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**Agrément Certificate**  
**No 03/4017**

## BREATHELINE VAPOUR PERMEABLE ROOF TILE UNDERLAY

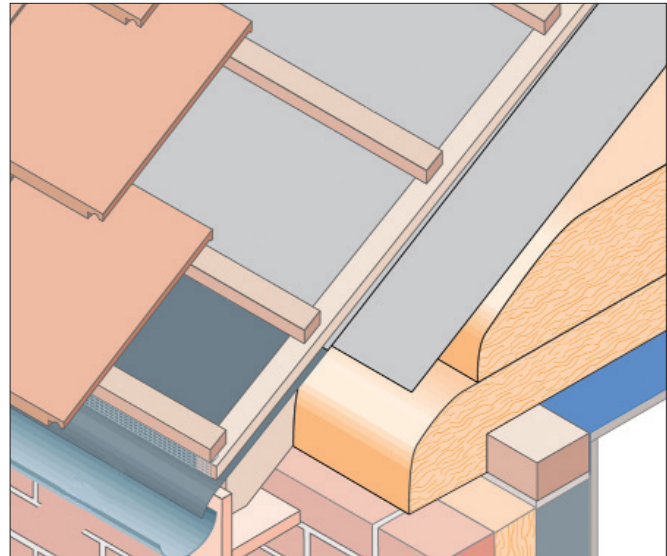
### PRODUCT SHEET 1 — FOR USE IN COLD NON-VENTILATED PITCHED ROOFS

#### PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Breatheline Vapour Permeable Roof Tile Underlay for use in cold non-ventilated pitched roof systems.

#### THIS CERTIFICATE INCLUDES:

- factors relating to compliance with UK Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



#### KEY FACTORS ASSESSED

**Weathertightness** — as part of a complete roof, the product will resist the passage of water, wind-blown snow and dust into the interior of the building (see section 4).

**Risk of condensation** — the product can be regarded as a low water vapour resistance (Type LR) underlay and can be used as part of a cold roof system without specific provisions for ventilation (see section 5).

**Wind loading** — when installed on appropriately spaced battens the products' physical properties are deemed adequate to resist the wind loads imposed on the underlay. The product will reduce the wind uplift forces acting on the roof covering (see section 6).

**Strength** — the product has adequate strength to resist the loads associated with the installation of the roof (see section 7).

**Durability** — under the normal conditions found in a roof space the product will have a service life comparable to a traditional roof tile underlay (see section 9).

The BBA has awarded this Agrément Certificate for Breatheline Vapour Permeable Roof Tile Underlay to Knauf Insulation Ltd as fit for its intended use provided it is installed, used and maintained as set out in this Agrément Certificate.

On behalf of the British Board of Agrément

Date of First issue: 28 March 2003  
Date of Second issue: 23 April 2007

Greg Cooper: Chief Executive

*The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at [www.bbacerts.co.uk](http://www.bbacerts.co.uk)*

*Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.*

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# Regulations

In the opinion of the BBA, Breatheline Vapour Permeable Roof Tile Underlay, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:



## The Building Regulations 2000 (as amended) (England and Wales)

Requirement:	C2(b)	Resistance to moisture
Comment:		The product will contribute to a roof meeting this Requirement. See sections 4.1 and 4.2 of this Certificate.
Requirement:	C2(c)	Resistance to moisture
Comment:		The product will contribute to a roof meeting this Requirement with respect to interstitial condensation. See sections 5.1 to 5.6 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The product is an acceptable material. See section 9 of this Certificate.



## The Building (Scotland) Regulations 2004

Regulation:	8	Fitness and durability of materials and workmanship
Regulation:	8(1)	Fitness and durability of materials and workmanship
Comment:		The product can contribute to a construction satisfying this Regulation. See section 9 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards — construction
Standard:	3.10	Precipitation
Comment:		The product will contribute to a roof satisfying clauses 3.10.1 <sup>(1)(2)</sup> and 3.10.7 <sup>(1)(2)</sup> of this Standard. See sections 4.1 and 4.2 of this Certificate.
Standard:	3.15	Condensation
Comment:		The product can enable a roof to satisfy this Standard with respect to interstitial condensation. See sections 5.1 to 5.6 of this Certificate.
Regulation:	12	Building standards — conversions
Comment:		All comments given for this product under Regulation 9, also apply to this Regulation, with reference to clause 0.12.1 <sup>(1)(2)</sup> and Schedule 6 <sup>(1)(2)</sup> . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



## The Building Regulations (Northern Ireland) 2000 (as amended)

Regulation:	B2	Fitness of materials and workmanship
Comment:		The product is an acceptable material. See section 9 of this Certificate.
Regulation:	C4	Resistance to ground moisture and weather
Comment:		The product will contribute to a roof satisfying this Regulation. See sections 4.1 and 4.2 of this Certificate.
Regulation:	C5	Condensation
Comment:		The product can enable a roof to satisfy this Regulation. See sections 5.1 to 5.6 of this Certificate.

## Construction (Design and Management) Regulations 2007

## Construction (Design and Management) Regulations (Northern Ireland) 1995 (as amended)

Information in this Certificate may assist the client, CDM co-ordinator or planning supervisor, designer and contractors to address their obligations under these Regulations.

See section: 1 *Description* (1.2).

# Non-regulatory Information

## NHBC Standards 2005

NHBC accepts the use of the Breatheline Vapour Permeable Roof Tile Underlay, when installed and used in accordance with this Certificate, as meeting Technical Requirement R3 in relation to NHBC Standards, Chapter 7.2 *Pitched roofs*.

## Zurich Building Guarantee Technical Manual 2006

In the opinion of the BBA, the Breatheline Vapour Permeable Roof Tile Underlay, when installed and used in accordance with this Certificate, satisfies the requirements of the *Zurich Building Guarantee Technical Manual*, Section 4 *Superstructure*, Sub-section *Pitched roofs*.

## General

This Certificate relates to Breatheline Vapour Permeable Roof Tile Underlay for use as a vapour permeable roof tile underlay in cold non-ventilated pitched roof systems.

The product will also prevent the ingress of wind-blown rain or snow.

It is important that the designers, planners, contractors and/or installers ensure that the roof and ceiling are constructed in accordance with the Certificate holder's instructions and the information given in this Certificate.

## Technical Specification

### 1 Description

1.1 Breatheline Vapour Permeable Roof Tile Underlay is a flexible, vapour permeable membrane comprising a breathable polypropylene film laminated with spunbonded polypropylene fabric on both sides.

1.2 The product has the nominal characteristics given in Table 1.

Table 1 Nominal characteristics

Characteristic (units)	Breatheline
Thickness (mm)	0.6
Weight per unit area (gm <sup>-2</sup> )	140
Roll length (m)	50
Roll width (m)	1.0 and 1.5
Roll weight (kg)	7.0 and 10.5
Colour	
upper	light grey (anti-glare), printed
lower	Dark grey

1.3 Quality control checks are carried out on the incoming materials, during production and on the finished product. Quality control checks on the finished product include:

- weight
- tensile strength
- nail tear
- dimensional stability
- head of water

### 2 Delivery and site handling

2.1 Rolls are delivered to site shrink-wrapped in polyethylene. Each roll carries a label bearing the company name, fixing instructions and the BBA logo incorporating the number of this Certificate.

2.2 The rolls should be stored flat on their sides, on a smooth, clean, dry surface, under cover and protected from sunlight.

## Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Breatheline Vapour Permeable Roof Tile Underlay.

## Design Considerations

### 3 Use

3.1 Breatheline Vapour Permeable Roof Tile Underlay is satisfactory for use in dwellings with non-ventilated tiled or slated roofs of any conventional plan and of any size. Features<sup>(1)</sup> successfully assessed include:

- duo pitched
- gable ends
- room in roof
- mono-pitched
- verges
- dormers
- hipped
- abutments
- timber sarking<sup>(2)</sup>
- mansard
- valleys

(1) For roofs incorporating other features, non-conventional roof geometries or construction materials, the advice of the Certificate holder should be sought.

(2) As in Scottish practice, where slates are nailed through the breather membrane directly onto timber planks (nominally 150 mm wide with a 2 mm gap) without battens.

3.2 The product can be installed by draping over rafters and securing with tiling battens, or installed taut over rafters and secured with counter battens and tiling battens.

3.3 In conventionally-ventilated roof constructions, energy loss by ventilation can account for up to 25% of the total heat lost through the roof. The non-ventilated system will subsequently reduce this mechanism of heat loss.

3.4 In non-ventilated roof systems, the risk of condensation is equivalent to, or less than, that for conventionally-ventilated cold roof systems (see section 5).

## 4 Weathertightness



4.1 Tests indicate that the product 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 in accordance with the relevant clauses of BS 5534 : 2003.

4.2 The product resists penetration of liquid water and consequently may be used as temporary waterproofing prior to the installation of slates or tiles. The period of such use should, however, be kept to a minimum. Advice should be sought from the Certificate holder (see section 14, Table for *Physical properties — general*).

## 5 Risk of condensation



5.1 For design purposes, the products' water vapour resistance may be taken as not more than  $0.25 \text{ MNsg}^{-1}$  and for roofs designed in accordance with BS 5534 : 2003 or BS 5250 : 2002, Section 8.4, it may be regarded as a Type LR membrane.

5.2 The complete roof construction, ceiling boards to roof tiles, must be considered as a total system with regard to condensation risk. It is important that the product is laid in accordance with the Certificate holder's instructions and this Certificate to minimise the risk of condensation.

5.3 The risk of condensation is highest in new-build construction during the first heating period, where there is high moisture loading due to wet trades, such as in-situ cast concrete slabs or plaster. The risk of condensation diminishes as the building naturally dries out. See *BBA Information Bulletin No 1 — Roof Tile Underlays in Cold Roofs during the Drying-out Period*.

5.4 All penetrations into and out of the roof space must be properly sealed in accordance with the Certificate holder's instructions which includes the use of the Certificate holder's recommended sealing tape. In addition, such features as vent stacks and boiler flues, passing through the roof space, must be sealed.

5.5 It is essential to minimise water vapour transfer into the loft space from the dwelling below. Appropriate measures include:

- ventilating the dwelling below in accordance with national Building Regulations and Standards for the dispersal and rapid dilution of water vapour, particularly from rooms that may experience high humidity (such as kitchens, utility rooms and bathrooms)
- covering all water tanks in the loft space and lagging pipework
- sealing penetrations in the ceiling and making loft hatches convection-tight by using a compressible draft seal
- ensuring that there is continuity of jointing with walls (and behind wall linings) at ceiling perimeters
- ensuring that masonry wall cavities do not interconnect with roof cavities.

5.6 For additional protection, the use of a vapour control layer/vapour check plasterboard can be considered.

## 6 Wind loading

6.1 Project design wind speeds should be determined and wind uplift forces calculated, in accordance with BS 6399-2 : 1997.

6.2 When unsupported, wind loading on the underlay should be calculated in accordance with BS 5534 : 2003, Section 5.5.2.7 (see section 14, Table for *Physical properties — general*, for acceptable wind loads with specific batten spacings for the draped product, using a 25 mm deep tiling batten).

## 7 Strength

The product will resist the loads associated with installation of the roof (see section 14, Table for *Physical properties — directional*).

## 8 Properties in relation to fire

8.1 The product will have similar properties in relation to fire to those of traditional polyethylene roof tile underlays.

8.2 When the product is used unsupported, there is a risk that fire can spread if the materials are accidentally ignited during maintenance works, eg by a roofer's or plumber's torch. As with all types of underlay, care should be taken during building and maintenance to avoid the material becoming ignited.

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

## 9 Durability



The product will be virtually unaffected by the normal conditions found in a roof space and will have a life comparable with that of traditional roof tile underlays, provided they are not exposed to sunlight for long periods (see section 10.4). Advice regarding exposure can be obtained from the Certificate holder.

## 10 General

10.1 Breatheline Vapour Permeable Roof Tile Underlay must be installed and fixed in accordance with the Certificate holder's instructions, provisions of this Certificate and the relevant recommendations of BS 5534 : 2003 and BS 8000-6 : 1990. Installation can be carried out under all conditions normal to roofing work.

10.2 The product is installed with the light grey or printed side uppermost and lapped to shed water out and down the roof slope.

10.3 Overlaps must be provided with the minimum dimensions given in Table 2.

Roof pitch (°)	Horizontal lap (mm)		Vertical laps (mm)
	Not fully supported	Fully supported	
12.5 to 14	225	150	100
15 to 34	150	100	100
35+	100	75	100

10.4 Where possible, it is recommended that eaves guards should be used to protect the product from sunlight and to direct water into the gutter.

## 11 Procedure

### Draped and loose lapped

11.1 The underlay should be installed as an unsupported system, and fixed in the traditional method for roof tile underlays, ie laid parallel to the eaves, draped between the rafters, with the light grey printed side uppermost.

### Taut

#### *Eaves-to-eaves installation (parallel with rafters)*

11.2 Lengths of the underlay are drawn up and over the roof ridge and down to the opposite eaves keeping the product taut. Each length of underlay is stapled to the rafters to hold it in position prior to counter battens (minimum thickness 25 mm) being fixed to the rafters at 300 mm centres.

11.3 Vertical edge laps of at least 100 mm (see Table 2) should be fully supported on and secured to the rafters using counter battens.

#### *Parallel-to-eaves installation*

11.4 The underlay is laid parallel to the eaves, pulled taut and nailed or stapled to the rafters to hold it in position prior to counter battens (minimum thickness 25 mm) being fixed to the rafters.

11.5 Horizontal laps should be made in accordance with Table 2 to shed water out and down the roof slope and sealed using a butyl adhesive tape to ensure a wind-tight loft space. If required, the laps can be supported with cross-noggings fixed between the rafters.

#### *Timber plank sarking*

11.6 For fully supported roofs (traditional Scottish), the slates can be nailed through the underlay into the timber plank sarking, normally 150 mm wide with a 2 mm gap.

## 12 Repair

Damage to the product can be repaired easily prior to the installation of slates or tiles by replacement of the damaged areas, by patching and sealing correctly. Care should be taken to ensure that the watertightness of the roof is maintained.

## 13 Finishing

13.1 Detailing of abutments, verges and hips must be in accordance with the Certificate holder's instructions. When detailing hips and valleys, laps must be a minimum of 300 mm.

13.2 To achieve a convection-tight loft space, it is important that the following details are maintained (see also section 5.5):

- all penetrations, eg pipework, electrical fittings to the loft space, must be sealed
- the loft hatch must be securely sealed to ensure a draught-free fit
- the insulation must be pushed into the eaves and against the underlay to avoid gaps.

13.3 The tiling and slating must be carried out in accordance with the relevant clauses of BS 5534 : 2003, BS 8000-6 : 1990 and the Certificate holder's instructions, especially when using tightly-jointed slates or tiles.

## 14 Tests

Samples of Breatheline Vapour Permeable Roof Tile Underlay were obtained from the Certificate holder for testing. The results of the tests carried out by, or on behalf of, the BBA are summarised in Tables 3 and 4.

**Table 3** *Physical properties — directional*

Test (units)	Mean result		Method <sup>(1)</sup>
	Longitudinal	Transverse	
Tensile strength (N per 50 mm)			BS EN ISO 527-1 and 3 (100 mm min <sup>-1</sup> )
unaged	252	159	
heat aged <sup>(2)</sup>	250	158	
wet strength <sup>(3)</sup>	267	179	
UV aged <sup>(4)</sup>			
200 light hours	207	138	
500 light hours	108	64	
Elongation at break (%)			BS EN ISO 527-1 and 3 (100 mm min <sup>-1</sup> )
unaged	23	49	
heat aged <sup>(2)</sup>	18	35	
wet strength <sup>(3)</sup>	22	51	
UV aged <sup>(4)</sup>			
200 light hours	13	32	
500 light hours	5	31	
Tear resistance (nail) (N) unaged	95	73	MOAT 27 : 5.4.1
Dimensional stability (%)	-0.5	0.2	BS EN 1107-2

(1) The test documents are detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the various documents.

(2) Heat aged at 70°C for 56 days.

(3) Wet strength soak at 23°C for 24 hours — tested surface wet.

(4) Exposure to UVA (cycle of 4 hours UV at 50°C followed by 4 hours condensation at 50°C).

**Table 4** *Physical properties — general*

Test (units)	Mean result	Method <sup>(1)</sup>
Water vapour transmission at 25°C/75% RH (gm <sup>-2</sup> day <sup>-1</sup> )	935	BS 3177
Vapour resistance (MNsg <sup>-1</sup> )	0.22	BS 3177
Slip resistance (coefficient of friction)		T1/10 <sup>(2)</sup>
dry	0.87	
wet	0.70	
Resistance to water penetration (Eosin test)	pass	BS 4016
Resistance to streaming water supported	pass	BBA T1/15 <sup>(2)</sup> pass
Mullen burst strength (kNm <sup>-2</sup> )	552	BS 3137
Head of water (cm)	453	BS EN 20811
Resistance to wind loads (kPa) <sup>(3)</sup>		MOAT 69 : 4.2.1
batten spacing 350 mm		
vertical <sup>(4)</sup>	1.5	
horizontal <sup>(5)</sup>	—	
batten spacing 330 mm		
vertical <sup>(4)</sup>	2.0	
horizontal <sup>(5)</sup>	1.0	
batten spacing 300 mm		
vertical <sup>(4)</sup>	2.5 <sup>(6)</sup>	
horizontal <sup>(5)</sup>	1.5	
batten spacing 250 mm		
vertical <sup>(4)</sup>	—	
horizontal <sup>(5)</sup>	2.5 <sup>(6)</sup>	

(1) The test documents are detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the various documents.

(2) BBA Test Method.

(3) Test carried out using 25 mm thick battens and a 600 mm rafter spacing.

(4) Simulates eaves to eaves installation.

(5) Simulates eaves to gable installation.

(6) Test stopped at 2.5 kPa.

## 15 Investigations

15.1 Using computer modelling, cold non-ventilated roofs were analysed for risk of condensation.

15.2 The manufacturing process was assessed, including the method adopted for quality control, and details were obtained of the quality and composition of the materials used.

## Bibliography

BS 3137 : 1972 *Methods for determining the bursting strength of paper and board*

BS 3177 : 1959 *Method for determining the permeability to water vapour of flexible sheet materials used for packaging*

BS 4016 : 1997 *Specification for flexible building membranes (breather type)*

BS 5250 : 2002 *Code of practice for control of condensation in buildings*

BS 5534 : 2003 *Code of practice for slating and tiling (including shingles)*

BS 6399-2 : 1997 *Loading for buildings — Code of practice for wind loads*

BS 8000-6 : 1990 *Workmanship on building sites — Code of practice for slating and tiling of roofs and claddings*

BS EN 1107-2 : 2001 *Flexible sheets for waterproofing — Determination of dimension stability — Plastic and rubber sheets for roof waterproofing*

BS EN 20811 : 1992 *Textiles — Determination of resistance to water penetration — Hydrostatic pressure test*

BS EN ISO 527-1 : 1996 *Methods of testing plastics — Mechanical properties — Determination of tensile properties — General principles*

BS EN ISO 527-3 : 1996 *Plastics — Determination of tensile properties — Test conditions for films and sheets*

MOAT No 69 : 2004 *UEAtc Technical Report for the Assessment of Discontinuous Roofing Underlay Systems*

## 16 Conditions

16.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English law.

16.2 References in this Certificate to any Act of Parliament, Statutory Instrument, Directive or Regulation of the European Union, British, European or International Standard, Code of Practice, manufacturers' instructions or similar publication, are references to such publication in the form in which it was current at the date of this Certificate.

16.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

16.4 In granting this Certificate, the BBA is not responsible for:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

16.5 Any information relating to the manufacture, supply, installation, use and maintenance of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used and maintained. It does not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the manufacture, supply, installation, use and maintenance of this product/system.