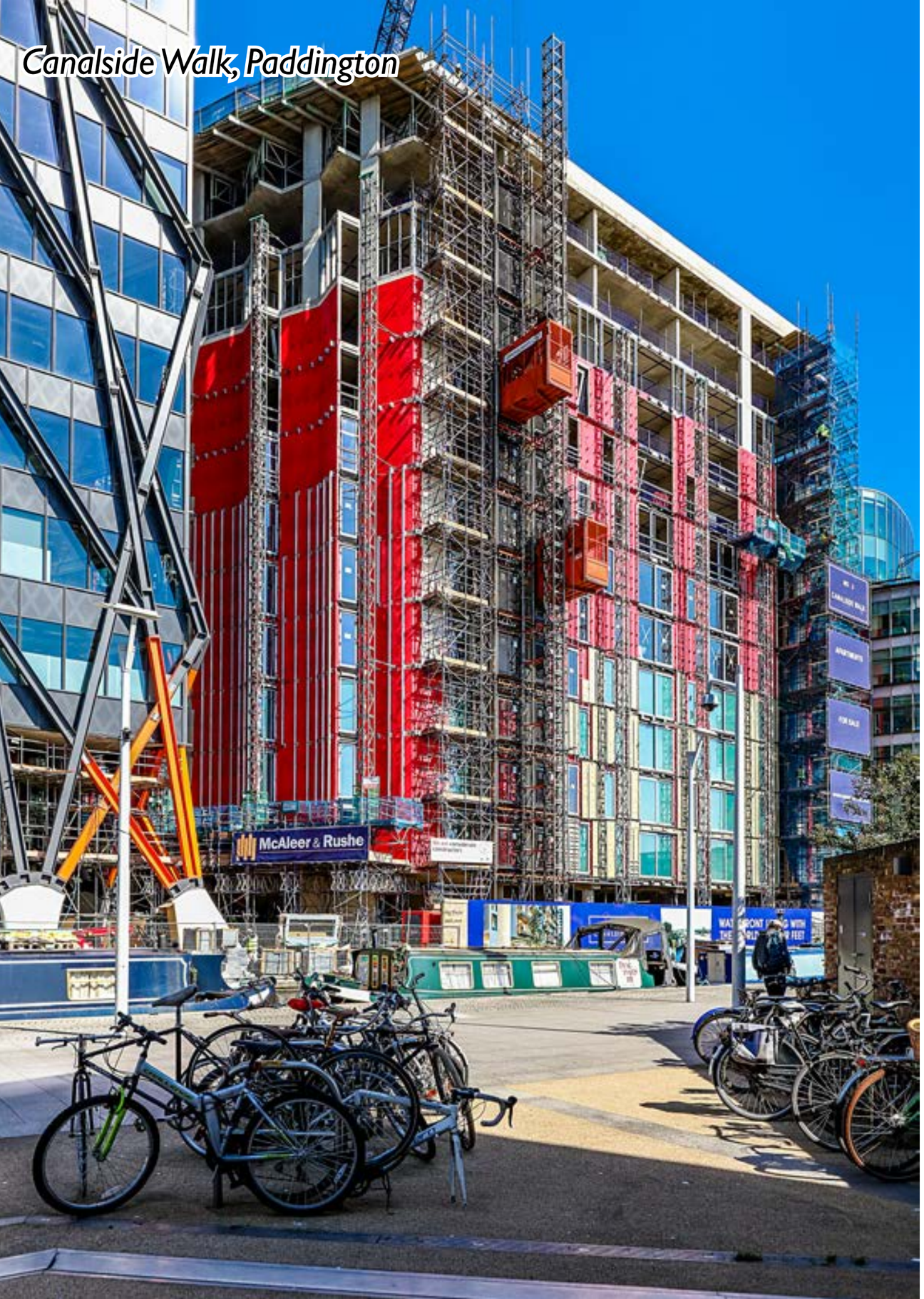
Façade & Highrise Building Design

SOLUTIONS FOR AIRTIGHTNESS AND HEAT, AIR & MOISTURE MOVEMENT

Proctor Group

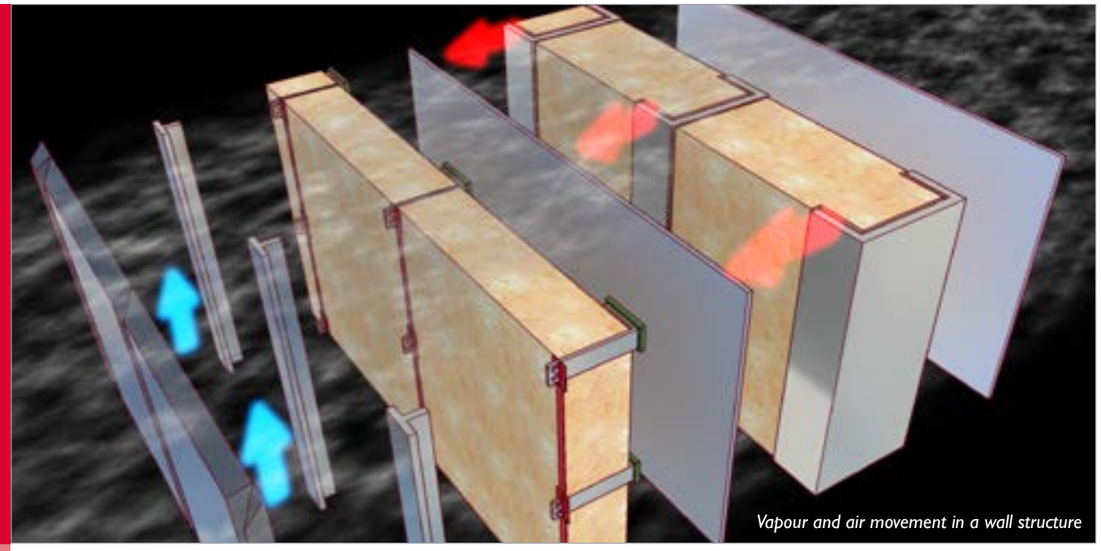


Canalside Walk, Paddington

We offer a range of technically advanced product solutions covering thermal, acoustic, ground gas, vapour control & airtightness, suitable for your commercial building. These are suitable for Steel, Concrete, Timber, CLT and Offsite construction projects.

Our portfolio of specialist vapour and airtight membranes, combined with our extensive technical expertise, ensure that the correct balance of Heat, Air & Moisture Movement is achieved via the building envelope. Our patented externally applied airtight membrane system, Wraptite, offers commercial construction providers the ability to reliably and comfortably exceed current airtightness requirements.

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. You can also watch our webinar 'Facade and Highrise Building Design, Airtight Membranes and Park B Revisions' by clicking here.


Vapour and air movement in a wall structure

AIRTIGHTNESS

Air (Air permeability & airtightness)

Air movement is important in the building envelope, both infiltration and exfiltration. We need to control interior conditioned air escaping (whether heated or cooled) and exterior air infiltrating as it puts more pressure on heating or cooling mechanisms internally. Airtight membranes are an obvious choice in this area whether vapour open/closed or variable.

Air Leakage Control Strategies

As Building Regulations have imposed more stringent energy performance criteria on the building envelope, improvements have often been driven through higher standards of insulation for roofs, walls, windows and floors. In the drive for higher standards the significance of localised areas of reduced insulation or thermal bridging leading to air leakage has become even more crucial.

Air leakage through cracks, gaps, holes and improperly sealed elements, such as doors and windows, can cause a significant reduction in the performance of even thermally insulated envelopes, in some cases reducing their effectiveness by up to 70%. As thermal insulation requirements increase, this reduction in performance is becoming a critical issue; a consensus having emerged in the industry that, discrepancies between 'as built' and 'as designed' performance are largely attributable to uncontrolled air leakage. Architects and developers are increasingly turning to air barrier membranes as an essential part of the design process in achieving the most effective means of controlling and reducing air leaks.

The Impact of Air Flow

Impact on the building
Unmanaged or uncontrolled air flow can act as a carrier for moist air, drawing it in from outside, or pulling it from inside, into walls, ceilings and roofs. The impact of this uncontrolled moist air movement can have a long term detrimental effect on the durability and life of the building.

Impact on energy efficiency

Uncontrolled air flow will almost certainly influence the energy efficiency of the building. Initial heat load calculations for heating and cooling equipment will usually make an allowance for a level of natural infiltration or uncontrolled air flow. The higher the infiltration rate, the lower the energy efficiency of the building. Efficiency levels can be affected by both natural and mechanical air movements. The forces of wind and stack effects will lead to an increased level of air filtration and subsequent efficiency loss. Sealing the shell of the building and any undesigned holes can reduce the impact of wind and stack effects and improve the overall energy efficiency.

Air flow within building cavities can also lead to a reduction in the energy efficiency of the building. Ensuring that all potential air pathways are identified and tightly sealed against both the building's exterior as well as the interior will help to mitigate any loss and reduce costs.

Guidance on Building Regulations - amendments to Approved Document B

Amendment to Approved Document B: November 2018

Guidance on how external walls can meet the Building Regulations requirement for resisting fire spread is set out in Approved Document B. Following the Independent Review of Building Regulations and Fire Safety, and subsequent Interim Report by Dame Judith Hackitt, the Government has introduced an amendment to the Approved Document B: Fire safety, which has a significant impact on the design and construction of buildings above 18 metres. Published in November 2018, the new regulations came into force on 21 December 2018.

Materials and workmanship

Regulation 7 of the Building Regulations relates to materials and workmanship and reads as follows:
7. (1) Building work shall be carried out—

(a) with adequate and proper materials which—
- (i) are appropriate for the circumstances in which they are used,
- (ii) are adequately mixed or prepared, and
- (iii) are applied, used or fixed so as adequately to perform the functions for which they are designed; and

(b) in a workmanlike manner.

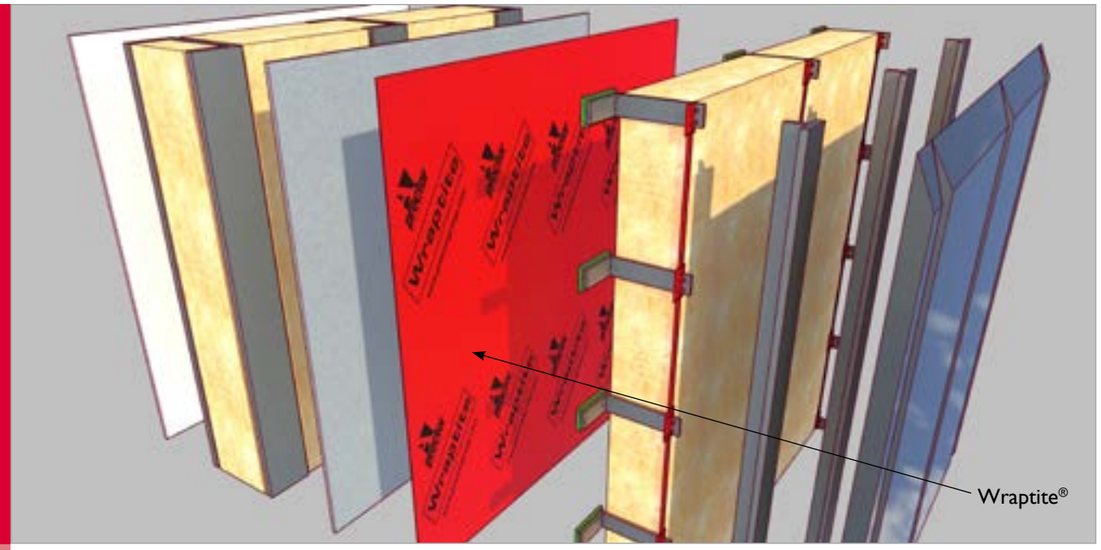
(2) Subject to paragraph (3), building work shall be carried out so that materials which become part of an external wall, or specified attachment, of a relevant building are of European Classification A2-s1, d0 or Class A1, classified in accordance with BS EN 13501-1:2007+A1:2009 entitled "Fire classification of construction products and building elements. Classification using test data from reaction to fire tests" (ISBN 978 0 580 59861 6) published by the British Standards Institution on 30th March 2007 and amended in November 2009.

Use of membranes as part of the external wall construction

It is important to note that with specific reference to membranes the Regulation provides an exemption and further clarification is found within Regulation 7, as stated below:
12.14 Particular attention is drawn to the following points.
a. Membranes used as part of the external wall construction should achieve a minimum classification of European Class B-s3, d0.

In summary, ***the amendment stipulates significant changes to which membranes can now be used and limits these to a minimum rating of Class B,s3,d0.***

The reason for this clarification is due to the complexity of manufacturing a non-combustible membrane which is still breathable to BS5250 standard, which cannot be achieved. Some European membrane products whilst quoting A2 ratings do not breathe or comply with BS5250, meaning using these membranes in the UK climate would make the building unhealthy and result in a much greater risk of condensation issues and mould growth.



WRAPTITE®

Wraptite is a unique patented **external airtight and vapour permeable,** self-adhered membrane which **solves the problem of reliably achieving airtightness in buildings.** Applying Wraptite to the outside of the building will mean there are **fewer penetrations for services** therefore the **likelihood of expensive remedial work is greatly reduced.** Wraptite is **lightweight, easy to install** and fully bonds to virtually any substrate, with a key benefit being its **speed and ease of installation**, negating any requirement for sealants or tapes. This new approach saves on both the labour and material costs associated with meeting the demands of modern **energy efficiency** requirements in both commercial and residential buildings.

Wraptite has received BBA certification for use in roofs, walls and modular floor construction making it an ideal choice for commercial projects with large uninterrupted façades. It is the only self-adhering vapour permeable air barrier certified by the BBA. It is the best performing self-adhesive membrane on the market. Wraptite is compliant with Part B regulation changes and also has **BRE approval** for use in the external wall systems of **buildings over 18m in height,** both as a continuous layer on sheathing board, behind fire classified insulation, and for use to tape joints in insulation behind rainscreen.

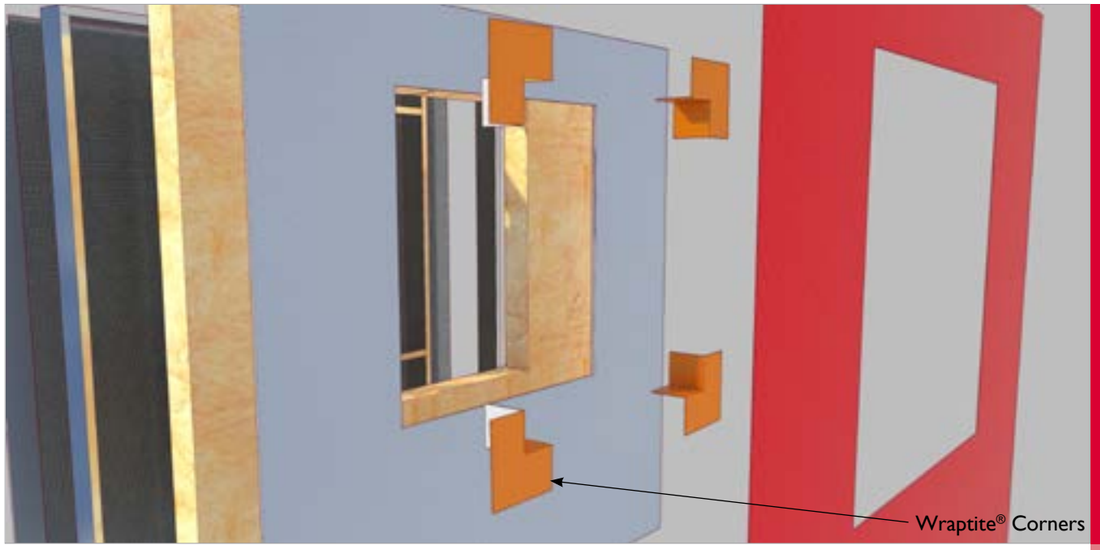
PHYSICAL PROPERTIES

Property	Test Method	Mean Results
Roll sizes	-	1.5m x 50m
Nominal Thickness	Calibrated Deadweight Micrometer	0.65mm
Basis Weight	Electronic Weigh Scale	292 g/m^2
Application Temperature	-	Air & surface: minimum -6°C maximum 60°C
Service Temperature	-	-40°C to +100°C
Water Penetration	EN 1928 : 2000 Method A	Class W1 (before ageing) Class W1 (after ageing)
Air Permeance	EN 12114	0.01 m^3/m^2.h.50 Pa
Water Vapour Resistance Sd	EN 12572	0.039m
Water Vapour Transmission	BS 3177:1959	893 g/m^2.24hr
Peel Adhesion	EN 1939	5.01 N/10mm
Tensile Strength	EN 12311-1	Mean MD 417N Mean XD 252N
Tear Resistance	EN 12310-1	Mean MD 412N Mean XD 286N
Reaction to Fire	EN 11925-2 BS EN 13501-1	Class B, s1, d0*

tested over 12mm Calcium Silicate Board as per BS EN 13238:2010
All tests carried out to EN 13859-2 standard

Key Benefits

- Part B compliant for buildings over 18m
- Class B, s1, d0 on A2, s1, d0 or A1 substrate with minimum density of 653kg/m^3 and 9mm thickness
- Water resistant yet vapour permeable membrane
- BRE approval for buildings over 18m high
- Can reduce wall thickness
- Leading airtightness performance
- Removes requirement for complex internal detailing and may negate requirement for VCL internally
- Reduces thermal by-pass
- Allows temporary protection until primary external covering
- Provides durability and reduced risk of tears and subsequent remedial work
- UK Patented
- Continuous airtight seal
- Simple detailing at junctions and corners - less EPDM required



WRAPTITE® CORNERS

Wraptite Preformed Airtight Corners have been developed for the **difficult areas** around doors and windows where maintaining **good air barrier continuity** is difficult and time consuming. Wraptite Corners' **simple design and installation** process makes sealing openings against air leakage simple, just peel off the release liner, stick the corners in place, then install the Wraptite membrane as normal. This helps achieve the best possible results in the **shortest possible time.**

Once installed, the corner sections provide the same vapour permeable air barrier performance as the Wraptite membrane itself, ensuring **air leakage and water ingress are minimised** without trapping construction moisture or causing condensation.

PHYSICAL PROPERTIES

Property	Test Method	Mean Results
Size	-	One size can be adapted to fit any corner
Nominal Thickness	Calibrated Deadweight Micrometer	0.65mm
Basis Weight	Electronic Weigh Scale	292 g/m^2
Application Temperature	-	Air & surface: minimum -6°C maximum 60°C
Service Temperature	-	-40°C to +100°C
Water Penetration	EN 1928 : 2000 Method A	Class W1 (before ageing) Class W1 (after ageing)
Air Permeance	EN 12114	0.01 m^3/m^2.h.50 Pa
Water Vapour Resistance Sd	EN 12572	0.039m
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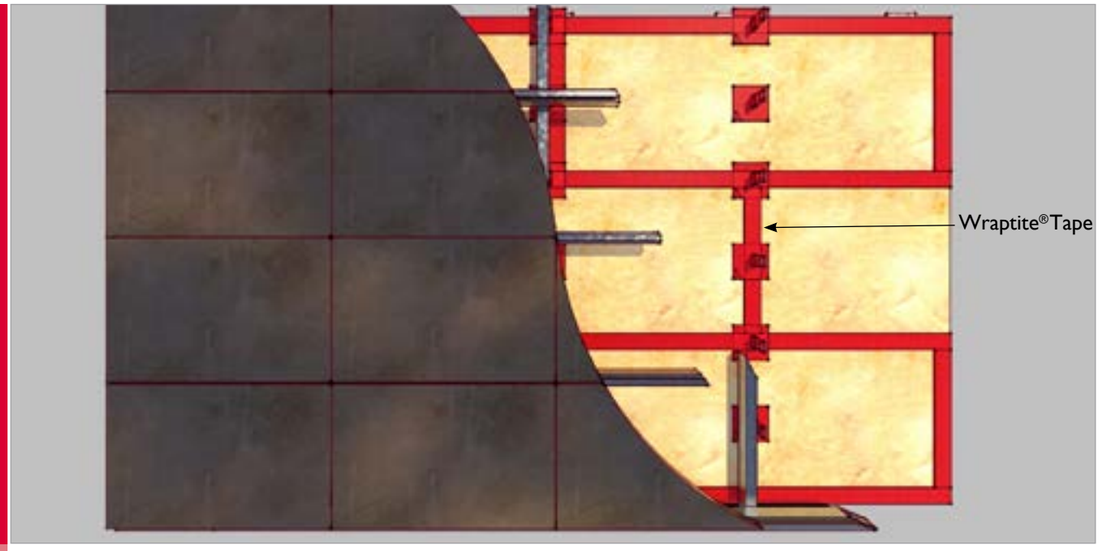
Reaction to Fire	EN 11925-2 BS EN 13501-1	Class B, s1, d0*

tested over 12mm Calcium Silicate Board as per BS EN 13238:2010
All tests carried out to EN 13859-2 standard

Key Benefits

- Easy installation
- Ensures continuity of airtightness measures
- Simplifies complex detailing
- Faster installation



WRAPTITE® TAPE

A useful way of stopping unnecessary air leakage around openings and overlaps is to use Wraptite Tape, an **airtight**, tear resistant tape with **high vapour permeability** for internal and external applications. Wraptite Tape's **flexibility facilitates ease of application and detailing**, while its **resilient composition resists punctures and tears during construction.** It **can be left exposed for up to 120 days during construction** and has a **wide operating temperature range (-40°C to +100°C).** Wraptite Tape is also available with a **split release liner** for ease of installation.

It fully bonds to all standard substrates, with **no primer required**, suppressing air leakage around joints, openings and penetrations. It is also suitable for permanent airtight sealing of membrane overlaps and for taping insulation joints. Wraptite Tape's high vapour permeability allows damp sheathing to dry quickly and moisture vapour to escape. This ensures good indoor air quality and reduces the likelihood of mould, mildew, condensation, timber distortion and metal corrosion. Wraptite Tape contains **no VOC's.**

PHYSICAL PROPERTIES

Property	Test Method	Mean Results
Roll sizes	-	75mm x 50m 100mm x 50m 150mm x 50m
Nominal Thickness	Calibrated Deadweight Micrometer	0.65mm
Basis Weight	Electronic Weigh Scale	292 g/m^2
Application Temperature	-	Air & surface: minimum -6°C maximum 60°C
Service Temperature	-	-40°C to +100°C
Water Penetration	EN 1928 : 2000 Method A	Class W1 (before ageing) Class W1 (after ageing)
Air Permeance	EN 12114	0.01 m^3/m^2.h.50 Pa
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Tear Resistance	EN 12310-1	Mean MD 412N Mean XD 286N
Reaction to Fire	EN 11925-2 BS EN 13501-1	Class B, s1, d0*

Key Benefits

- Vapour permeable tape used to protect exposed joints in insulation
- Easy to use when detailing joints
- Ultimate airtightness accessory
- Can seal joints in mechanically fastened air barrier
- Airtight

**tested over 12mm Calcium Silicate Board as per BS EN 13238:2010*

All tests carried out to EN 13859-2 standard

WRAPTITE® LIQUID FLASHING

Wraptite Liquid Flashing is a high-quality, gunable, elastomeric, polyether, liquid applied flashing and detailing membrane. It bonds to most construction materials, such as aluminium, brick, concrete, wood, vinyl, and exterior sheathing boards. Wraptite Liquid Flashing is compatible with the entire line of A. Proctor Group's vapour permeable products for joint detailing in exterior sheathing panels.

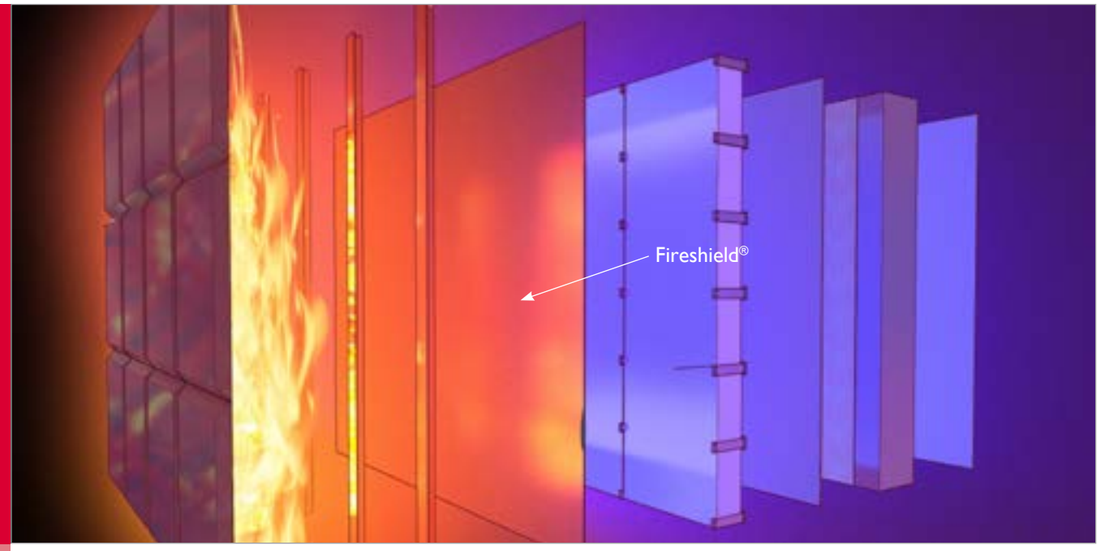
Wraptite Liquid Flashing is for use with A. Proctor Group's range of vapour permeable membranes. This liquid applied flashing membrane is ideal for use in complex details. It can also be used to protect the leading edge of the Wraptite membrane or tape from water penetration if the edge cannot be protected by overlapping in a shingle fashion.

PHYSICAL PROPERTIES

Property	Test / Standard	Mean Results
Size	-	600ml Sauasages (12 per carton)
Coverage		1.4-1.8m^2 per 600 ml sausage
Chemistry	Silyl-Terminated Polyether - Moisture Cure	
Density	ASTM D1475	12.2 kg/L (12.2 lb./Gal.)
Viscosity at time of manufacture	900,000 +/- 200,000 cps	21.1°C (70°F) +/- -16.7°C (2°F)
Tack-Free Time	ASTM C679	30 min
Shear Strength	ASTM D412	210 psi
Tensile Strength	ASTM D412	230 psi
Elongation at Break	ASTM D412	215%
Low Temperature Flex	ASTM D816	Pass @ -23°C (-10°F)
Shore A Hardness	ASTM C661	38
Installation Temperature	> 0°C (32°F)	
Service Temperature	-29°C to 93°C (-20°F to 200°F)	
Shrinkage	No visible shrinkage after 14 days	
Exposure Time	12 Months	
VOC Content	19 g/L	
Colour	Green	

Key Benefits

- Continuous seal and system approach.
- Can be applied in damp conditions.
- Does not peel back when left exposed.
- Does not create build up in rough openings.
- Non-sag.
- 100% solvent free.
- Non-shrinking.
- Bonds to most construction materials.
- Easily applied and spread.
- Does not harm foam insulation.



FIRESHIELD®

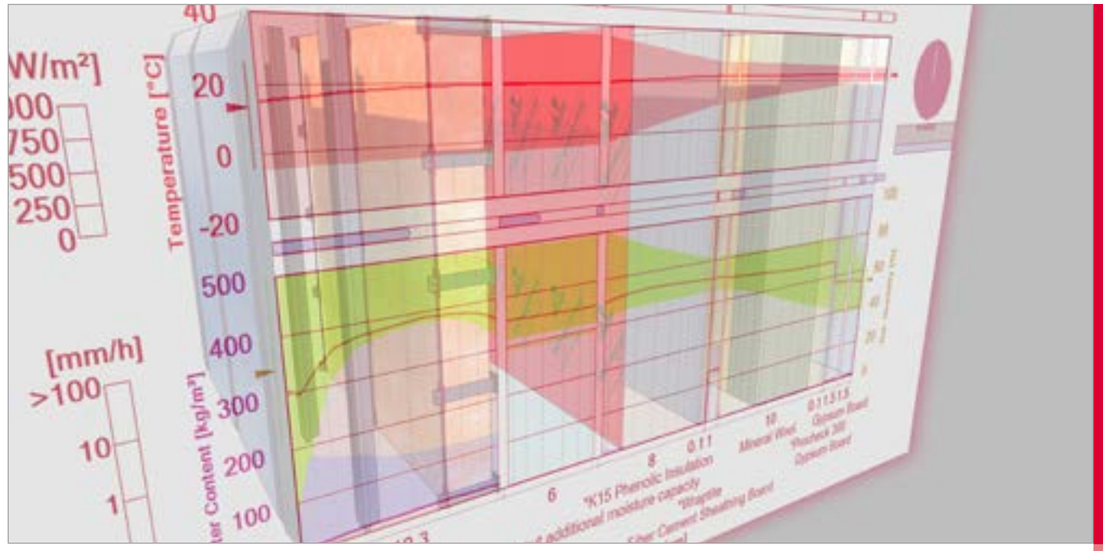
Fireshield is a vapour permeable walling underlay with fire proof surface. Fireshield is suitable for all walling applications including those in multiple storey buildings. Its unique coating doesn't just resist fire, but eliminates fire spread. It is installed and fixed to the substrate in the same manner as standard breather membranes using mechanical fixings.

PHYSICAL PROPERTIES

Property	Test Method	Mean Results
Roll Size	-	1.1m x 20m
Weight	EN 1849-2	720g/m^2
Thickness	EN 1849-2	1.2mm
Nail Tear Resistance	EN 12310-1	MD 180N CD 220N
Resistance to water penetration	EN 13859-1	Class W1
Tensile Strength	EN 12311-1	MD 300N/5cm CD 275N/5cm
Elongation	EN 12311-1	MD 2-3% CD 2-3%
Water impermeability	EN 20811	Minimum value: 2m
UV resistance	Internal method, UVB	12 months
Water vapour transmission properties	EN ISO 12572 conditions C	Sd=0.08m
Flexibility at low temperature	EN 1109	-20°C
Reaction to Fire	EN 13501-1 Test method: EN 11925-2 and EN 13823 (SBI)	B, s1, d0
Resistance to air penetration	EN 12114	<0.3m^3/m^2/hr@50Pa
Artificial ageing (5000h uv + 90 days 70°C) Tensile strength after ageing Resistance to water penetration after ageing	EN 13859-1	MD: 290N/5cm CD 240N/5cm Class W1

Key Benefits

- Part B compliant for buildings over 18m
- Unique composition actively reacts to prevent fire taking hold
- Vapour permeable walling underlay for use either directly onto sheathing or insulation
- Class B, s1-d0 but performs differently to other similar class products
- Complies with BS5250, BS4016 & NHBC requirements for vapour permeable walling underlays
- Ideal for use in open jointed rainscreen / façade construction



CONDENSATION CONTROL

Moisture (Condensation control)

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.

Controlling the moisture flow in a building is fundamental to the core principals of HAMM and to maintaining the durability of the building envelope. Well managed moisture maximises energy efficiency by reducing adverse effects on fabric insulation, in addition to protecting the health and safety of the occupants.

The Impact of Moisture Flow

Impact on the building

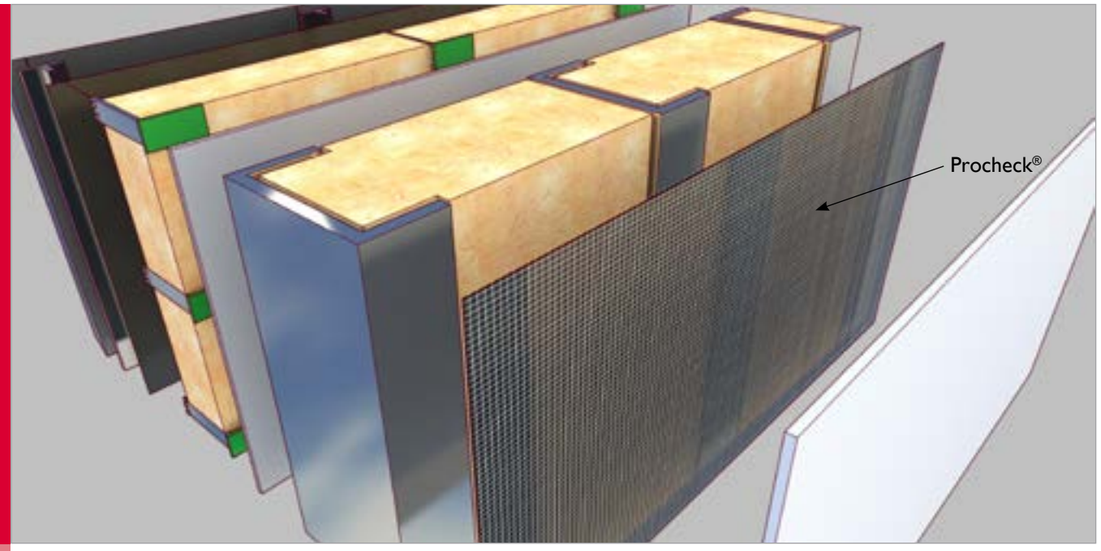
To avoid the occurrence of excess condensation, which can result in mould growth and damage to building fabric and/or contents, designers should assess the amount of water vapour likely to be generated within the building and determine the resultant increase in internal vapour pressure above that of external air. They should then consider the physical properties of the construction.

WUFI CALCULATIONS

BS 5250 explains that Hygrothermal analysis (BS EN 15026) is the most appropriate method of determining the condensation risk in solid walls with internal insulation.

A. Proctor Group Ltd advises its customers using WUFI software, which is fully compatible with BS EN 15026, and dynamically predicts moisture movement and storage as well as condensation for each location. The designer is able to achieve an hour-by-hour prediction over a given period of years, as specified by the designer. The programme considers a worst-case scenario with the injection of air and/or moisure leaks at the source to predict the drying out of the fabric build up.

The data obtained from a WUFI assessment provides an accurate measurement of the temperature, relative humidity, and water content within the elements of a building measured over a specified time period. WUFI simulations help to analyse different construction assemblies in various climates globally and determine the risks of interstitial condensation, which could lead to subsequent risks of mould growth and timber rot in associative building materials, and how to eliminate these risks.



PROCHECK® 125

Procheck 125 is a lightweight reinforced polyethylene vapour control layer which can be utilised in a variety of commercial applications. **Procheck 125 with a vapour resistance of Sd 25m, means it can be utilised where very high moisture vapour resistance is not a necessity but a strong, durable airtight membrane is.**

Key Benefits

- Durable VCL for low to medium risk applications
- Reinforced, ensuring minimal tears and robustness to withstand tough site conditions
- Translucent, allowing visibility to substructure for ease of installation

PROCHECK® FR200

Procheck FR200 is a fire retardant vapour control layer used in roof and wall structures in both new build and renovation projects. Procheck FR200 has a Reaction to Fire classification of B-s1, d0 which provides assurance of fire performance for the structure. Procheck FR200, **air and vapour tight membrane improves energy efficiency and reduces the condensation risk, and has a vapour resistance of Sd 44m.**

Key Benefits

- Independent assurance of fire performance (Class 1 to BS 476 parts 6 & 7 and EN 11925-2 B,s1,d0)
- Improved energy efficiency
- Reduced condensation risk
- Reinforced and robust

PROCHECK® 300

Procheck 300 is a lightweight, reinforced, polyethylene vapour control layer for use within roof and wall constructions to prevent warm, moist air escaping from inside the building and condensing within the insulation. The woven, polypropylene, multifilament scrim **reinforcement provides excellent resistance to tears and punctures to withstand tough site conditions** and is **unaffected by chlorine. Procheck 300's vapour resistance of Sd 64m makes it the ideal choice for applications such as heated warehouses, schools and shops. Its translucent colour allows visibility to the substructure.**

Key Benefits

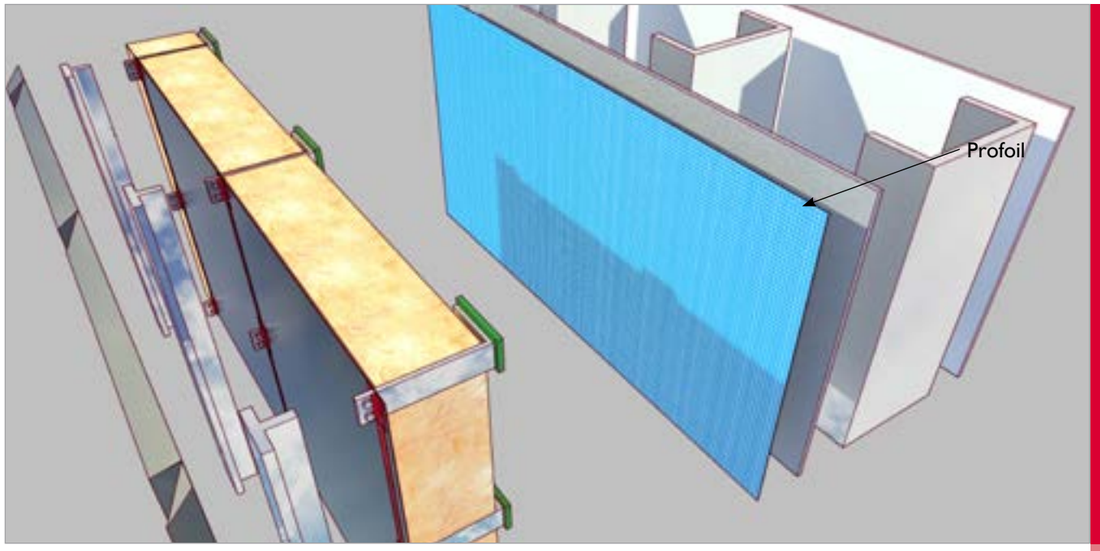
- Suitable for low risk applications e.g. heated warehouses
- Minimal tears due to reinforcement
- Robust to withstand tough site conditions
- Visibility to substructure for ease of installation

PROCHECK® 500

Procheck 500 is a strong reinforced polyethylene vapour control layer with a **vapour resistance of Sd 100m, making it suitable for low to medium risk applications e.g. offices, schools & housing.** The woven extruded polypropylene multifilament scrim **reinforcement provides improved nail tear resistance and robustness to withstand tough site conditions.** The sheet is **transparent allowing visibility to the substructure to ease the installation**. Procheck 500 is the grade utilised by many leading system manufacturers. It is **UV stabilised** and **unaffected by chlorine**.

Key Benefits

- Suitable for low to medium risk applications e.g. offices, housing
- Reinforced, ensuring minimal tears
- Robust to withstand tough site conditions
- Visibility to substructure



PROFOIL 861

Profoil 861 is a heavyweight, reinforced, **UV stabilised** vapour control layer with an aluminium foil core which gives a high water **vapour resistance of Sd 1700m. This makes it ideal for high risk applications such as swimming pools (unaffected by chlorine) and textile factories.** The aluminium foil is protected on both faces by polyethylene for corrosive situations. The **reinforced scrim ensures minimal tears and robustness to withstand tough site handling while the encapsulated foil ensures high vapour resistance.**

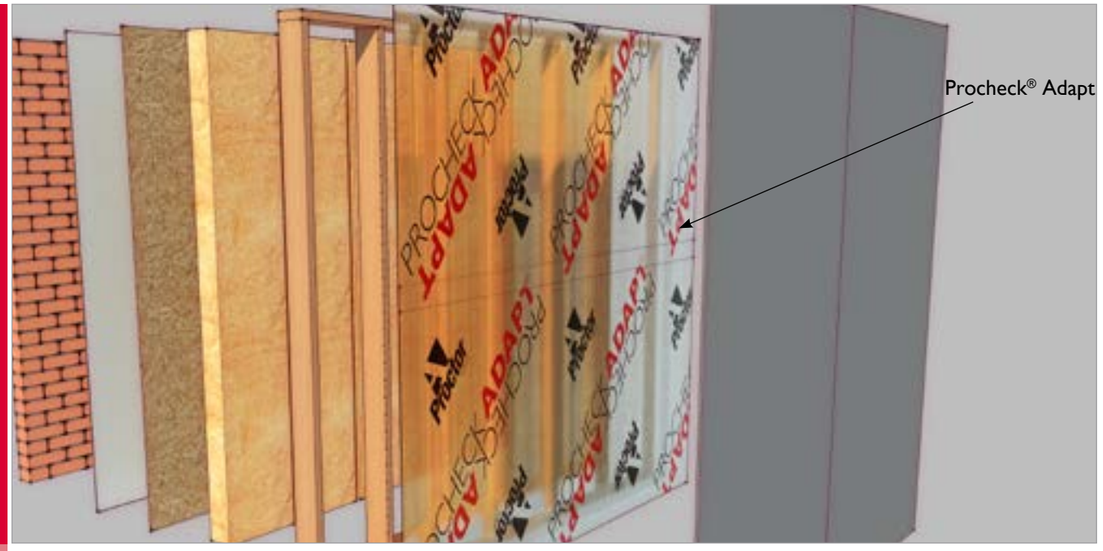
Key Benefits

- Ideal for high risk applications e.g. leisure centres, textile factories
- Minimal tears
- Robust to withstand tough site conditions
- Unaffected by chlorine
- High vapour resistance

PHYSICAL PROPERTIES

Property	Procheck 125	Procheck FR200	Procheck 300	Procheck 500	Profoil 861
Thickness	0.35mm	0.16 mm	0.3 mm	0.5 mm	0.4mm
Weight	90g/m^2	94g/m^2	151g/m^2	238g/m^2	312g/m^2
Roll Size	2m x 50m	1.6m x 50m	2m x 50m	2m x 50m	2m x 50m
Colour	Translucent	Black / white	Translucent	Translucent	Blue / Silver
Vapour Resistance	126MNs/g Sd 25m	220MNs/g Sd 44m	>300MNs/g Sd 64m	>500MNs/g Sd 100m	>7000 MNs/g Sd 1700m
Air Permeability*	0 $m^3/m^2.hr$	-	0 $m^3/m^2.hr$	0 $m^3/m^2.hr$	0 $m^3/m^2.hr$
Condensation Classification	Low	Low / Medium	Low	Low / Medium	High

**Demonstrated no airflow at all pressures up to the maximum test level of 1000Pa. The resolution of the method is 0.1 $m^3/m^2.hr$*



PROCHECK® ADAPT

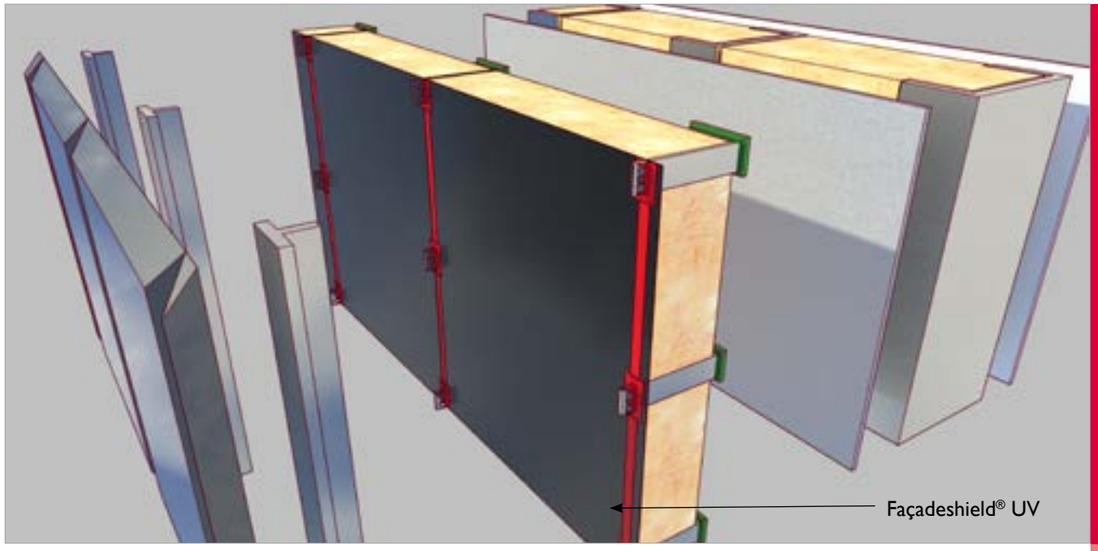
Procheck Adapt is a high performing variable resistance vapour control layer for use in a variety of commercial and residential applications. It is designed to protect the building fabric from potential risks of condensation and it will also act as an airtight barrier. Its variable permeability adapts to changes in humidity levels becoming more resistant in Winter and more permeable in Summer. This means the building fabric is protected from damaging moisture levels during cold, wet months of the year and it will allow the fabric to dry out effectively in warmer, drier months. Procheck Adapts' translucent structure eases fixing to structural frames and in conjunction with its integral tape allows for a fast installation time.

PHYSICAL PROPERTIES

Property	Test Method	Mean Results
Roll Size	-	1.5m x 50m
Weight	ISO 536	110 g/m^2
Nail Tear Resistance	EN 12310-1	MD 350N CD 375N
Tensile Strength	EN 12311-1	MD 350N/50mm CD 315N/50mm
Elongation	EN 12311-1	MD 20% CD 20%
Vapour Resistance	EN 12572	Sd 0.4m - 90m
Reaction to Fire	EN 13501-1	Class E
Air Permeability	BS EN 12114:2000	0.00 m^3/m^2.hr @ 50 Pa

Key Benefits

- Variable resistance adapts to changes in humidity
- Wide Sd range guarantees performance in demanding climatic conditions
- Ensures effective drying out of building materials
- Suitable for variety of commercial and residential applications
- Provides airtightness to structure as well as vapour control
- Translucent material allows for ease of installation onto framework



FAÇADESHIELD® UV

Façadeshield UV is designed specifically to ensure the building fabric maintains good water resistance and breathability **when used behind open jointed façades**. It is a breathable membrane that combines **exceptional water and UV resistance** with the aesthetically pleasing **anti-glare** dark colour which provides a "shadow" appearance within open rainscreen façades. Façadeshield UV enhances the airtightness of the building whilst reducing the risk of condensation due to its' **high vapour permeability, yet airtight fabric**. Façadeshield UV is **robust, with good tear resistance and tensile strength**.

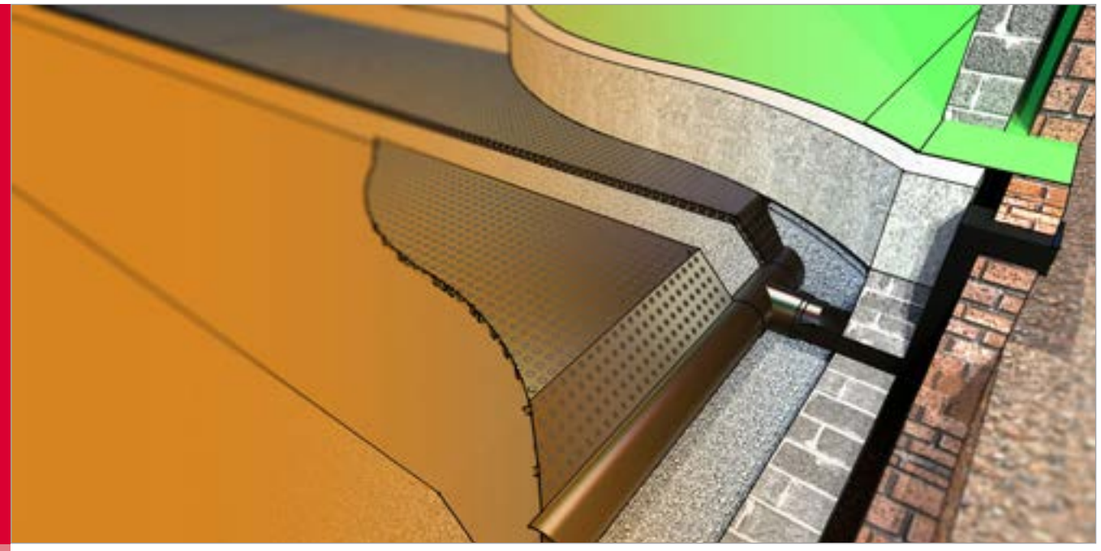
PHYSICAL PROPERTIES

Property	Test Method	Mean Results
Roll size	EN 1848-2	1.4m x 50m
Weight per unit area	EN 1849-2	220g/m^2
Thickness	EN 1849-2	0.35 mm
Colour		Black
Sd-value	EN ISO 12572	0.11 m
Temperature resistance	EN 13859-2	- 40°C to +80°C
Fire performance*	EN 13501-1 / EN ISO 11925-2	B-s2, d0
Resistance to water permeability	EN 1928	W 1
UV resistance uncovered		12 months (Climate-Central Europe)

** on substrates of Class A1 or A2-s1,d0 with a density ≥653 kg/m³ and a thickness of ≥ 11mm*

Key Benefits

- Provides secondary protection to open jointed & perforated façades
- Aesthetically pleasing behind open façades
- Provides externally applied airtight layer for continuity of air barrier
- Has long term durability
- Class B fire performance
- Can be fully exposed for up to 12 months



GROUND GAS PROTECTION

Gas protection systems are critical in developments constructed on sites affected by permanent ground gas and/or volatile organic compound (VOC) contamination. Systems are designed using the methodology which is set out in various advisory documents and legislation. The primary purpose is the prevention of hazardous gases and contaminants from the underlying soils that may cause harm to occupiers. A well-designed system should also perform the function of a damp-proof membrane, assisting in preventing the uptake of moisture into the construction.

Whatever your requirement, our team of highly trained specialists is on hand to provide technical advice to assist in all aspects of designing gas protection systems. From recommending the ideal level of protection for a particular site, through to selection of suitable materials, and advice on detailing, our team will work with you to ensure that all elements are covered.

As part of providing this complete service to customers, we have developed relationships with strategic partners; these include:

- Consultants specialising in all aspects of gas protection system design
- Specialist installation sub-contractors
- Consultants offering independent verification of gas protection installations

The A. Proctor Group can facilitate contact between our clients and professional companies in the field of gas protection systems, who can offer quotations for:

- **Full design** of systems in line with site-specific investigation, and remediation strategy covered by £1m professional indemnity
- **Installation** of gas protection measures by CSkills NVQ Level 2 qualified installation contractors
- **Verification** by independent consultants providing validation plans including relevant levels of integrity testing specific to site risks

The A. Proctor Group has been a contributor and funder to various CIRIA advisory documents including C665, C716 and C735.

PROTECH VOC FLEX

High Risk Characteristic Sites

Protech VOC Flex complies with CIRIA C748 and BS 8485:2015. It is a high performance 6 layer flexible proprietary reinforced VOC gas barrier and is suitable for use on brownfield sites that require protection from dangerous contaminants such as VOCs and hydrocarbons. Protech VOC Flex has been developed to ease installation on site due to the flexibility of the membrane. It is also suitable as a high performance damp proof membrane.

PHYSICAL PROPERTIES

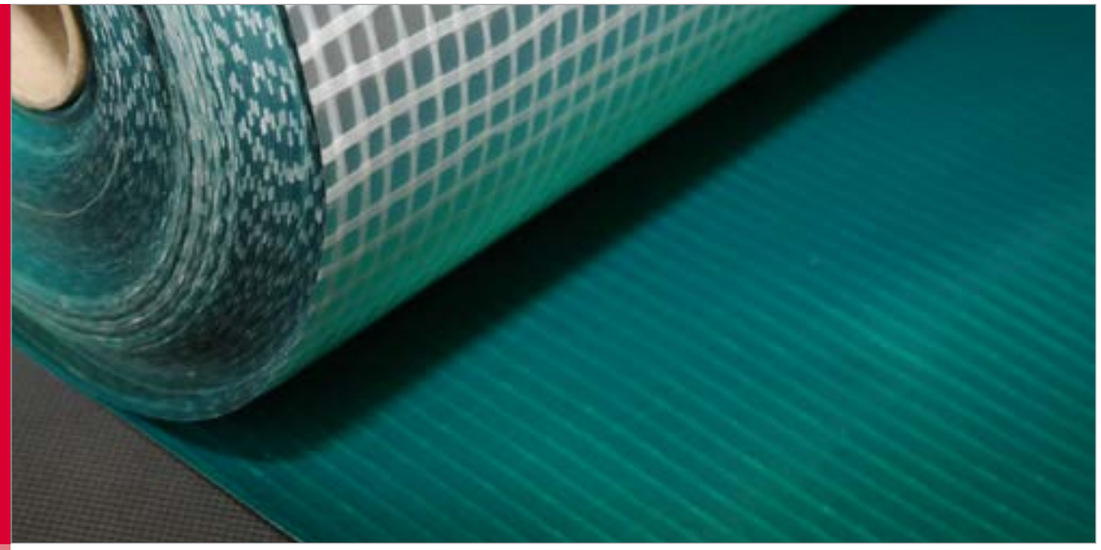
Property		Unit	Mean	Method
Roll size		m	2 x 50	
Thickness		mm	0.55	
Weight		g/m²	564	DIN EN ISO 536
Methane Permeability		ml/day/m²	<0.1	ISO 15105-1
Tensile strength	MD CD	N/50mm	700 640	EN 12311-1 +Mods EN 13859-1
Elongation	MD CD	%	30 25	EN 12311-1 +Mods EN 13859-1
Nail tear resistance	MD CD	N	500 540	EN 12310-1

Key Benefits

- Exceptional chemical resistance
- Additional damp proofing protection
- Flexible membrane to ease installation on site
- Robust & durable multi-layer membrane
- High resistance to puncturing

Accessories

- Protech VOC Flex Starter Band
- Protech VOC Tophats
- Protech VOC Flashing
- Protech VOC Corner Units
- Protech VOC Primer
- Protech Protection Board
- Protech VOC Protection Fleece
- Protech GM Tape
- Protech LAGM (Liquid Applied Gas Membrane)



PROTECH GM SUPER

High Risk Characteristic Sites

Protech GM Super is a high performance proprietary LDPE reinforced gas barrier, which incorporates a 12 micron aluminium foil layer for maximum protection against ground-borne gases. Please contact our technical department for further details. The product has been specifically designed to conform to the latest guidance documents, and its unique composition makes the membrane extremely robust and flexible, and easy to install. The membrane also provides protection from damp, therefore there is no need for a separate DPM.

PHYSICAL PROPERTIES

Property	Mean Results
Roll Size	2m x 50m
Weight	370g/m²
Thickness	0.46mm
Colour	Green / Silver
Methane Permeability (ISO 15105-1)	≤ 0.1 ml/day/m²

Key Benefits

- BS 8485:2015 Compliant
- High performance reinforced virgin polymer proprietary gas membrane
- Superior tear resistance
- Aluminium core for reduced methane permeability on higher risk sites
- Complies with the latest guidance
- BBA certified
- Robust and flexible
- Easy to install

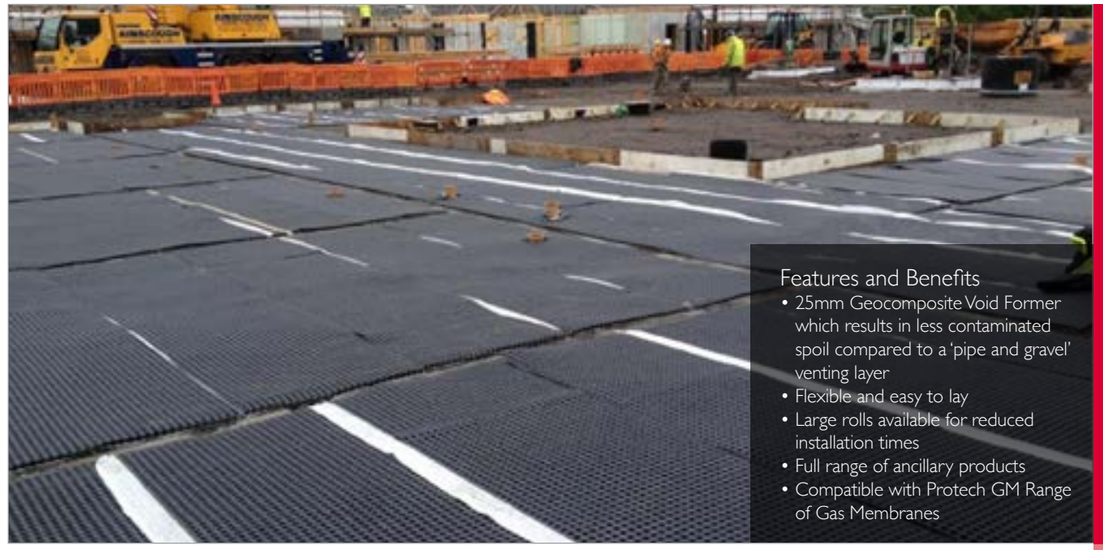
REGULATIONS COMPATIBILITY

	CIRIA 665 CHARACTERISTIC SITUATION 2	CIRIA 665 CHARACTERISTIC SITUATION 3-6	BS8485 CHARACTERISTIC SITUATION 2	BS8485 CHARACTERISTIC SITUATION 3-6	BRE 211 RADON	NHBC AMBER 1	NHBC AMBER 2 & RED
METHANE	✓	✓	✓	✓	N/A	✓	✓
CARBON DIOXIDE	✓	✓	✓	✓	N/A	✓	✓
RADON	N/A	N/A	N/A	N/A	✓	N/A	N/A

The table above can be used as a basic guide but for site specific guidance please contact the A. Proctor Group technical department

Accessories

- Protech GM Super Starter Band
- Protech GM Tape
- Protech GM Tophats
- Protech GM Flashing
- Protech GM Super Corner Units
- Protech GM Primer
- Protech Protection Board
- Protech GM Protection Fleece
- Protech SAGM (Self Adhesive Gas Membrane)
- Protech LAGM (Liquid Applied Gas Membrane)



Features and Benefits
- 25mm Geocomposite Void Former which results in less contaminated spoil compared to a 'pipe and gravel' venting layer
- Flexible and easy to lay
- Large rolls available for reduced installation times
- Full range of ancillary products
- Compatible with Protech GM Range of Gas Membranes

PROVOID 25

High Risk Characteristic Sites

Provoid 25 is a 25mm thick single-sided geocomposite that provides a void beneath floor slabs which, when connected to air inlets and outlets, allows sufficient air changes to dilute gases to safe concentrations when designed correctly.

Provoid 25 can be laid in strips at predetermined centers or in a full blanket depending on site requirements. Being only 25mm thick means there is a reduced dig when compared to the alternative of 200 to 300mm of clean stone. If Provoid is laid in strips it must be bedded in 200mm of clean stone to achieve a good venting performance in compliance with BS8485:2015.

Provoid 25 is flexible and can be laid horizontally and vertically to deal with awkward foundation arrangements. Because of its flexibility, it will cope easily with settlement under the slab without compromising the system.

We offer venting design advice in line with DOE (1997) Passive venting of soil gases beneath buildings. We can offer venting layouts and detailing of inlets and outlets on existing foundation slab layouts. If calculations are required to prove a specific venting performance, we can arrange quotations for these through our strategic partners.

PHYSICAL PROPERTIES

Property	Mean Results
Roll Length	50m
Width	900mm
Thickness	25mm
Compressive strength	300 kPa
Gas flow capacity - Composite	0.07 m³/s (Calculated[1])

[1]Gas flow calculation based on a discharge coefficient of 0.61 with a pressure difference of 10Pa and a standard air density of 1.29kg/m³

Accessories

Venting System Components
6,000mm² ventilation area
1: Ground Level Gully Vent Box*
2: Provoid Connector 'T-Piece'
3: Provoid (Geotextile side down)

** Provoid Gully Vent Boxes need to be set in 150mm surround of no fines concrete. No vehicular trafficking should be driven over Gully Vents.*

REGULATIONS COMPATIBILITY

	CIRIA 665 CHARACTERISTIC SITUATION 2	CIRIA 665 CHARACTERISTIC SITUATION 3-6	BS8485 CHARACTERISTIC SITUATION 2	BS8485 CHARACTERISTIC SITUATION 3-6	BRE 211 RADON	NHBC AMBER 1	NHBC AMBER 2 & RED
METHANE	✓	✓	✓	✓	N/A	✓	✓
CARBON DIOXIDE	✓	✓	✓	✓	N/A	✓	✓
RADON	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HYDROCARBON VAPOURS & LIQUID	✓	✓	✓	✓	N/A	✓	✓

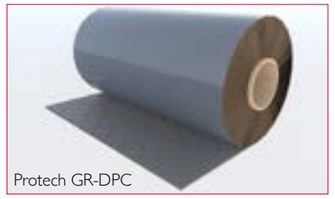
*The table above can be used as a basic guide but for site specific guidance please contact the A. Proctor Group technical department

Protech GM Accessories

Both the British Standard BS8485:2015 and the CIRIA C735 guidance document emphasise the importance of on site verification to ensure design performance targets for gas membrane systems are met. In order to achieve this, good installation and site practices are increasingly important. To assist contractors in meeting the strict guidance given in the most recent standards documents, the A Proctor Group supplies a wide range of membrane accessories to ensure the installation process is both simple and robust.

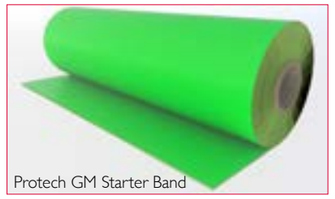
Please refer to our Protech GM Accessories brochure for full product details.


Protech GM Flashing


Protech GR-DPC


Protech GM Primer

Protech Protection Board


Protech GM Starter Band


Protech GM Tapes


Protech GM Corners


Protech GM Tophats


Provoid Solid Collection Pipe

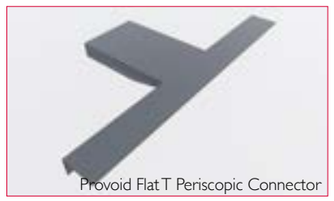

Provoid Gully Vent Box


Provoid Ground
Level Gas Vent box


Provoid BTB Connectors


Provoid T Connector


Provoid Periscopic
Vent inc Air Brick


Provoid Flat T Periscopic Connector


End Caps
for Provoid T
Connectors


Provoid Gas
Venting Stacks


Provoid Gas
Venting Bollards


Provoid Horizontal Adaptor


Provoid Vertical Adaptor


Protech Tool Box

SPACETHERM® SLENTEX A2

Spacetherm Slentex A2 is a flexible, high-performance, silica aerogel-based insulation material of limited combustibility used for exterior and interior applications. Supplied in a variety of finishes, the substantial layers of Spacetherm Slentex A2 meet the requirements for A2 classification. The product is used to optimise the thermal performance and fire properties of façade systems in a number of ways. These include enhancing the thermal performance of the ventilated façade, and addressing thermal bridging in the façade. Spacetherm Slentex A2 is also useful in minimising thermal bridges around windows in areas such as window reveals and roller shutter cases.

With a thermal conductivity of 0.019 W/mK, Spacetherm Slentex A2's performance, coupled with its superior fire performance, qualify it as one of the best insulation materials available worldwide. Engineered for space-critical applications, the product offers low thermal conductivity, superior compression strength, plus breathability allied to hydrophobic characteristics. Its flexibility and ease of use has proven it as the insulation material of choice in many applications and for a wide variety of clients.

PHYSICAL PROPERTIES

Property	Test Method	Mean Results
Reaction-to-Fire	EN 13501-1:2010	A2-s1, d0
Thickness	-	10, 20, 30, 40mm*
Width	-	up to 1500 mm
Colour	-	White
Thermal Conductivity	EN 12667	0.019 W/m-K
Density	EN 1602	190-200 kg/m^3
Dimensional Stability	EN 1604	Δ <0.6% @ 70°C, 48hrs
Compressive Strength	EN 826	30 kPa at 10% compression
Tensile Strength	EN 1607	16 kPa perpendicular to faces compression
Tensile Strength	EN 1608	1085 kPa parallel to faces
Short Term Water Absorption	EN 1609 (A)	0.04 kg/m^2 (partial immersion 24hrs)
Long Term Water Absorption	EN 12087 (1A)	0.10 kg/m^2 (full immersion 48hrs)
Water Vapour Permeability, μ-Value	EN 12086	5
Organic Content of Spacetherm A2	DIN EN 13820	3.8 Gew.-%

Key Benefits

- Class leading fire performance from an Aerogel insulation
- Superior thermal performance
- Limited combustibility
- Water vapour diffusion open
- Permeable
- Flexible
- Thinnest A2 Aerogel insulation available

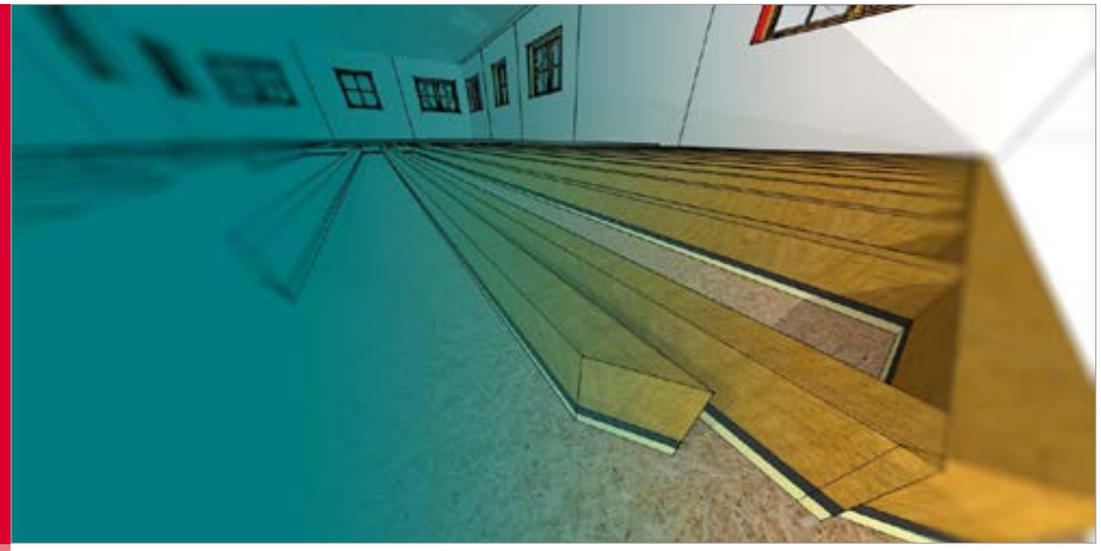
Product range

- Spacetherm A2 Multi
- Spacetherm A2 Wallboard
- Spacetherm A2 Directfix
- Spacetherm A2 Cold Bridge Strip
- Spacetherm A2 Window Reveal Board

More details on the product range can be found on our website.

ETA - 18/0011 Dated 6th December 2018

**other thicknesses available on request*



ACOUSTIC FLOOR SOLUTIONS

We have been providing innovative solutions to acoustic flooring problems for over 25 years. Our unrivalled expertise has been gained via extensive research and development, both at our own acoustic laboratory and through the close links we have established with acoustic specialists at Napier, Sheffield Hallam and Heriot-Watt universities. The end result is that we are able to offer unique acoustic floating floor solutions which will provide answers for the majority of floor constructions. Profloor® Systems are designed to meet the requirements of the Building Regulations and Robust Details for impact and airborne sound. Solutions are available for timber and concrete floors on both new build and refurbishment projects.

Impact Sound

In buildings, noise travels in two main ways. One is impact- or structure-borne sound. This is where mechanical or kinetic energy is being imparted directly to the structure as the result of steady vibrations or impacts. These are then transmitted to other rooms in the building, causing a partition, structure or surface to vibrate, thereby creating sound.

The main sources of structure-borne sound are people (footsteps, slamming doors etc), plant machinery, services and household appliances.

Airborne Sound

Airborne sound can be transferred from the source along a continuous path to a listener. Examples of how sound can be transmitted through the structure could be small holes or openings in the construction, ductwork or 'forced' transmission through partitions or floors.

Airborne sound is affected by:

- Gaps in joints
- Cracks in masonry or plasterwork
- Insufficient sealant around pipes etc passing through the structure
- Mass of the construction
- Effectiveness of isolation and absorption layers

The Solution

Real-world experience and lab analysis has shown that highly resilient materials such as open-cell foam or vertical fibres, whether used in strip form or as a distributed layer, will provide excellent long-term isolation of impact sound and deliver optimum deflection and durability.

Some materials will initially provide adequate deflection, but over a period of time their effectiveness can often be severely impaired, owing to poor resilience or creep under continued dynamic loading (foot traffic). It is therefore essential that the resilient material provides both adequate deflection and long term durability.

The best materials available to date which are proven to provide these combined properties are open-cell polymer foam and vertical polyester fibres. The combination of these is the key to the success of the A. Proctor Group's range of Profloor products.

PRODUCT SELECTOR

Battens




Properties	Unit	Profloor Dynamic Batten	Profloor Excel Batten	Profloor Solo Batten	Profloor Levelling System
Resilient layer composition		Open & Closed Cell	Vertically Orientated Fibre	Closed Cell	Closed Cell PE
Timber Type	-	Homegrown	Homegrown	Homegrown	Homegrown
Resilient layer thickness	mm	22	13	7	10
Overall thickness	mm	55 / 67 / 81 / 91*	58 / 72 / 82	40 / 52	range 33 - 185
Batten length	m	2.4	2.4	2.4	2.4
FFT compliant	-	1, 3 & 80*	1 & 3 & 80*	3 (utilising 52mm batten)	2 (on concrete floor)
Timber or Concrete Floor		Both	Both	Concrete	Both

*Scotland only

Decks




Properties	Unit	Profloor Dynamic Deck 26	Profloor Excel Deck 31	Profloor Micro Deck 17	Profloor SoloDeck 23
Resilient layer composition	-	Open & Closed Cell	Vertically Orientated Fibre	Open & Closed Cell	Composite PU
Type and thickness of board	-	18mm T&G Chipboard	18mm T&G Chipboard	9mm T&G MDF	18mm T&G Chipboard
Resilient layer thickness	mm	8	13	8	5
Overall thickness	mm	26	31	17	23
Board size	m	0.6 x 2.4	0.6 x 2.4	0.6 x 1.2	0.6 x 2.4
FFT compliant**	-	5	5	5	5
Timber or Concrete Floor		Both	Both	Both	Both

** Only FFT5 compliant on concrete floor. Can be used on timber, but wouldn't be RD compliant.

"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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