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Agrément Certificate

08/4548

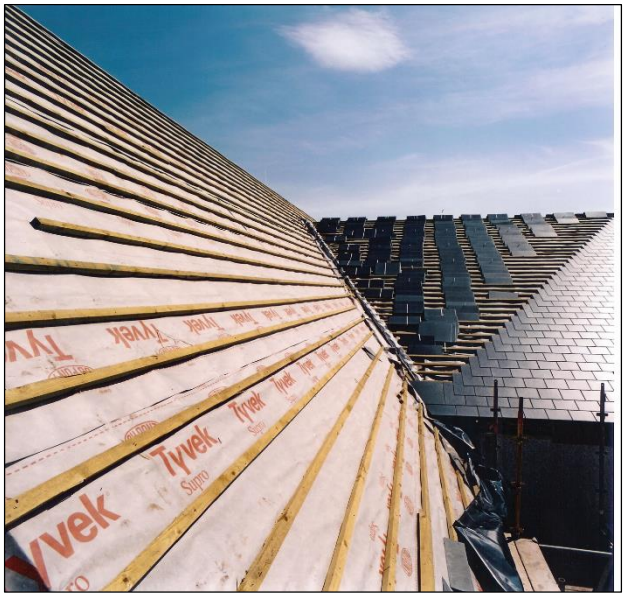
Product Sheet 2

TYVEK ROOF LINING SYSTEMS

TYVEK SUPRO ROOF TILE UNDERLAY FOR USE IN ENERGY-EFFICIENT COLD NON-VENTILATED ROOFS

This Agrément Certificate Product Sheet(1) relates to TYVEK(2) Supro Roof Tile Underlay for use in energy-efficient cold non-ventilated roofs. Use of the product in warm non-ventilated systems is covered in Product Sheet 1 and in cold ventilated systems in Product Sheet 8.

(1) Hereinafter referred to as 'Certificate'.
(2) TYVEK is a registered trademark of E.I duPont de Nemours & Co or its affiliates.



CERTIFICATION INCLUDES:

- factors relating to compliance with 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 and wind-blown snow and dust into the interior of the building (see section 6).

Risk of condensation – the product is a low water vapour resistance (Type LR) underlay and can be used as part of a cold non-ventilated roof system without specific provisions for ventilation (see section 7).

Wind loading — when installed on appropriately spaced battens and/or rafters the product's physical properties are 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 8).

Strength – the product has adequate strength to resist the loads associated with the installation of the roof (see section 9).

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 12).

The BBA has awarded this Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of Third issue: 18 March 2015
Originally certificated on 8 April 2008

John Albon
Head of Approvals — Construction Products

Claire Curtis-Thomas
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

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Regulations

In the opinion of the BBA, TYVEK Supro Roof Tile Underlay, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):

The Building Regulations 2010 (England and Wales) (as amended)

Requirement: C2(b) **Resistance to moisture**
Comment: The product will contribute to a roof meeting this Requirement. See section 6.1 of this Certificate.

Requirement: C2(c) **Resistance to moisture**
Comment: The product will enable a roof to meet this Requirement with regard to interstitial condensation. See sections 7.1 to 7.6 of this Certificate.

Regulation: 7 **Materials and workmanship**
Comment: The product is acceptable. See section 12 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation: 8(1) **Durability, workmanship and fitness of materials**
Comment: The product can contribute to a construction satisfying this Regulation. See section 12 and the *Installation* part of this Certificate.

Regulation: 9 **Building standards applicable to construction**
Standard: 3.10 Precipitation
Comment: The product will contribute to a roof satisfying clauses 3.10.1[(1)(2)] and 3.10.8[(1)(2)] of this Standard. See section 6.1 of this Certificate.

Standard: 3.15 Condensation
Comment: The product can enable a roof to satisfy this Standard with regard to interstitial condensation. See sections 7.1 to 7.6 of this Certificate.

Standard: 7.1(a) Statement of sustainability
Comment: The product can contribute to meeting the relevant requirements of Regulation 9, Standards 1 to 6 and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.

Regulation: 12 **Building standards applicable to conversions**
Comment: Comments made in relation to the product under Regulation 9, Standards 1 to 6 also apply to this regulation, with reference to clause 0.12.1[(1)(2)] and Schedule 6[(1)(2).]

(1) Technical Handbook (Domestic).
(2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2012

Regulation: 23(a)(i)(iii)(b)(i) **Fitness of materials and workmanship**
Comment: The product is acceptable. See section 12 and the *Installation* part of this Certificate.

Regulation: 28(b) **Resistance to moisture and weather**
Comment: The product will contribute to a roof satisfying this Regulation. See section 6.1 of this Certificate.

Regulation: 29 **Condensation**
Comment: The product can enable a roof to satisfy this Regulation. See sections 7.1 to 7.6 of this Certificate.

Construction (Design and Management) Regulations 2007
Construction (Design and Management) Regulations (Northern Ireland) 2007

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

See section: 1 *Description* (1.2) of this Certificate.

Additional Information

CE marking

The Certificate holder has taken the responsibility of CE marking the product in accordance with harmonised European Standard EN 13859-1 : 2014. An asterisk (*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 TYVEK Supro Roof Tile Underlay is a vapour permeable, high-density polyethylene (HDPE) membrane backed with a polypropylene scrim. The product is available with or without an integral adhesive tape (the product incorporating adhesive tape is known as TYVEK Supro Plus).

1.2 The product has the following nominal characteristics:

Thickness (mm)	0.45
Mass per unit area* ($g \cdot m^{-2}$)	145
Roll length (m)	50
Roll width (m)	1.0, 1.5
Water vapour transmission – s_d* (m)	0.025
Watertightness*	
unaged	Class W1
aged(1)	Class W1
Tensile strength* ($N \cdot 50\ mm^{-1}$)	
longitudinal	300
transverse	245
Nail tear* (N)	
longitudinal	190
transverse	205
Colour	White underside, grey top side and red logo.

(1) Aged in accordance with EN 13859-1 : 2014, Annex C.

1.3 Air and Vapour Control Layers (AVCLs) are recommended for use in conjunction with this product (see Product Sheets 3 and 4 of this Certificate).

1.4 TYVEK 2060B Tape is a single-sided tape for use at joints.

2 Manufacture

2.1 The product is manufactured by spinning strands of HDPE and bonding them with heat and pressure to form a flexible sheet. A polypropylene scrim is thermally bonded to one side.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated

- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control being operated by the manufacturer are being maintained.

2.3 The management system of the Certificate holder has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by DQS GmbH (Certificate 463950 QM08).

3 Delivery and site handling

3.1 Rolls of membrane are delivered to site in packages that carry a label bearing the marketing company's name, the grade identification and the BBA logo including the number of this Certificate.

3.2 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 TYVEK Supro Roof Tile Underlay.

Design Considerations

4 Use

4.1 The product is satisfactory for use in dwellings with fully-supported or unsupported (draped) underlay over rafter or counterbatten specifications in non-ventilated tiled and slated pitched roofs of any conventional plan and size. Features[(1)] successfully assessed include:

- duo pitched
- gable ends
- room-in-roof[(2)]
- mono-pitched
- verges
- dormers
- hipped
- abutments
- timber sarking[(3)(4)(5)]
- mansard
- valleys.

(1) For roofs incorporating other features, unconventional roof geometries of construction materials, the advice of the Certificate holder should be sought.
(2) Where a room-in-roof results in part of a pitch being insulated (ie a warm roof), design and detailing of that part of the roof should comply with the relevant guidance given in Product Sheet 1 of this Certificate.
(3) When used in Scottish practice with timber sarking, the membrane is laid over open jointed timber planks (nominally 150 mm wide with 2 mm gap) and fixed with galvanized clout nails. Slates are nailed through the membrane on the sarking without battens.
(4) When used on other tiled roofs with timber sarking, counterbattens of 12 mm minimum thickness should be used to provide a drainage path beneath the tiling battens. The membrane may be laid directly over the timber sarking or draped over the counterbattens.
(5) Sheet sarking materials should not be used.

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

4.3 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 significantly reduce this heat loss.

5 Practicability of installation

Installation must be carried out by slaters/tilers experienced with this type of product.

6 Weathertightness

6.1 The product is Class W1* in accordance with BS EN 13859-1 : 2014 and 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 : 2014.

6.2 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. Further information is given in BBA Information Bulletin 2 *Permeable Roof Tile Underlay – Guide to Good Site Practice.*

7 Risk of condensation

7.1 For design purposes, the product's water vapour resistance may be taken as not more than 0.25 $MN \cdot s \cdot g^{-1}$ and for roofs designed in accordance with BS 5534 : 2014 or BS 5250 : 2011, Section H, it may be regarded as a Type LR membrane.

7.2 In common with all roofs, care must be taken in the overall design and installation to minimise the risk of water vapour coming into contact with cold parts of the construction. Factors to be considered and minimised include moisture diffusion through the ceiling, infiltration through unsealed openings/penetrations in the ceiling and services evaporating or venting moisture into cold spaces.

7.3 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 in-situ cast concrete slabs or plaster. The risk of condensation diminishes as the building dries out. See BBA Information Bulletin No. 1 *Roof Tile Underlays in Cold Roofs during the Drying-out Period.*

7.4 All penetrations into and out of the roof space must be properly sealed in accordance with the Certificate holder's instructions which include 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.

7.5 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 draught 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.

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

7.7 Convective water vapour transfer into the roof construction can be reduced by installing a vapour control layer/air barrier (eg DuPont AVCL) behind the internal lining (see Product Sheets 3 and 4 of this Certificate).

8 Wind loading

8.1 Project design wind speeds for the roof in which the product is to be installed should be determined, and wind uplift forces calculated, in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex.

Unsupported

8.2 The product is satisfactory for use in unsupported systems, in the geographical wind zones given in Table 1, where a well-sealed ceiling is present and the roof has a ridge height ≤15m, a pitch between 12.5° and 75°, and a site altitude ≤100 m, and where topography is not significant. For all other cases, the required uplift resistance should be determined using BS 5534 : 2014 and the Certificate holder's declared wind uplift resistances in Table 2.

Table 1 Zones of applicability of Tyvek Supro Roof Tile Underlay according to BS 5534 : 2014, clause A.8 with battened laps.and taped laps

Product	≤345 mm batten gauge with battened lap	≤250 mm batten gauge with battened lap	≤345 mm batten gauge with taped lap(1)	≤345 mm batten gauge with 2060B tape lap
Tyvek Supro	Zones 1 to 5	Zones 1 to 5	-	Zones 1 to 5
Tyvek Supro Plus(1)	Zones 1 to 5	Zones 1 to 5	Zones 1 to 5	-

(1) The laps were taped using the integrated tape.

Table 2 Declared wind uplift resistance (Pa)

Product	≤345 mm batten gauge with battened laps(3)	≤250 mm batten gauge with battened laps(2)(3)	≤345 mm batten gauge with taped laps(3)	≤345 mm batten gauge with 2060B tape
Tyvek Supro	1643	2332	-	3371
Tyvek Supro Plus	1750	-	3204	-

(1) The laps were taped using the integrated tape.
(2) Underlays with a wind uplift resistance at a 250 mm batten gauge that meet the minimum design wind pressure of 820 Pa for Zone 1 are considered to satisfy the requirements for use at a 100 mm batten gauge in all wind zones.
(3) Mean of test results.

Supported

8.3 The products, when fully supported, have adequate resistance to wind uplift forces.

8.4 The products may be used at any batten gauge in all wind zones when laid over nominally airtight sheet sarking, for example OSB, plywood, chipboard and insulation for warm-roof design. They may also be used in applications where slates are nailed directly onto sarking boards.

8.5 Sarking boards, such as square-edged butt jointed planks, are not considered to be airtight and the underlay is treated as unsupported.

9 Strength

The product will resist the loads associated with installation of the roof.

10 Properties in relation to fire

10.1 The product will melt and shrink away from heat, but will burn in the presence of a naked flame. The product is classified in accordance with EN 13501-1 : 2007 as a Class E* material.

10.2 When the product is used unsupported, there is a risk that fire can spread if it is 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 ignition.

11 Maintenance

As the product is confined within a roof structure and has suitable durability (see section 12), maintenance is not required. However, any damage occurring before enclosure must be repaired (see section 16).

12 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 a traditional roof tile underlay, provided it is not exposed to sunlight for long periods (see section 14.4). Advice regarding exposure can be obtained from the Certificate holder.

Installation

13 General

13.1 TYVEK Supro Roof Tile Underlay must be installed and fixed in accordance with the Certificate holder's instructions, the provisions of this Certificate and the relevant recommendations of BS 5534 : 2014 and BS 8000-6 : 2013. Installation can be carried out under all conditions normal to roofing work.

13.2 The product is installed with the printed side uppermost and lapped to shed water out and down the slope.

13.3 Overlaps must be provided with the minimum dimensions given in Table 3. **The Certificate holder's advice must be sought when using tapes for sealing overlaps.**

Table 3 Minimum overlaps

Roof pitch°(1)	Horizontal lap (mm)		Vertical laps (mm)
	Not fully supported	Fully supported	
12.5 to 14	225	150	300
15 to 34	150	150	300
35+	150	150	300

(1) In all cases the minimum pitch for the slate or tile being used should be considered. Where variations occur, advice should be sought from the Certificate holder.

13.4 Where possible, eaves guards should be used to protect the product from sunlight and to direct water into the gutter.

14 Procedure

Draped and loose laps

14.1 The product should be installed as an unsupported system, and fixed in the traditional method for roof tile underlays, ie draped between the rafters, with the coloured printed side uppermost. The underlay should not drape more than 10 mm.

Taut

14.2 The product should be laid horizontally and must be pulled taut and not allowed to drape. Each sheet should be fixed to hold it in position prior to the counterbattens being fixed. Counterbattens (minimum thickness 25 mm) are then fixed to the rafter. To assist in achieving the desired air permeability, the lap joints and penetrations through the underlay can be sealed with TYVEK 2060B Tape or by using Tyvek Supro Plus.

Timber plank sarking

14.3 For fully supported roofs (traditional Scottish), the slates can be nailed through the product into the timber plank sarking, normally 150 mm wide with a 2 mm gap. The underlay must be fixed to the sarking board using galvanized clout nails.

14.4 For fully supported roofs (where battens are used) counterbattens of minimum thickness 12 mm should be installed either above or beneath the underlay for drainage purposes.

15 Finishing

15.1 Detailing of abutments, verges and hips must be in accordance with the Certificate holder's instructions.

15.2 The tiling and slating must be carried out in accordance with the relevant clauses of BS 5534 : 2014, BS 8000-6 : 2013 and

the tile/slate manufacturer's instruction, especially when using tightly-jointed slates or tiles.

16 Repair

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

Technical Investigations

17 Tests

17.1 An assessment was made of data to EN 13859-1 : 2014 in relation to:

- dimensions*
- mass per unit area*
- tensile strength and elongation*
- resistance to tear*
- dimensional stability*
- flexibility at low temperature*
- resistance to water penetration*
- water vapour transmission*
- resistance to air penetration*
- resistance to artificial ageing*.

17.2 Tests were carried out to determine:

- slip resistance
- Mullen burst strength
- resistance to wind loads

in order to assess:

- safety during installation
- robustness during installation
- properties when installed.

17.3 Data from previous tests on TYVEK membrane assessments were used to evaluate:

- wet strength
- low temperature flexibility
- heat ageing
- water immersion
- UV ageing.

18 Investigations

18.1 The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of materials used.

18.2 The condensation risk in cold non-ventilated roof constructions incorporating the product (specifically those containing sarking boards) was examined.

18.3 An assessment of practicability of installation was made from data gathered during previous assessments of TYVEK Supro Roof Tile Underlay.

18.4 An evaluation was made of monitored data covering internal loft space temperature and relative humidity, plus moisture content of the rafters. The data were collected over winter and summer periods.

18.5 An evaluation was made of data relating to the reduction in unwanted energy loss from roofs incorporating the TYVEK non-ventilated system.

Bibliography

BS 5250 : 2011 *Code of practice for control of condensation in buildings*

BS 5534 : 2014 *Code of practice for slating and tiling (including shingles)*

BS 8000-6 : 2013 *Workmanship on building sites — Code of practice for slating and tiling of roofs and claddings*

BS EN 1991-1-4 : 2005 *Eurocode 1: Actions on structures — General actions — Wind actions*

NA to BS EN 1991-1-4 : 2005 UK National Annex to *Eurocode 1: Actions on structures — General actions — Wind actions*

EN 13501-1 : 2007 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*

EN 13859-1 : 2010 *Flexible sheets for waterproofing — Definitions and characteristics of underlays — Underlays for discontinuous roofing*

BS EN ISO 9001 : 2008 *Quality management systems — Requirements*

Conditions of Certification

19 Conditions

19.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page — no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- 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.

19.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

19.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and 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.

19.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

19.5 In issuing this Certificate, the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- 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
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal.
- any claims by the manufacturer relating to CE marking.

19.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal 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, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue 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.