

Don & Low Ltd (Nonwovens)

Glamis Road
Forfar

Angus DD8 1EY

Tel: 01307 452600 Fax: 01307 452610

e-mail: nonwovens@donlow.co.uk

website: www.donlow.com



Agrément Certificate

99/3648

Product Sheet 1

DALTEX ROOFSHIELD ROOF LINING SYSTEM

FOR USE IN ENERGY EFFICIENT NON-VENTILATED COLD PITCHED ROOF SYSTEMS

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to the Daltex Roofshield Roof Lining System, for use in energy efficient non-ventilated cold pitched roof systems (for use of the system in non-ventilated warm and ventilated cold pitched roofs, see Agrément Certificate 96/3220).

AGRÉMENT 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 5).

Risk of condensation — the product is regarded as an air permeable and a low water vapour resistance (Type LR) underlay and can be used as part of a non-ventilated cold pitched roof system (see section 6).

Wind loading — when installed on appropriately spaced battens the product's 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 7).

Strength — the product has adequate strength to resist the loads associated with the installation of the roof (see section 8).

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 11).



The BBA has awarded this Agrément 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

Simon Wroe
Head of Approvals — Materials

Greg Cooper
Chief Executive

Date of Fifth issue: 1 October 2009

Originally certificated on 28 March 2003

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

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.

British Board of Agrément
Bucknalls Lane
Garston, Watford
Herts WD25 9BA

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tel: 01923 665300
fax: 01923 665301
e-mail: mail@bba.star.co.uk
website: www.bbacerts.co.uk

Regulations

In the opinion of the BBA, the Daltex Roofshield Roof Lining System, 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 section 5.1 of this Certificate.
Requirement:	C2(c)	Resistance to moisture
Comment:		The product can enable a roof to meet this Requirement with respect to interstitial condensation. See sections 6.1 to 6.7 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The product is an acceptable material. See section 11 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)	Fitness and durability of materials and workmanship
Comment:		The use of the product satisfies the requirements of this Regulation. See section 11 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 ⁽¹⁾ and 3.10.7 ⁽¹⁾ of this Standard. See section 5.1 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 6.1 to 6.7 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 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ . (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 11 and the <i>Installation</i> part of this Certificate.
Regulation:	C4(b)	Resistance to ground moisture and weather
Comment:		The product will contribute to a roof satisfying this Regulation. See section 5.1 of this Certificate.
Regulation:	C5	Condensation
Comment:		The product can enable a roof to satisfy this Regulation. See sections 6.1 to 6.7 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 sections: 1 *Description* (1.2), 12 *General* (12.6).

Non-regulatory Information

NHBC Standards 2008

NHBC accepts the use of the Daltex Roofshield Roof Lining System, when installed and used in accordance with this Certificate, as meeting Technical Requirement R3 in relation to *NHBC Standards*, Chapter 7.2 *Pitched roofs* (ie ridge or high-level ventilation is not required).

Zurich Building Guarantee Technical Manual 2007

In the opinion of the BBA, the Daltex Roofshield Roof Lining System, 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

Advice on the use of the product in this application can be sought from the product's UK distributor, A. Proctor Group, The Haugh, Blairgowrie, Perthshire. Tel: 01250 872261 or Fax: 01250 872727.

(1) Daltex Roofshield and Roofshield are registered trademarks of Don & Low Ltd (Nonwovens).

Technical Specification

1 Description

1.1 The Daltex Roofshield Roof Lining System is manufactured by converting polypropylene granules and various additives into a non-woven fabric via the 'Reicofil' spunbonding process. During this process a water vapour permeable membrane is thermally bonded between two layers of non-woven fabric to form a flexible sheet.

1.2 The product has the nominal characteristics of:

Thickness (mm)	0.6
Mass unit area (gm^{-2})	175
Roll length (m)	50/100
Roll width (m)	1 and 1.5
Colour	
upper	green
lower	white

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
- water penetration
- tear strength
- tensile strength and elongation.

2 Delivery and site handling

2.1 Rolls are delivered to site individually wrapped in polythene sleeves bearing the BBA identification mark incorporating the number of this Certificate. Labels bearing the manufacturer's name, product name and product code are attached to the inside of each roll core. A Roofshield technical leaflet is included with each roll.

2.2 Rolls should be stored flat or on end on a clean, level surface and kept under cover and protected from sunlight.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Daltex Roofshield Roof Lining System.

Design Considerations

3 General

3.1 The Daltex Roofshield Roof Lining System is satisfactory for use in dwellings with non-ventilated tiled or slated roofs of any conventional plan and of any size. Features⁽¹⁾ successfully assessed include:

- duo pitched
- gable ends
- room-in-roof
- mono-pitched
- verges
- dormers
- hipped
- abutments
- timber sarking⁽²⁾
- 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 underlay directly onto timber planks (nominally 150 mm wide with a 2 mm gap) without battens.

3.2 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.

3.3 The product is installed by draping over rafters in the traditional manner, parallel to eaves, and securing with tiling battens. The insulation, laid horizontally at ceiling level is pressed tightly into the eaves against the underlay to ensure no gaps are present.

3.4 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 mechanism of heat loss.

3.5 In non-ventilated roof systems, the risk of condensation is equivalent to, or less than, that for conventionally-ventilated cold roof systems (see section 6).

4 Practicability of installation

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

5 Weathertightness



5.1 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.

5.2 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 particularly during periods of high UV exposure. Advice should be sought from the Certificate holder (see section 16, Table for *Physical properties — general*).

6 Risk of condensation



6.1 For design purposes, the product's water vapour resistance may be taken as not more than 0.1 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.

6.2 The product is also air permeable, with a nominal value of $150 \text{ m}^3\text{h}^{-1}\text{m}^{-2}$ at 1 Pa pressure difference, allowing a significant additional mechanism for water vapour egress by convection.

6.3 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.

6.4 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 air permeability of the product will reduce this risk (see section 6.2). 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*.

6.5 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.

6.6 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 using loft hatches with an effective 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.

6.7 A vapour control layer is not required (see section 6.2).

7 Wind loading

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

7.2 When unsupported, wind loading on the underlay should be calculated in accordance with BS 5534 : 2003, Section 5.5.2.7. For acceptable wind loads with specific batten spacings for the draped product, using a 25 mm deep tiling batten, see section 16, Table for *Physical properties — general*.

8 Strength

The product will resist the normal loads associated with installation of the roof (see section 16, Table for *Physical properties — directional*).

9 Properties in relation to fire

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

9.2 When the product is used unsupported, there is a risk that fire can spread if the material 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 the material becoming ignited.

9.3 The product achieves a Class D classification in accordance with BS EN 13501-1 : 2002.

10 Maintenance

As the product is confined within a roof structure and has suitable durability (see section 11), maintenance is not required. However, it must be ensured that damage occurring before enclosure is repaired (see section 14).

11 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 it is not exposed to sunlight for long periods (see section 12.4). Advice regarding exposure can be obtained from the Certificate holder.

Installation

12 General

12.1 The Daltex Roofshield Roof Lining System 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.

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

12.3 Overlaps must be provided with the minimum dimensions given in Table 1.

Table 1 Minimum overlaps

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

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

12.5 Hips should be covered with a 600 mm wide strip of the product.

12.6 The product has a smooth surface with a low coefficient of friction and care should be taken when moving or standing on a wet surface covered with the product.

13 Procedure

Draped and loose laps

13.1 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.

Timber plank sarking

13.2 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.

14 Repair

Damage to the product can be repaired 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.

15 Finishing

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

15.2 To minimise the risk of condensation, it is important that the following details are maintained (see also sections 6.2, 6.3 and 6.6):

- all penetrations, eg pipework, electrical fittings to the loft space, must be sealed
- the loft hatch must be securely sealed with an effective compressible draught seal
- the insulation must be pushed into the eaves and against the underlay to avoid gaps.

15.3 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.

16 Tests

Samples of the Daltex Roofshield Roof Lining System 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 2 and 3.

Table 2 Physical properties — directional

Test (units)	Mean result		Method ⁽¹⁾
	Longitudinal	Transverse	
Tensile strength (N per 50 mm)			EN 12311-1
unaged	297	224	
aged ⁽²⁾	251	196	
Elongation at break (%)			EN 12311-1
unaged	42	58	
aged ⁽²⁾	28	41	
Tear resistance (nail) (N)			EN 12310-1
unaged	259	177	

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

(2) UVA aged for 336 hours at 50°C/heat aged for 90 days at (70±2)°C.

Table 3 Physical properties — general

Test (units)	Mean result	Method ⁽¹⁾
Water vapour transmission at 25°C/75% RH (gm ⁻² day ⁻¹)	2409	BS 3177
Vapour resistance (MNsg ⁻¹)	0.09	BS 3177
Dimensional stability		BS EN 1107-2
longitudinal	-0.2	
transverse	0.0	
Low temperature flexibility (-40°C)	pass	BS EN 1109
Slip resistance (coefficient of friction)		BBA Test spec T1/10 ⁽²⁾
dry	0.75	
wet	0.4	
Resistance to water penetration		EN 1928 ⁽³⁾
unaged	W1	
aged ⁽⁴⁾	W1	
Spray test	no leakage	BBA Test spec T1/15 ⁽⁵⁾
Mullen burst strength (kNm ⁻²)	488	BS 3137
Head of water (mm)	1135	BS EN 20811
Resistance to wind loads (kPa)		wind tunnel test ⁽⁶⁾
up to 350 mm batten spacing		
25 mm batten depth used	>2.5	

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

(2) Test method is based on the RAPRA in-house procedure No 73 : Issue 1 : 10th July 1991, using the British Portable Pendulum Tester fitted with a standard simulated shoe sole (four s).

(3) As modified in accordance with BS EN 13859-1 : 2005.

(4) UVA aged for 336 hours at 50°C/heat aged for 90 days at (70±2)°C.

(5) A 1000 mm by 700 mm mock-up roof section at a pitch of 45°, comprising a wooden board, covered with Daltex Roofshield with an underlining of absorbent paper, was exposed to a fine mist water spray. The sample was sprayed from a distance of one metre for two hours, left for 16 hours, then sprayed for a further three hours at one metre and three hours at 0.7 m.

(6) Based on wind tunnel tests on a range of underlays, including 1F felt.

17 Investigations

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

17.2 An assessment of practicability of installation was made from site visits and data gathered during previous assessments of Daltex Roofshield Roof Lining Systems.

17.3 Monitored data, covering internal loft space temperature and relative humidity, plus moisture content of the rafters was evaluated. The data was collected over winter and summer months.

17.4 An examination was made of independent data on the investigation of wind loads on underlay/tile roof systems and data on the behaviour of roof tile underlays under suction.

17.5 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 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 1109 : 2000 *Flexible sheets for waterproofing — Bitumen sheets for roof waterproofing — Determination of flexibility at low temperature*

BS EN 12310-1 : 2000 *Flexible sheets for waterproofing — Determination of resistance to tearing (nail shank)— Part 1 — Bitumen sheets for roof waterproofing*

BS EN 12311-1 : 2000 *Flexible sheets for waterproofing — Determination of tensile properties — Part 1 — Bitumen sheets for roof waterproofing*

BS EN 13501-1 : 2002 *Fire classification of construction products and building elements. Classification using test data from reaction to fire tests*

BS EN 13859-1 : 2005 *Flexible sheets for waterproofing — Definitions and characteristics of underlays — Part 1 Underlays for discontinuous roofing*

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

EN 1928 : 2000 *Flexible sheets for waterproofing — Bitumen, plastic and rubber sheets for roof waterproofing — Determination of watertightness*

18 Conditions

18.1 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.

18.2 Publications and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

18.3 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.

18.4 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.

18.5 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.