

Roofshield®

THE AIR & VAPOUR PERMEABLE PITCHED ROOF UNDERLAY





A. Proctor Group

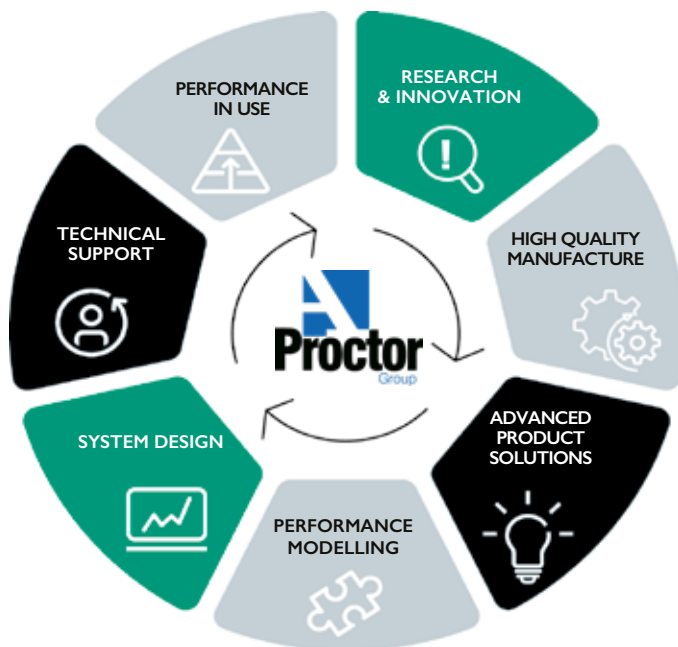
Experts in membrane systems

The A. Proctor Group has, for 50 years, been serving the construction industry with an extensive portfolio of technically advanced thermal, acoustic and membrane products.

Roofshield is an air and vapour permeable, highly water resistant roofing underlay that has been made to the same high specification for over 25 years. It has consistently met the evolving demands of the roofing industry to be the first choice of most roofing contractors. The underlay's reliable performance has been demonstrated in the toughest locations around the world. Its characteristics allow even very complex pitched roofs to breathe, without the need for air gaps or secondary venting.

Total Solution Capabilities

From concept to completion



Our products are backed up by a dedicated team of technical experts, able to assist at every project stage from pre-planning to on site. We offer CAD detail reviews, installation guidance, condensation risk analysis, WUFI® calculations, U-Value calculations, ground gas system designs, telephone support & more. Our products also have a range of BIM Objects & Performance Specifications.

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Condensation Control



Innovative high performing solutions

The A. Proctor Group is at the forefront of the development of vapour permeable membranes, vapour control layers and condensation control solutions for all areas of the building envelope.

Moisture vapour will pass through the various layers of any construction by both convection and diffusion. The objective is to ensure, by design, that the moisture vapour can disperse to the outside atmosphere without being cooled to below dewpoint temperature, thus eliminating condensation and associated problems such as mould growth.

Our range of innovative solutions includes Roofshield (industry-leading air and vapour permeable pitched roof underlay).

Condensation Control



Roofshield

Roofing Design Considerations

Condensation Control and Ventilation

As Building Regulations demand ever-higher thermal efficiency, today's buildings are becoming increasingly airtight. While this is undoubtedly beneficial for building energy performance, architects and contractors must understand the implications for moisture and vapour management when considering roofing membranes.

Condensation control should be considered as part of the design process. Successful control will depend on factors such as prevailing winds, room layout, number of storeys and type of heating system as well as the more usually accepted aspects such as construction, heating, ventilation and moisture production. All these aspects, therefore, should be considered carefully and, as they are interdependent to a greater or lesser degree, they should be considered together.

The fundamental principle in designing to minimize condensation is to maintain a balance of the three factors 1. Thermal and vapour properties of the structure 2. Heat input and 3. Ventilation to achieve either low vapour pressure and/or high structural temperature.

The building fabric, typical weather conditions and anticipated occupancy patterns and uses will all interact to define the moisture risks associated with the construction. These "ground rules" form the basis of a good hygrothermal design strategy.

Once an understanding of the building, weather and occupancy are achieved, the designer can then focus on ensuring the heat, air and moisture movement within the structure is properly balanced. This ensures both a healthy environment for the occupants of the building and long life for the building.



Non- Ventilated Warm Roof Construction

A “warm roof ” is a roof construction where the insulation layer is placed either over or between the rafters, and follows the pitch of the roof from eaves to ridge. This configuration keeps the roof structure within the heated envelope of the building and allows spaces within the roof to be used as habitable spaces, or easily converted at a later date. Warm roofs are typically insulated using rigid boards, and the underlay may be installed either fully supported, or draped, depending on the location of the insulation.

Full details of warm roof design and on-site practice are given in BBA certificate No.96/3220 and in NSAI certificate 06/0238.

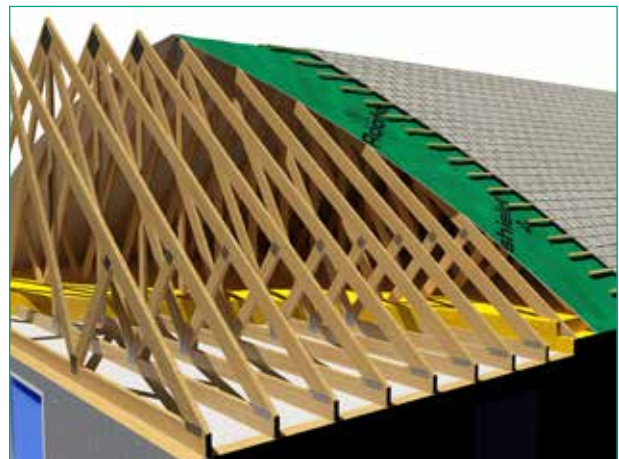


Warm Roof Construction

Non- Ventilated Cold Roof Construction

In a cold pitched roof construction, the insulation is placed horizontally at ceiling level, running from eaves to eaves, leaving the loft and roof structure above the heated envelope of the building. Traditionally, this cold loft space would require ventilation, but this can be impractical for some roof configurations, and avoiding such ventilation has long been desirable.

Long term studies carried out by the BRE between 1997 and 2006 concluded that the moisture content found in non-ventilated Roofshield roofs were comparable with the moisture content found in a conventionally ventilated roof space, and following this research Roofshield has been certified for this use since 1999. The relevant BBA certificate for cold pitched roof and room-in-roof constructions is 99/3648 and in the NSAI certificate 06/0238.



Cold Roof Construction



The Need for Breather Membranes

Since their introduction in the late 1980s, “breather membranes” have become an important part of the construction industry landscape, however, the term itself is widely misunderstood. “Breather membrane” relates to membranes used in timber frame walls, with a vapour resistance of S_d 0.12m (0.6MN/g) or less, while for those membranes used on roofs, the term “vapour permeable underlay” is more appropriate, these membranes must have a vapour resistance of S_d 0.05m (0.25MN/g) or lower. It can be argued that higher performance, air-permeable membranes such as Roofshield, are “breathable” in the truest sense.

All activities within a building, from initial construction and wet trades, to cooking and washing, generate substantial amounts of water vapour, which must be managed successfully to ensure the longevity of the building fabric and a healthy indoor environment. The vapour permeable structure used in these membranes allows this to be achieved without compromising temporary weather protection during construction or requiring complex and expensive passive or active ventilation systems and accessories.



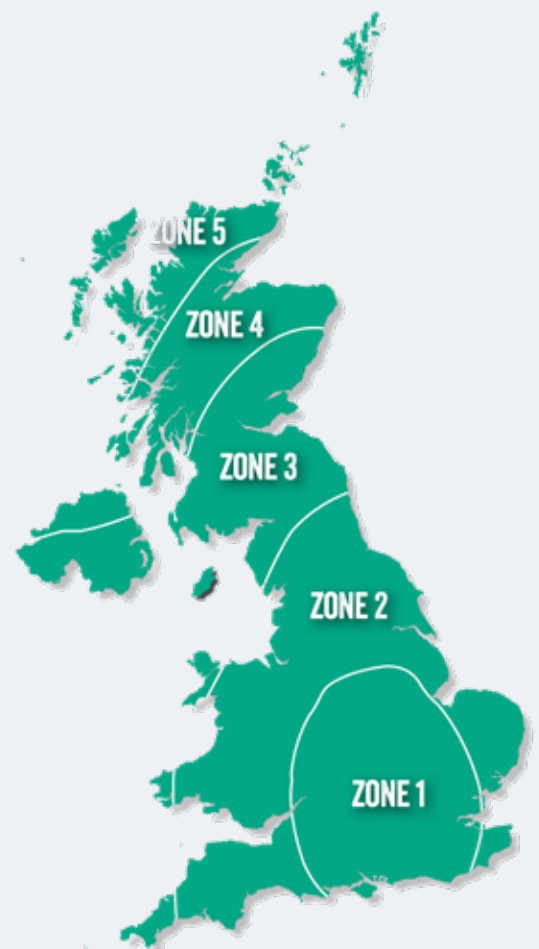


Wind Uplift Resistance

Batten Gauge	Declared wind uplift resistance Pa (N/m ²)	Accessories	Zone Suitability
≤345mm	1252	NONE	1 - 3
	2192	≥11mm* counter batten	1 - 5
	2615	Wraptite Tape	1 - 5
≤250mm	2574	NONE	1 - 5
Softwood sarking with slates**	2974	n/a	1 - 5

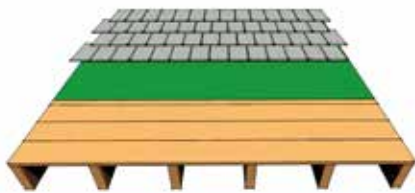
*Alternatively, a 38mm tile batten can be used instead of a 25mm tile batten which would alleviate the need for an 11mm counter batten.

**The slates were set with a headlap of 54mm; which is the minimum allowed in BS5534. The nail diameter of 2.65mm is also the minimum allowed in BS5534. This roof configuration as tested therefore represents the weakest (with respect to wind uplift) configuration allowed in BS5534 for these slates.



Typical Roof Constructions

Cold Roof Slate Sarking Detail



1. Slate
2. Roofshield
3. Timber sarking / Board
4. Rafter

Cold Roof Tile Detail



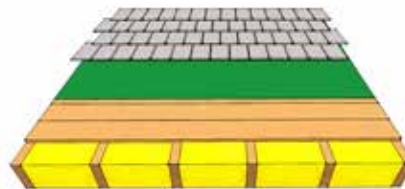
1. Tile
2. Batten
3. Roofshield (draped)
4. Rafter

Metal Roof Profile Detail



1. Metal Cladding
2. Ventilation air space
3. Roofshield
4. Insulation
5. Vapour Control Layer
6. Metal Lining

Warm Roof Slate Sarking Detail



1. Slate
2. Roofshield
3. Timber sarking / Board
4. Insulation
5. Rafter

Warm Roof Tile Alternate Detail



1. Tile
2. Batten
3. Roofshield (draped)
4. Insulation
5. Rafter

Warm Roof Tile Detail



1. Tile
2. Batten
3. Counter batten
4. Roofshield
5. Insulation
6. Rafter

Warm Roof Tile with OSB Alternate Detail



1. Tile
2. Batten
3. Roofshield (draped)
4. Counter batten
5. OSB
6. Insulation
7. Rafter

Warm Roof Tile with OSB Detail



1. Tile
2. Batten
3. Counter batten
4. Roofshield
5. OSB
6. Insulation
7. Rafter



Standards & Building Regulations

With the increased spotlight and focus on building regulations and the suitability of materials specified for use within building construction, the correct selection and application of materials are at their most critical. The key guidance on meeting the requirements of Building Regulations for England, Ireland and Wales, and Building Standards (Scotland) relating to ventilation, thermal efficiency, moisture and condensation control is outlined within the Approved Documents and Technical Standards below.

For specific advice on any of these please contact our technical support on 01250 872261.

Building Regulations

Ventilation

- Approved Document F - Means of Ventilation (England & Wales)
- Building Standards Section 3 Environment (Scotland 2017)
- Technical Booklet K - Ventilation (N. Ireland Oct 2012)
- Technical Guidance Document F - Ventilation (Ireland 2019)

Moisture

- Part C Site Preparation and Resistance to Contaminants and Moisture 2013
- Building Standards Section 3 Environment (Scotland 2017)
- Technical Booklet C - Site Preparation and Resistance to Contaminants and Moisture (N. Ireland Oct 2012)
- Technical Guidance Document C - Site Preparation and Resistance to Moisture (Ireland 1997 Reprint 2004)

Thermal

- Part L Conservation of Fuel & Power (England 2013 with amendments 2016/ Wales 2014)
- Building Standards Section 6 Energy (Scotland 2017)
- Technical Booklet F - Conservation of fuel and power (N. Ireland Oct 2012)
- Technical Guidance Document L - Conservation of fuel and energy (Ireland 2019)

Product & Performance Standards

- BS5250:2021 Management of Moisture in Buildings - Code of Practice
- BS EN 15026:2007 Hygrothermal Performance of Building Components and Building Elements
- BS EN ISO 13788:2012 Hygrothermal performance of Building Components and Building Elements. Internal surface temperature to avoid critical surface humidity and interstitial condensation. Calculation methods.





Standards & Building Regulations

NHBC technical requirements

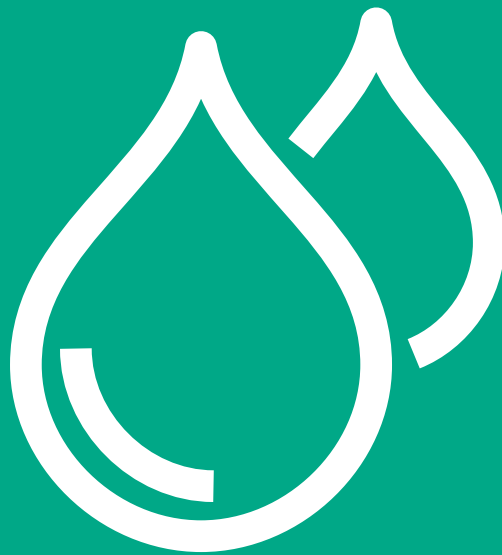
The NHBC operates its own technical standards which differ from national Building Regulations. Although reference is still made to the BS5250 Code of Practice, Standard 7.2 has, since 2011, required high-level ventilation equivalent to 5mm/m to be used with type LR underlays regardless of any recommendations given in 3rd party certification. Although not explicitly stated in the technical standards, an exception to this requirement is made where the underlay specified has third party certification of both vapour and air permeability. Having this certification, Roofshield is therefore exempt from this requirement and can be specified as outlined in the BBA certification, without high or low-level roof ventilation.

NFRC Technical Bulletin 6

Released by the National Federation of Roofing Contractors in 2012, Technical Bulletin 6 outlines best practice for roof system installers. TB6 aligns itself with the NHBC technical standards by recommending high-level ventilation where airtight type LR underlays are used. As with the NHBC standard, however, it is recognised that this provision is unnecessary where the underlay is both vapour and air permeable, therefore Roofshield is exempt from this recommendation.



Roofshield





Why Roofshield?

Roofshield is a vapour and air permeable underlay (VPU) for pitched roof applications. First launched in 1996, and with an unchanged specification since, its unique blend of physical properties has allowed it to consistently outperform not only competing vapour-permeable underlays but also traditionally ventilated roofs.

While the majority of VPUs in use today utilise an airtight, vapour permeable, film layer to achieve their performance, Roofshield's patented SMS (Spunbond Meltblown Spunbond) structure allows high levels of airflow in addition to the transport of moisture vapour, making the formation of condensation virtually impossible. It was this outstanding air-permeability powered performance, in BRE trials, that led to the granting of one of the first BBA certificates for non-vented cold roofs in 1999, and which today allows the NHBC to accept its use without high-level vents, a position further reinforced by NFRC Technical Bulletin 6 in 2012.

Independent studies of the effect of air permeability have confirmed that lofts using Roofshield have more consistent air-flow through the roof than those found in traditionally ventilated lofts, according to BS5250, so whatever side of the vents/no vents debate you sit on, Roofshield has it covered.

Developed and manufactured in Scotland, Roofshield has been widely used in some of the harshest climates on earth, from northern Canada to the Antarctic, and its superb resistance to wind loadings allow it to be used without restrictions on batten spacing in any UK exposure conditions, giving specifiers the flexibility to choose whatever configuration of outer roof covering meets their requirements. Its heavyweight 185gsm three-layer structure is also hydrophobic, giving a Class W1 rating under the latest EN13859-1 specifications.



Roofshield - Key Features

VAPOUR PERMEABLE

Roofshield has a vapour resistance of 0.065 MNs/g and an Sd-value of 0.013m, making Roofshield one of the highest performing vapour-permeable membranes on the market.

FULLY AIR PERMEABLE

Air permeable membranes allow air movement through the roof, as well as allowing moisture to escape by diffusion. This means that condensation is far less likely to form on the membrane itself, and also allows the membrane to deal with much higher moisture levels within the building, for example during the drying out period.

MORE UNIFORM AIRFLOW THAN VENTS

The air permeability of Roofshield means a non-ventilated roof fitted with Roofshield allows a more consistent air flow through the roof than a roof ventilated as per BS5250, without expensive and time consuming ventilation hardware fitted to the roof.

HIGHLY WATER RESISTANT

Roofshield is rated W1 under EN13859-1, and can support a water column of over a metre without leakage. The membrane can be left exposed to provide temporary weather protection to the building envelope for up to three months (see FAQs, page 22 & 23).

FULLY BBA AND NSAI CERTIFIED

Roofshield is fully BBA certified for use in non-ventilated warm or cold roof applications, and has been since 1996. In 1999, Roofshield became the first membrane certified for use in cold non-vented roofs. The granting of these certificates then lead onto further certification with NSAI in 2006, giving confidence of specification within Ireland. While the construction industry has changed considerably over the last 25 years, Roofshield offers the same benefits as it always has.

NHBC ACCEPTANCE

With a certified air permeability of 34.4m³/m²h.50Pa, Roofshield does not require additional high level ventilation when used on NHBC-approved projects. It also allows the same specification to be used across all your projects, regardless of the regulatory regime applied.

NO VCL REQUIRED

Roofshield is the only vapour-permeable underlay available which the BBA puts enough trust in to explicitly state in their certificate that a vapour control layer is not required for non-ventilated cold pitched roof constructions.

BS5534 COMPLIANCE

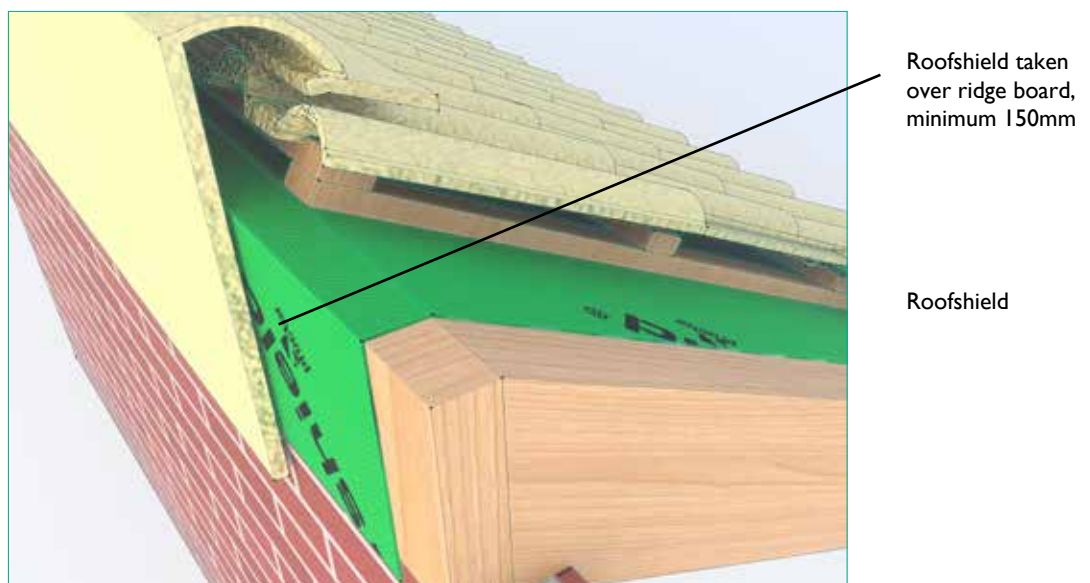
Based on fully independent 3rd party testing, Roofshield can continue to be used across the UK (see table below). This, in addition to no requirement for high level ventilation or the use of a vapour control layer, ensures Roofshield remains the simplest and most cost effective method of achieving regulation compliance.

Roofshield Details

DUOPITCH RIDGE DETAIL

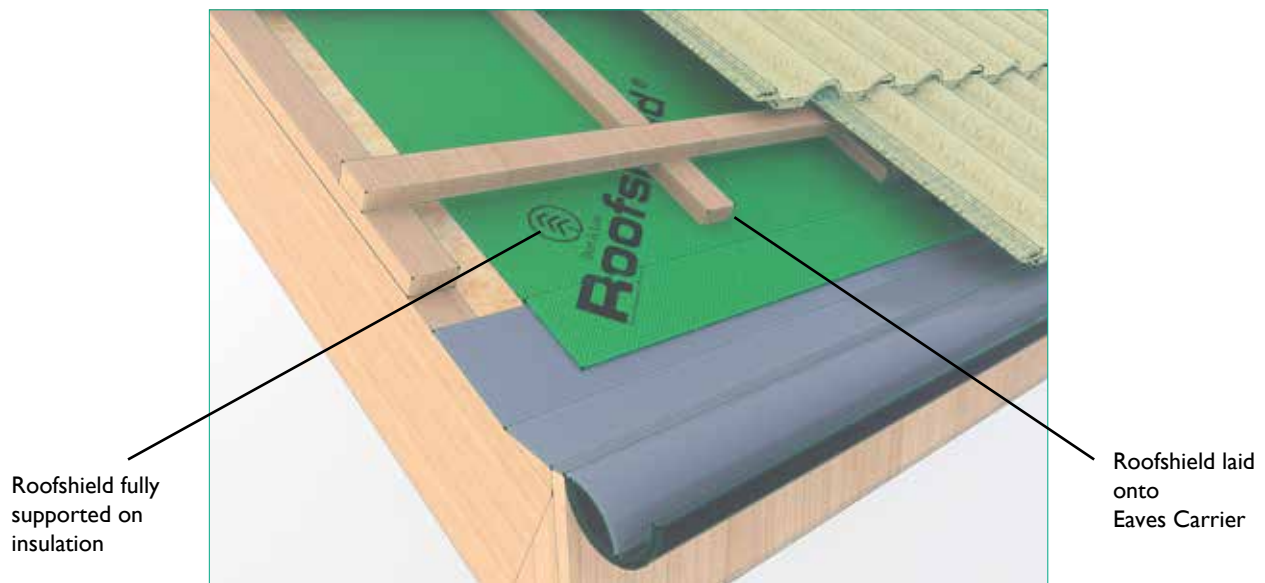


MONOPITCH RIDGE DETAIL

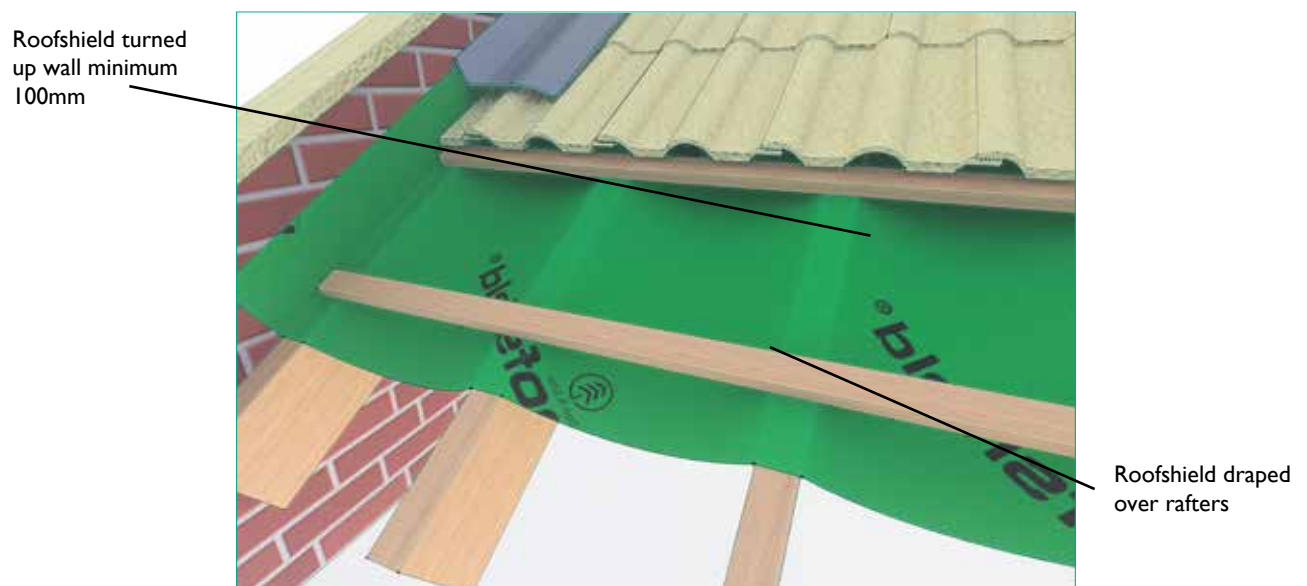


Roofshield Details

EAVES DETAIL

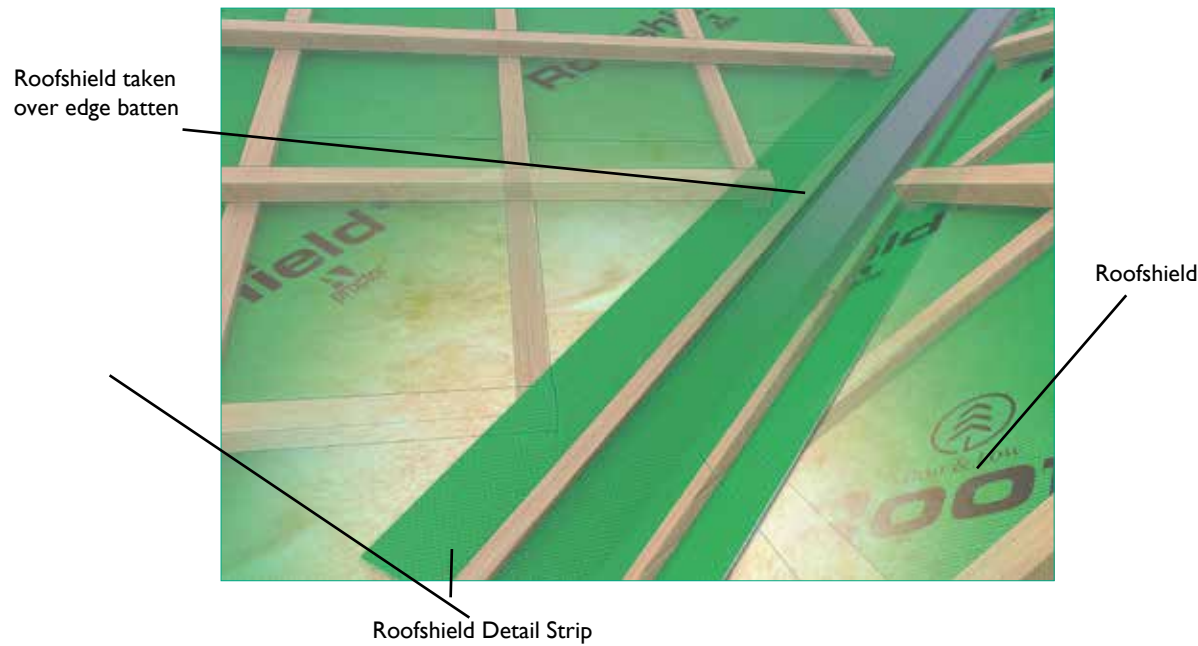


VERGE-ABUTMENT DETAIL

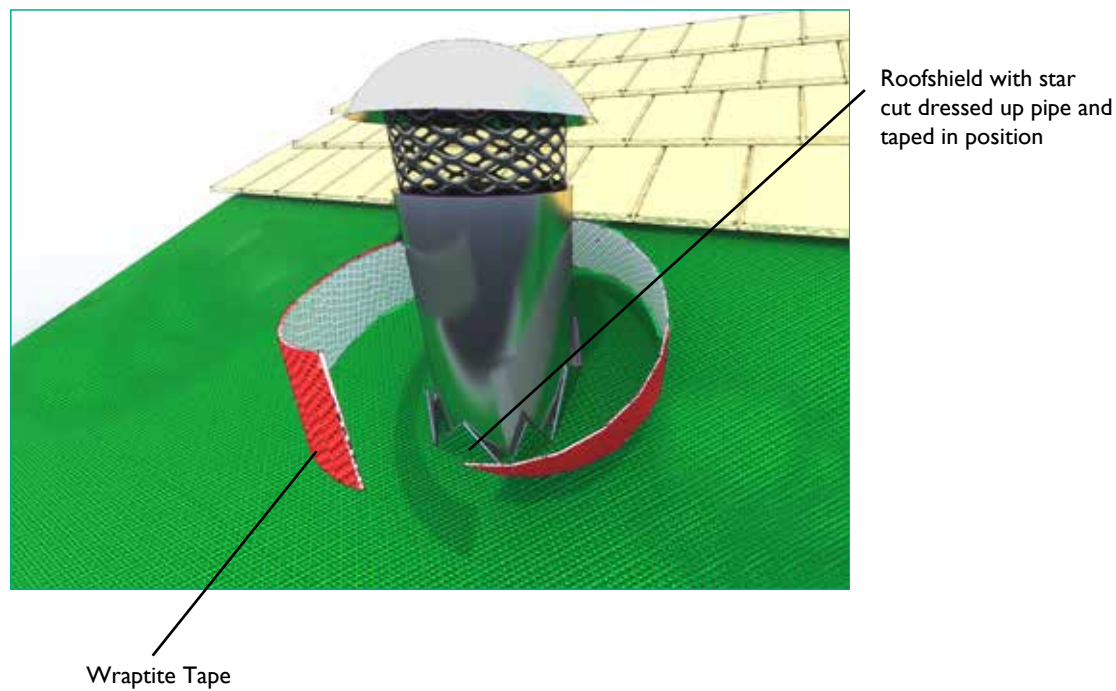


Roofshield Details

VALLEY DETAIL



PIPE DETAIL



Roofshield - Physical Properties

Property	Test Method	Mean Results	
Standard Roll Size Detail Strip		1m x 50m & 1.5m x 50m 500mm x 50m	
Mass per unit area	EN 1849-2	185g/m ²	
Reaction to Fire	EN 11925-2	Class E	
Water vapour resistance Sd	EN 12572	0.013m	
Vapour resistance	EN 12572	0.065 MNs/g	
Air permeability	EN 12114	34.4 m ³ /m ² .h.50Pa	
Water penetration	EN 1928	Class W1 (before ageing) Class W1 (after ageing)	
Tensile Strength	EN 12311-1	MD 390N MD 330N	CD 230N (before ageing) CD 190N (after ageing)
Elongation	EN 12311-1	MD 55% MD 40%	CD 75% (before ageing) CD 60% (after ageing)
Tear resistance	EN 12310-1	MD 230N	CD 275N
Flexibility at low temperature	EN 1109	No cracking at minus 60°C	

Roofshield Detail Strip

Roofshield Detail Strip has been developed to aid installers in the laying of Roofshield and to allow efficient and cost effective installation in areas where a full width of Roofshield is not economical or required to be used such as valleys, hips etc. It is also ideal to use on small areas of roof such as dormers where handling a full sized roll could be problematic.



Polypropylene is recyclable. Mechanical recycling is the primary option, depending of the requirements of the application and the intended article specification. It can also be valorised for energy recovery, its high calorific value is around 44 MJ/kg.

Polyolefins are neither biodegradable nor compostable.

Roofshield - Technical Support

Our products are backed up by a dedicated team of technical experts, able to assist at every project stage from pre-planning to on site. We offer CAD detail reviews, installation guidance, condensation risk analysis, WUFI calculations, U-Value calculations, ground gas system designs, telephone support & more. Our products also have a range of BIM Objects & Performance Specifications.



Customer Focused

- Online Technical Advice
- Members Area / Onsite App
- WUFI & U-Value Calculations
- Condensation Risk Analysis
- CAD Design
- Site Advice
- CPD Presentations
- Accreditations

Expertise and know-how to support your project

CONDENSATION RISK ANALYSIS

Condensation can significantly reduce the effectiveness of insulation, and result in damage to the building fabric. A Condensation Risk Analysis evaluates the likelihood of interstitial condensation in your roof or wall construction. These calculations are regularly required by building control to demonstrate compliance with building regulation requirements. Calculations are performed free of charge when using our products.

BIM OBJECTS

Our range of Performance Specifications & BIM content, covering our Condensation Control Membranes, External Airtight Barriers, Acoustics Flooring Solutions, Ground Gas Protection Systems & Thermal Insulation range is now available in a combination of Revit Project files (.rvt), Revit Detail Component files (.rfa), Industry Foundation Class files (.ifc) & PDF format.

PRODUCT DIVISIONS

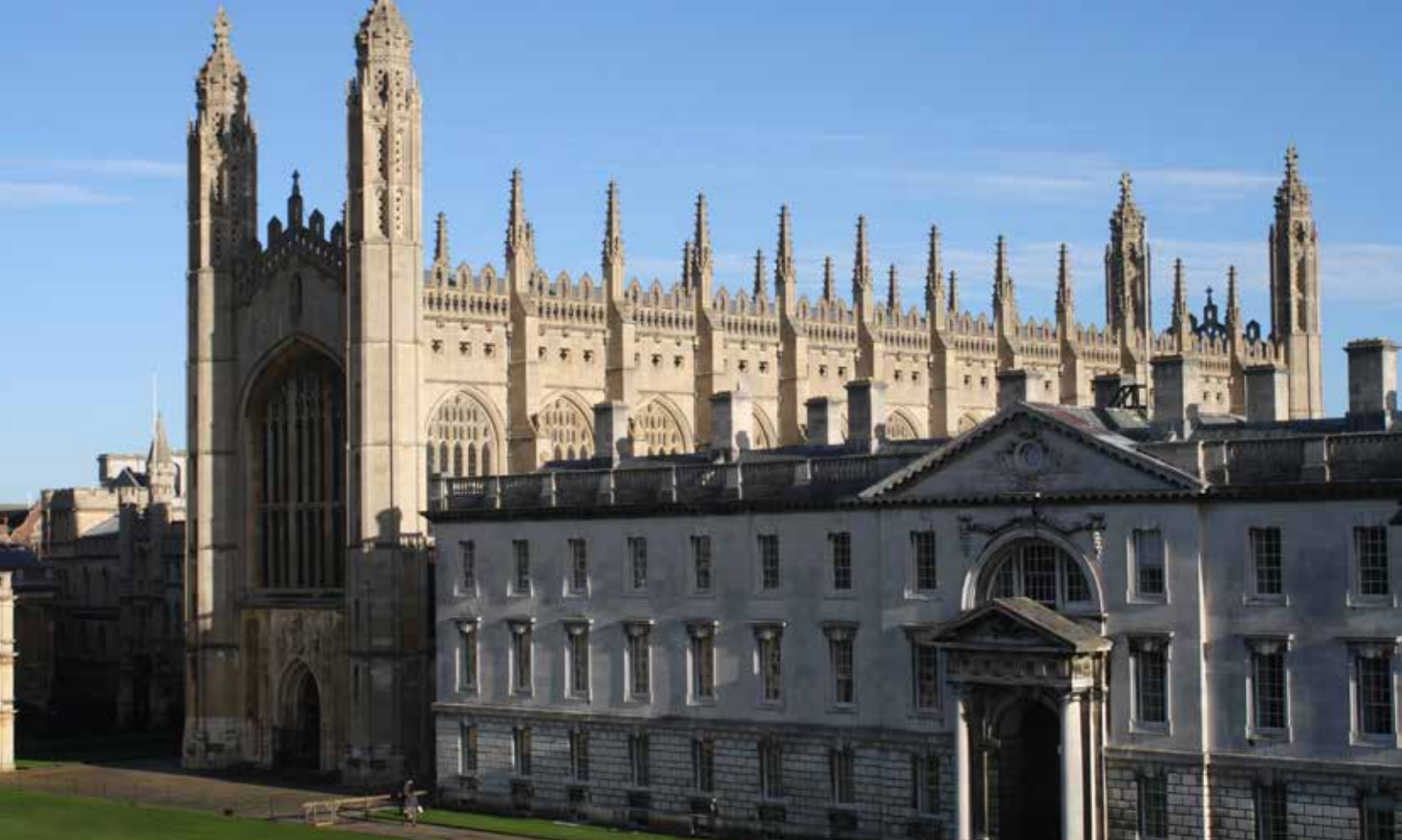
We provide a wide range of high quality, innovative solutions which are designed to meet the continuously evolving requirements of the construction industry.

Product divisions include:

- Condensation Control
- Acoustics Floor Solutions
- External Airtight Barriers
- Ground Gas Protection
- Thermal Solutions

Get in touch for more information

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Case Study - Roofshield® fit for King's

The roofs of the magnificent historic buildings of King's College Cambridge were renovated and protected with the combination of beautiful Collyweston Slate and Roofshield membrane.

Roofshield has long been recognised as one of the highest performing roofing membrane solutions.

The re-roofing of Bodley's Court situated alongside the river Cam was led by award-winning architectural practice Donald Insall Associates - specialists in the care, repair and adaptation of historic buildings. The buildings, which dates back over 100 years needed re-slatting.

For more than 600 years Collyweston slate has been protecting buildings in the region. After half a century one of the country's oldest slate mines on the outskirts of the Northamptonshire village of Collyweston was re-opened by Collyweston roofing specialist Claude N. Smith and its distinctive limestone slate tiles now adorn the impressive buildings at King's.

Donald Insall Associates specified Roofshield, the renowned pitched roof underlay, for the roof refurbishment. The roof structures of historic buildings can be complex in nature and demand careful consideration of moisture management, and

condensation control. Many vapour and air permeable underlays use an airtight VP film layer to achieve their performance, whilst Nigel Smith, Director of Claude N. Smith commented, "Roofshield was chosen by the architects as they required materials of the highest specification for the project. It has been excellent to work with, is exceptionally strong and durable and its superior air permeability ensures comprehensive protection for the historic college buildings."



The one year project was due to be completed at the end of 2019, with additional projects confirmed for the re-roofing of Christ's College and Clare College.

Case Study - Roofshield preserves the character of historic Scottish steading

A historic farmstead conversion in Westmarch, Dundee benefitted from the added protection of Roofshield.

The original building comprising farm steading and offices dated back to around 1856. In 2017 the buildings were purchased by Jason Stewart of Circinn Developments Dundee with plans to convert the site into two buildings consisting of a 2-bed and 3-bed unit.

Jason commented: "it was important to maintain a strong traditional character to the buildings, preserving the stone finish exterior and slate roof. As part of the roof construction, we insisted on the Roofshield membrane to ensure the highest level of protection. We have used Roofshield on a number of projects and it is excellent in terms of its weather tightness, where some cheaper alternatives can tend to sag in the gaps between sarking boards, causing water to collect and create the risk of leaks. It's also extremely robust so you don't have to worry about tearing or damaging on site. In fact, Roofshield was in place during Storm Hector with wind speeds in parts of Scotland registered at up to 100mph and it remained firmly in place."



Steadings form part of the history of the agricultural background of the country and are a legacy and connection with our past. All too often modern farmstead conversions can end up destroying any signs of the original character. In the case of the Westmarch Steading, an excellent balance has been maintained between the old and the new resulting in a traditional look and feel to the buildings.





Frequently Asked Questions

How “Breathable” is Roofshield?

While “Breathability” is a commonly used term, it is more technically accurate to refer to a material’s “vapour permeability”. As Roofshield is air permeable as well as vapour permeable, it can certainly be argued that it does breathe, as it allows air movement, but this does not hold true for all “breathable” materials. In terms of vapour permeability, Roofshield, with a vapour resistance of 0.065MNs/g (Sd-value 0.013m) is one of the most vapour permeable membranes on the market, as well as benefitting from the additional advantage of air permeability.

What difference does air permeability make?

Roofshield, in addition to having one of the lowest vapour resistance available, is also air permeable. Industry research concluded that air permeability, combined with very low vapour resistance, inhibits the formation of condensation in a pitched roof to the point where it’s virtually impossible for condensation to occur under normal conditions.

Studies conducted by the BRE and Glasgow Caledonian University have concluded that not only does an air permeable roofing underlay outperform conventional airtight underlays, but may provide a higher air change rate than a roof ventilated according to the recommendations in BS5250.

Does Roofshield suffer from “tenting”?

As anyone who’s slept in a cheap tent can tell you, some vapour permeable fabrics can lose their water resistance if anything happens to touch the underside. Developed in Scotland, where the use of underlays fully supported on timber sarking board is standard practice, ensuring Roofshield does not suffer from this

effect was always an important consideration for the A. Proctor Group. In fact while the first generation of VPU’s suffered from this problem, most modern roof underlays are unaffected by this phenomenon.

So vents aren’t required?

Over the course of its more than 20-year lifespan, Roofshield has undergone extensive testing to prove that ventilation is not required to the underside of the underlay in both warm and cold roof applications, and is BBA and NSAI certified to that effect. Roof features successfully assessed include duo-pitched, mono-pitched, hipped, mansard, gable-end, valleys, room in the roof, dormers and timber sarking. In more complex roof configurations, the use of Roofshield will provide a far more robust solution than a complex layout of ventilation openings.

The sole remaining situation where ventilation to the roofspace is required is in a cold roof with Plywood or OSB sarking. If in doubt, our team of technical experts can assist specifiers in achieving the most appropriate solution for their specific project.

How about high level vents?

Although non-ventilated roofs have been specified successfully for many years, recently BS5250, the NHBC technical standards and NFRC Technical Bulletin 6 have recommended that ridge only ventilation equivalent to 5mm per metre is used when vapour permeable underlays are specified. In both cases, the exception to this is where the underlay specified is both vapour AND air permeable. As Roofshield meets this requirement, this additional high level ventilation is not required when using Roofshield.



Frequently Asked Questions

Does Roofshield “chatter” in the wind?

Wind blowing up into the eaves of a roof can cause a ‘chatter’ type noise with some types of underlay. Roofshield is silent in such situations. As Roofshield does not suffer from this problem, the membrane does not have to be pulled taut and does not have any special fixing instructions compared to that of some underlays. Counterbattens can be provided to increase the air movement when used with close-fitting slates or tiles, or to provide drainage below the tile battens when used fully supported, but otherwise Roofshield may simply be draped between the rafters as normal.

Can I use Roofshield with timber treatments?

All three layers of the Roofshield underlay have additives to increase the water hold out of the membrane. Timber treatments containing fungicides, insecticides and wood preservatives are extensively used in the building trade to protect rafters, sarking boards and tile battens. As such, a number of tests have been carried out to see if these timber treatments will affect the water hold out properties of Roofshield.

Four timber treatments were investigated - two water based micro-emulsions, a solvent-based treatment, and a CCA. Treatments were applied to the fabric and allowed to dry, then the water resistance of the material was tested. The water resistance of the Roofshield was not affected by these timber treatments.

What is the “drying out period”?

This is the period immediately after the building is completed, during which there are significantly higher amounts of moisture within the building. These include moisture in damp timber;

from wet trades (concrete, plaster etc) and moisture that may have found its way in, prior to the building shell being wind and watertight. Although this moisture will eventually dry out, condensation is more likely to occur as it does so. This will usually be most apparent in the first winter when the building is heated. Roofshield roofs are far less prone to this effect.

Is Roofshield expensive?

In terms of the cost per roll, Roofshield is more expensive than a traditional non-breathable felt, however if we consider the costs associated with ventilation hardware then using Roofshield will save you money. Independent assessments carried out by Hardies Property and Construction Consultants of installed costs have shown that Roofshield can offer savings of between 4% and 6% when compared with either impermeable felt and full ventilation, or a lower specification VPU with high level ventilation only. The full cost report is available for download at www.proctorgroup.com.

What about severe weather conditions?

Although Roofshield is highly water resistant, the BBA, in its Site Practice Bulletin Number 2, states: “An underlay is not a total waterproof barrier and if used as a temporary waterproof covering, some rain penetration may occur. In certain conditions, particularly if there is persistent heavy rainfall combined with subsequent severe freeze/thaw conditions, an underlay should not be exposed for more than a few days.” If such conditions are expected, the temporary use of a tarpaulin covering is recommended.



“ I believe the success of the A. Proctor Group is down to a solid foundation of innovation backed up by an excellent, loyal and committed team, every one of them playing an important role in our continued success. Scotland provides us with a unique platform to launch our ideas, systems and products. I am fiercely proud of this heritage and our brand.”

Keira Proctor

Managing Director, A. Proctor Group Ltd



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