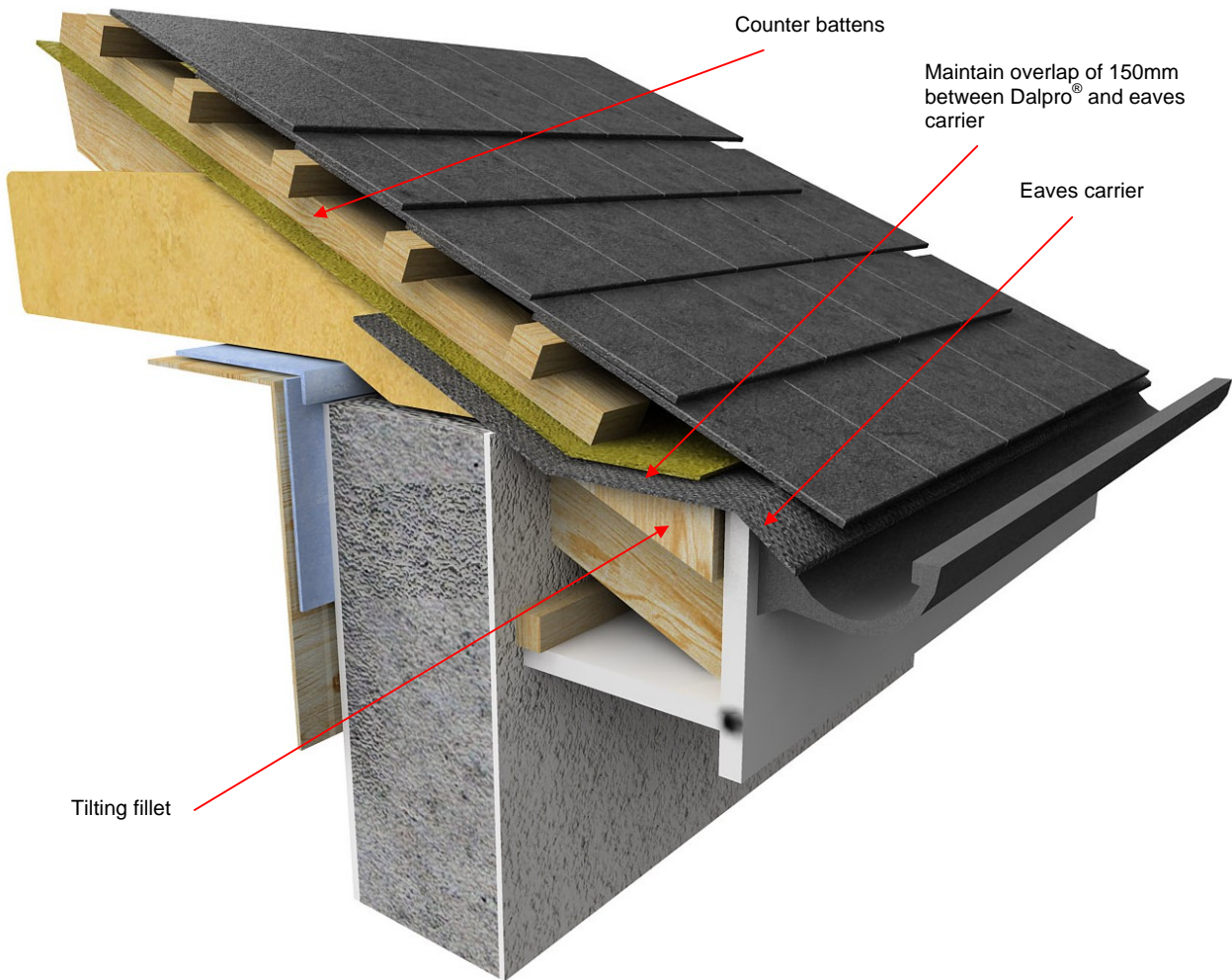
**Figure 3: Warm roof detail**



**Figure 4: Warm roof detail with counter battens**



**Figure 5: Ridge detail**



**Figure 6: Eaves detail**

### 3.1 GENERAL

Dalpro<sup>®</sup> breathable roof tile underlay provides a satisfactory underlay in tiled and slated pitched roofs constructed in accordance with ICP 2:2002, BS 5534-1:1997 and BS 8000-6:1990 *Code of practice for slating and tiling of roofs and claddings*.

### 3.2 STRENGTH

Dalpro<sup>®</sup> will resist the loads associated with the installation phase of the roof.

Dalpro<sup>®</sup> has adequate resistance to withstand typical uplift values for various rafter/batten centres.

Design wind speeds should be determined – the maximum net wind pressure must not exceed 2.5 kPa as calculated in accordance with BS 6399:Part 2:1997 *Code of practice for wind loads*.

### 3.3 WEATHERTIGHTNESS

Tests confirm that Dalpro<sup>®</sup> 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 ICP 2:2002, BS 5534:Part 1:1997 and BS 8000:Part 6:1990.

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

In the Dalpro<sup>®</sup> non-ventilated roof system, the risk of condensation is equivalent to, or less than, that for current conventionally ventilated cold roof systems meeting the criteria of BS 5250:1989(1995).

In conventional ventilated warm roof construction attention should be given to ensuring that there is adequate ventilation to the roof space at eaves level in accordance with the Building Regulations 1997 to 2006. There is no need for high level ventilation when using Dalpro<sup>®</sup> as the underlay has a water vapour permeability which is greater than that quoted as a minimum for conventional roof tile underlay in ICP 2:2002.

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.

A vapour control layer should be used on the warm side of the insulation.

#### 4.1 BEHAVIOUR IN FIRE

Dalpro® breathable roof tile underlay has 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 13501-1:2002 *Fire classification of construction products and building elements – Classification using test data from reaction to fire tests*, the product achieved a Class E Classification.

Tests indicate that Dalpro® has 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.

Dalpro® being a combustible material must be separated from chimneys and flues as indicated in cl. 2.15, 2.16 and 2.17 of TGD to Part J of the Building Regulations 1997 to 2006.

Toxicity is negligible when used in a roof situation.

#### 4.2 WATER PENETRATION

Dalpro®, when used in accordance with this Certificate, presents no significant risk of water penetration.

#### 4.3 WATER VAPOUR PENETRATION AND CONDENSATION RISK

Dalpro® has a significantly higher water vapour permeability than that quoted as a minimum for conventional roof tile underlays in BS 5534-1:2003, and hence movement of moisture vapour can take place through the underlay. Typical values of water vapour resistance are given in Table 3.

Material	Water Vapour Resistance (MNs/g)	Water Vapour Permeability (g/m <sup>2</sup> /day)
Dalpro® 125g/m <sup>2</sup>	0.20	1020
Traditional felt underlay (maximum)	570	0.36
Polythene sheet (0.15mm)	450	0.46

Table 3: Water Vapour Resistance to BS 3177

#### 4.4 DURABILITY AND MAINTENANCE

Dalpro® when 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 downpipes should be unblocked and cleaned.

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

Tables 4 gives a summary of the technical investigations carried out on Dalpro®.

#### 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.

Test	Method	Results
Tensile strength (N/50mm)	EN 12311-1	MD 290 CD 160
Elongation at break (%)	EN 12311-1	MD 40 CD 50
Tear resistance (N)	EN 12310-1	MD 210 CD 180
Dimensional stability (%)	EN 1107-2	< 1

Table 4: Physical Properties

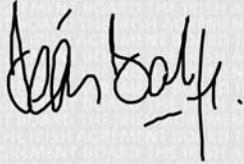
- 5.1** National Standards Authority of Ireland ("NSAI") following consultation with the Irish Agrément Board ("IAB") has assessed the performance and method of installation of the product/process and the quality of the materials used in its manufacture and certifies the product/process to be fit for 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 2006 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 IAB are paid.
- 5.2** The IAB 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 IAB 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. 1989, 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.

## The Irish Agrément Board

This Certificate No. **07/0272** is accordingly granted by the NSAI to **Don & Low Ltd. Nonwovens** on behalf of The Irish Agrément Board.

Date of Issue: **April 2007**

Signed



**Seán Balfe**  
Director of the Irish Agrément Board

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. Fax: (01) 807 3842. [www.n sai.ie](http://www.n sai.ie)