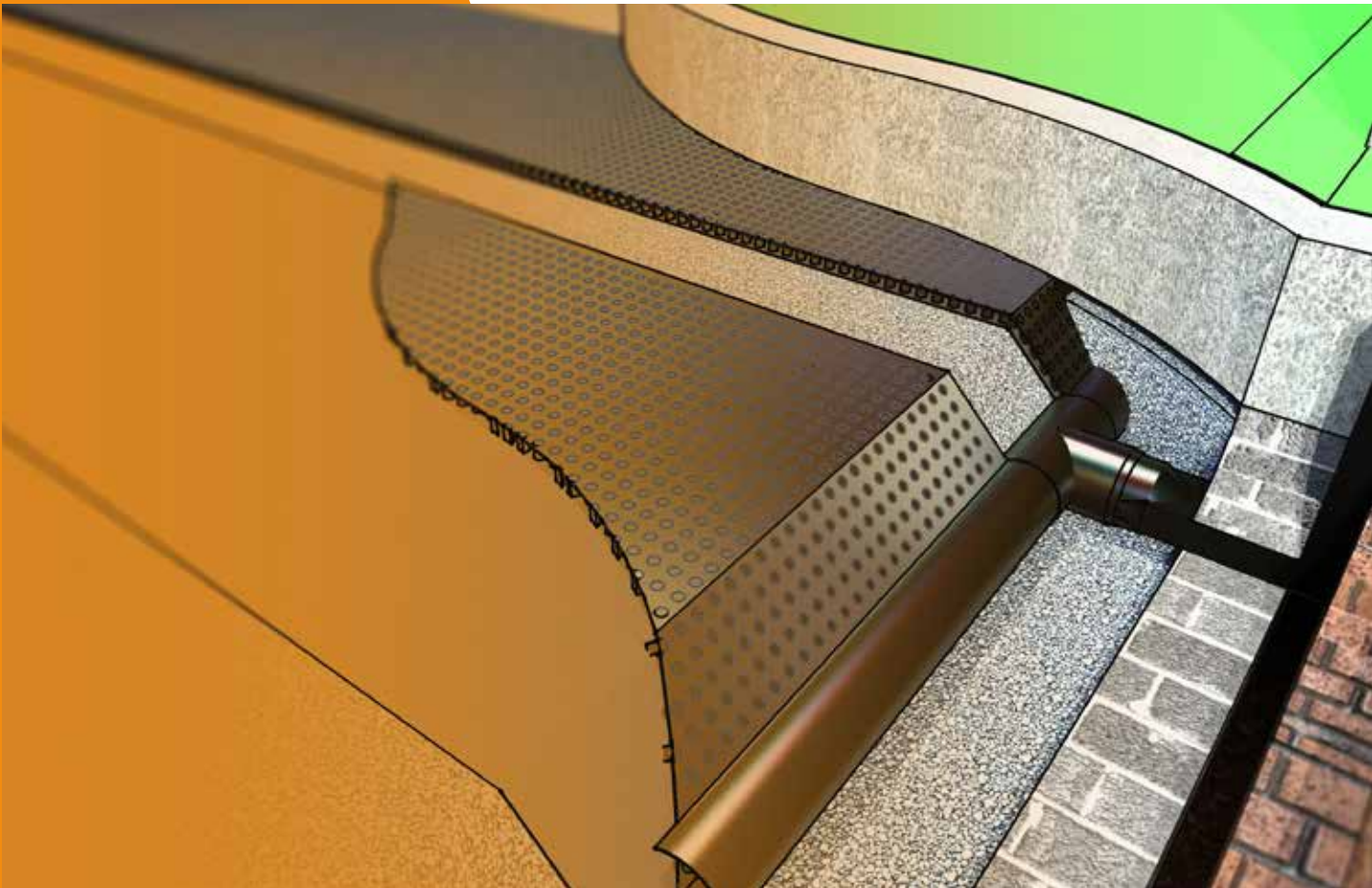


Ground Gas Protection

WE'VE GOT GROUND GAS COVERED



System Solution Providers





A. Proctor Group

Experts in ground gas protection systems

The A. Proctor Group Ltd is a family-owned company in its fourth generation which has been providing solutions and products to the construction industry for over 50 years. One of our five core divisions is Ground Gas Protection Systems.

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.

Contents

Ground Gas Protection

Introduction

Pages 4

- Types of Gases

Product Range

Pages 5-13

- Protech Radon 400
- Protech GM Super
- Protech VOC Flex
- Protech Self Adhesive Gas Membrane
- Protech GM Accessories
- Provoid 25
- Provoid Accessories

Services & Support

Pages 14-15

- Case Study - Lime Kilns, East Calder
- Technical Support

BGA British
Geomembrane
Association

 **The
Radon
Council**

CE

**UK
CA**



Types of Gases

RADON (Rn)

Radon is a radioactive, colourless, odourless gas which occurs naturally in the environment, and can migrate into any building that is built over a source. If it accumulates in a building, it increases the risk of lung cancer for occupants. In 2009, the World Health Organisation (WHO) stated that radon is the cause of 15% of lung cancers worldwide.

CARBON DIOXIDE (CO₂)

Carbon Dioxide is toxic, odourless and colourless, and in high concentrations can result in asphyxiation. The gas is formed by the oxidation of carbon compounds such as that which occurs in landfill sites. When CO₂ levels reach a concentration of 3%, symptoms of headaches and shortness of breath will occur; these become severe at 5%, at 7 - 10% will cause suffocation and at 22% is fatal.

METHANE (CH₄)

An odourless flammable gas that is explosive when released into the atmosphere at levels as low as 5%, and exposed to a source of ignition. Methane is formed where there is below-ground degradation of organic substances e.g. landfill sites, sewage treatment areas, mining operations and peat bogs.



VOLATILE ORGANIC COMPOUNDS (VOCs)

VOCs are organic compounds that are volatile under normal environmental/atmospheric conditions. They can be found in the ground in solid, liquid and dissolved state, and as gases. Some VOCs are short-lived, therefore their impact can change rapidly as they degrade to other chemicals. Typical VOCs encountered on brownfield and industrial sites include: Petroleum (non-halogenated) hydrocarbons (e.g. benzene, toluene, butylbenzenes). Halogenated hydrocarbons (e.g. chlorinated ethenes, ethenes and associated breakdown products as from dry-cleaning fluids or degreasers or chlorofluorocarbons [freons]) Nitrogen, sulphur and oxygen-containing organic compounds (e.g. tetrahydrofuran).



Protech Radon 400

Basic and full protection sites



Protech Radon 400 is a high performance proprietary reinforced radon barrier. Due to its unique composition, the membrane is extremely robust and flexible and, therefore, easy to install on site. It can be jointed with use of our Protech tapes or heat welded. Protech Radon 400 also acts as a high performance damp proof membrane, therefore there is no need to install a separate DPM.



TYPICAL PROPERTIES	
Roll size	2m x 50m
Thickness	0.43mm
Weight	400g/m ²
Sd value	290m
Resistance to static loading	20kg
Water tightness	W1
Against heat ageing (EN 1296)	W1
Against chemicals (EN 1847)	W1
Tearing strength	MD 320N CD 330N
Tensile strength	MD 385 N/50mm CD 295 N/50mm
Elongation	MD 20% CD 17%
Foldability at low temperature	Pass (-45°C)
Radon transmittance	1.4.10 ⁻⁸ m/s
Radon permeability	6.0.10 ⁻¹² m ² /s

Features and Benefits

- Robust and flexible
- BBA and NSAI Certified
- Easy to install
- Wide temperature range

Accessories

- Protech GMTape
- Protech Foil Lap Tape
- Protech GM Tophats
- Protech GM Flashing
- Protech GM Corners
- Protech GM Primer
- Radon Sump
- Protech Protection Board
- Protech GM Protection Fleece
- Protech Liquid Applied Gas Membrane (LAGM)

INSTALLATION

Protech Radon 400 can be sealed by welding or taping. Pipe penetrations should be sealed with Protech Top Hats or Protech Flashing Strip.



Protech GM Super

Low / Moderate / High risk characteristic sites



Protech GM Super is a high performance proprietary reinforced gas barrier, that incorporates an integral aluminium foil layer, for maximum protection against ground-borne gases. This has been specifically designed to conform with the latest guidance documents. Due to its unique composition, the membrane is extremely robust and flexible and, therefore, easy to install on site. The membrane also provides protection from damp when placed below the slab and, therefore, there is no need to install a separate DPM.

TYPICAL PROPERTIES	
Roll Length	50m
Width	2m
Weight	370g/m ²
Thickness	0.4mm
Colour	Green / Silver
Methane Permeability (ISO 15105-1)	≤ 0.1 ml/day/m ²

Features and Benefits

- BS8485:2015 +A1 2019 Compliant
- High performance reinforced virgin polymer proprietary gas membrane
- Superior tear resistance
- Provides moisture protection, no additional DPM required
- Aluminium core for reduced methane permeability on higher risk sites
- Complies with the latest guidance
- BBA certified
- Robust and flexible
- Easy to install

Accessories

- Protech GM Super Starter Band (1m x 50m)
- Protech GM Tape
- Protech Foil Lap Tape
- Protech GM Tophats
- Protech GM Flashing
- Protech GM Corners
- Protech GM Primer
- Protech Protection Board
- Protech GM Protection Fleece
- Protech DPC
- Protech SAGM (Self Adhesive Gas Membrane)
- Protech LAGM (Liquid Applied Gas Membrane)

INSTALLATION

Protech GM Super can be sealed by taping. Pipe penetrations should be sealed with Protech Top Hats or Protech Flashing Strip.

Protech VOC Flex

High risk characteristic sites



Protech VOC Flex complies with CIRIA C748 and BS8485:2015 +A1 2019. 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 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.



TYPICAL PROPERTIES		
Roll Length		50m
Width		2m
Weight		564g/m ²
Thickness		0.55mm
Tensile Strength (EN 12311-1 +Mods EN 13859-1)	MD	700 N/50mm
	CD	640 N/50mm
Elongation (EN 12311-1 +Mods EN 13859-1)	MD	30%
	CD	25%
Nail tear resistance (EN 12310-1)	MD	500 N
	CD	540 N

Features and Benefits

- Complies with CIRIA C748 and BS8485:2015 +A1 2019
- Exceptional chemical resistance
- BBA Certified
- Provides moisture protection, no additional DPM required
- Flexible membrane to ease installation on site
- Robust & durable multi-layer membrane
- High resistance to puncturing

Accessories

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

INSTALLATION

Protech VOC flex can be sealed by welding. In areas where the membrane crosses cavity walls or internal single skin walls, Protech VOC Flex Starter Band should be used in conjunction with Protech VOC Flex Internal and External preformed corner units. Pipe penetrations should be sealed with Protech GM Tophats or Protech GM Flashing Strips. Stanchions and columns should be sealed with Protech GM Primer and Protech GM Flashing strips (Photos, isometric and standard details are available on our website).

For further information regarding permeation testing results please visit our website www.proctogroup.com or contact our technical department on 01250 872261.



Protech Self Adhesive Gas Membrane (SAGM)

Protech SAGM is a self adhesive gas and waterproofing membrane for use in detailing and vertical installation applications. Protech SAGM can be used on any site where Carbon Dioxide, Radon or Methane is present. Methane will occur on any construction, on any sites previously used for landfill. Such conditions can exist on household, commercial and industrial sites. Protech SAGM is perfect for detailing work around awkward penetrations and finishes. It is suitable for vertical, horizontal, stepped and cavity applications, however care should be taken when applying to porous materials that Protech GM Primer be used first. Protech SAGM should be installed in accordance with manufacturers instructions. Protech SAGM consists of an aluminium/polythene laminate coated on one surface, and a bitumen-polymer adhesive compound.

TYPICAL PROPERTIES	
Roll Length	19.05m
Width	1.05m
Thickness	1.5mm
Weight	1700 g/m ²
PHYSICAL CHARACTERISTICS	
Tensile Strength (N / 50mm)	EN 12311-2
CD	CD ≥ 2N/mm ²
MD	MD ≥ 2N/mm ²
Elongation (%)	EN 12311-2
CD	≥ 120%
MD	≥ 120%
Methane Permeability (ISO 15105-1)	< 10 ml/(m ² .day.atm)
Water vapour transmission properties	0.013 g/(day/m ²)

Accessories

- Protech GM Flashing
- Protech GM Primer
- Protech Protection Board

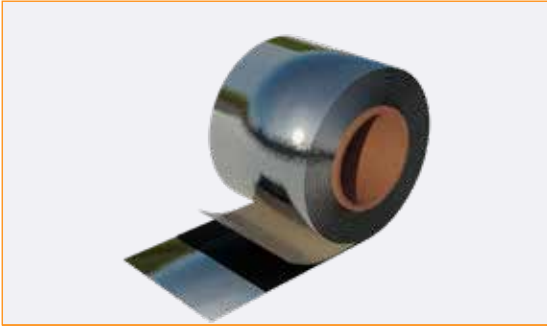
Features and Benefits

- Fully compliant with BS8485:2015 +A1 2019
- Self-Adhesive Membrane
- Multi Layer Membrane incorporating a aluminium foil layer
- Flexible Membrane to ease installation on site
- Tanking Applications
- Excellent for detailing work

INSTALLATION

Protech SAGM has an easily removal silicone coated paper on the lower side. Release liner should only be removed at the time of use. SAGM installation must not be carried out below 5°C and some warming with a hot air gun may be required between temperatures of 5 and 10°C to ensure a satisfactory seal. Ensure exact positioning prior to removal of the release film, as product will adhere instantly and any repositioning may compromise the adhesive properties.

Protech GM Accessories

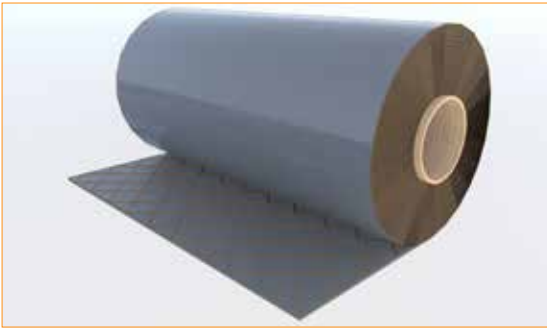


PROTECH GM FLASHING

Product Code: A31211

Protech GM Flashing Strip is a waterproof and gas resistant tape protected by an aluminium film and reinforced with a polyester film. Used for detailing stanchions, corners, penetrations and repairs.

Dimension: 300mm x 10m (A31211)



PROTECH GR-DPC

Product Code: A30212

Protech GR-DPC is a gas resistant DPC used through junctions with cavities or masonry to protect against the ingress of gas and damp.

Dimension: 600mm x 20m



PROTECH SAGM

Product Code: A30203

Protech SAGM is a self adhesive gas and waterproofing membrane for use in detailing and vertical installation applications.

Dimension: 1.05m x 19.05m x 1.5mm



PROTECH GM PRIMER

Product Code: A31220

Protech GM Primer is used in conjunction with Protech SAGM and Protech GM Flashing in order to consolidate the substrate and ensure complete bond development. Protech GM Primer is supplied as a single pack brush applied liquid coating.

Dimension: 5 litre



PROTECH GM PROTECTION FLEECE

Product Code: A32005

Protech GM Protection Fleece used to protect the integrity of the Protech Gas Membranes from follow on trades or from sharp protrusions in made ground.

Dimension: 1m x 50m (A32005)



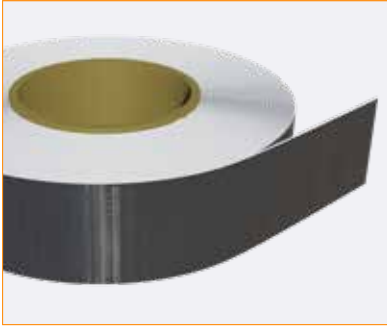
PROTECH LAGM

Product Code: A30210

Protech LAGM* (Liquid Applied Gas Membranes) is used in areas of vertical applications or in hard to treat areas.

Size: 15kg

Protech GM Accessories

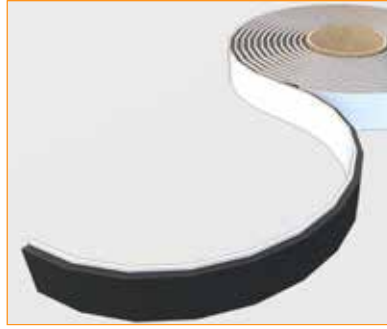


PROTECH FOIL LAP TAPE

Product Code: A17012

Protech Foil Lap Tape is an aluminium foil tape coated with solvent acrylic adhesive over laminated with polyester film.

Dimension: 75mm x 50m



PROTECH GM TAPE

Product Code: A31208

Protech GMTape is used to seal overlaps in gas membranes and accessories.

Dimension: 30mm x 30m



PROTECH TF TAPE

Product Code: A312161

Protech TF Tape is an extruded tape designed for use on timber frame constructions to act as a gasket where the fixings penetrate the gas membrane or starter band.

Dimension: 100mm x 15m



PROTECH VOC FLEX STARTER BAND

Product Code: A30224

Protech VOC Flex Starter Band has a dual function to provide a continuous barrier to gas which is then linked in with the horizontal Protech VOC Flex Membrane. Protech VOC Flex Starter Band crosses the cavity to prevent ingress of gas.

Dimension: 1m x 50m

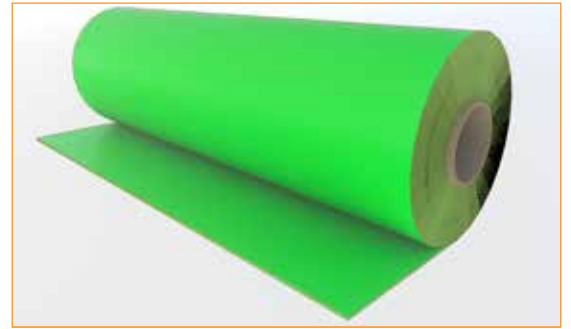


PROTECH GM CORNERS

Product Code: A13011E

Protech GM Internal & External Corners are recommended to achieve a gas tight seal and as technically a better solution. Corners available to suit all Protech gas membranes. Alternative sizes available on request.

Dimension: 150mm x 150mm x 300mm



PROTECH GM SUPER STARTER BAND

Product Code: A30215

Protech GM Super Starter Band has a dual function to provide a continuous barrier to gas which is then linked in with the horizontal Protech GM Super Membrane. Protech GM Super Starter Band crosses the cavity to prevent ingress of gas.

Dimension: 1m x 50m



PROTECH GM TOPHATS

**Product Code: A31601V
A31604V
A31605V**

Protech GMTophats are used to detail around pipe penetrations. Tophats available to suit all Protech gas membranes.

**Sizes available: 110mm (A31601V)
130mm (A31604V)
160mm (A31605V)**

Other sizes available.

Provoid 25

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 also extremely strong and flexible with a crush resistance of 300 kpa and is supplied in rolls of 45m²; therefore large areas can be covered very quickly.

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.



TYPICAL PROPERTIES	
Roll Length	50m
Width	900mm
Thickness	25mm
Compressive strength	300 kPa
Gas flow capacity - Composite	0.07 m ³ /s (Calculated ¹)

¹Gas 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

Features and Benefits

- 25mm Geocomposite Void Former which results in less contaminated spoil compared to a 'pipe and gravel' venting layer
- When installed as a full blanket achieves 1.5 to 2.5 points as per table 6 of BS8485:2015+A1 2019.
- 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
- Optimised for maximum strength and performance
- UV stabilised
- Allows for a reduced dig
- High crush resistance
- Excellent flow rate

Accessories**

Example Venting System Components
 7,000mm² 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.

** Please refer to Protech GM Accessories brochure for full range



Provoid is available in other thicknesses.
 Contact Sales / Technical for more details.

Provoid Accessories



PROVOID GULLY VENT BOX

Product Code: A31201

Provoid Gully Vent Boxes are an integral part of the Provoid Gas Venting System to act as inlets and outlets. Provoid Gully Vent Box comprises:

- Alloy Grating
- Top section - 150mm x 430mm
- Base section - 150mm x 330mm
- T-piece has a 150mm x 300mm socketed outlet to suit 110mm collector pipe

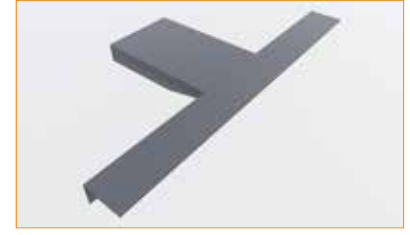


PROVOID GROUND LEVEL GAS VENT BOX

Product Code: A31203

Provoid Ground Level Vent Boxes* are an integral part of the Provoid Gas Venting System to act as inlets and outlets. This item comprises of:

- Stainless steel grate
- Top Section – 150mm x 430mm
- Base Section – 150mm x 330mm
- T-Piece 150mm x 300mm socketed outlet to suit 110mm collection pipe



PROVOID FLAT T PERISCOPIC CONNECTOR

Product Code: A33053

Provoid Flat T Periscopic Connectors* are used to connect the Provoid Gas Vent System to the Provoid Telescopic Vents.



PROVOID BTB CONNECTORS 900MM OPEN

Product Code: A31603

Provoid BTB Connectors* (Open) are used to provide a carrier to transmit going through dwarf walls.



PROVOID SOLID COLLECTION PIPE

Product Code: A31212/ A31225/ A31204/ A31209

Provoid Solid Collection Pipe is used to connect the Provoid T Connectors to assist the Provoid Strip Formation System in the dilution of potential gases under the slab.

Sizes available: 110mm x 1m*
110mm x 2m
110mm x 3m*
110mm x 6m*



PROVOID FLAT T GULLY CONNECTOR

Product Code: A33054

Provoid Flat T Gully Connectors are used to connect the Provoid Gas Vent System to the Provoid Gully and Ground Level Gas Vent Box.



PROVOID T CONNECTORS

Product Code: A31903

Provoid T Connectors (open) are used to connect the Provoid Gas Vent System to the inlets and outlets.



END CAPS FOR PROVOID T CONNECTORS

Product Code: A31205

End Caps are used to close off Provoid T Connectors.

110mm diameter End Caps.

Provoid Accessories



PROVOID HORIZONTAL ADAPTOR

Product Code: A33055

Provoid Horizontal Adaptor* allows a connection from the Provoid Periscopic Vent to the Provoid T Connectors for ventilation under the slab.



PROVOID VERTICAL ADAPTOR

Product Code: A30220

Provoid Vertical Adaptors* are 1m long sleeve to vertically extend the Provoid Periscopic Vent.

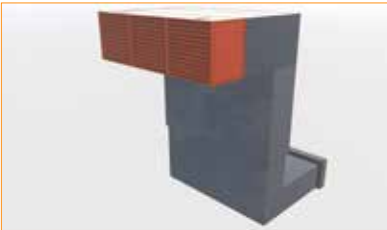
Dimension: 1m length



RADON GAS SUMP

Product Code: A33002B

The Radon Gas Sump* is designed to enable sub-floor depressurisation or pressurisation as part of a radon protection measure. This unit facilitates radon gas removal from interior spaces and superstructure construction cavities to the outside.



PROVOID PERISCOPIC VENT INCLUDING AIR BRICK (TERRACOTTA)

Product Code: A31217

Provoid Periscopic Vents* are an integral part of the Provoid Gas Venting System to act as inlets and outlets.

ALTERNATIVE AIR BRICK COLOURS:



BLACK



PROVOID SLOTTED COLLECTION PIPE

Product Code: A31218/ A31228/
A31219/ A31221

Provoid Slotted Collection Pipe* is used to connect the Provoid T Connectors to assist the Provoid Blanket Formation System in the dilution of potential gases under slab.

Sizes available: 110mm x 1m* (A31218)
110mm x 2m (A31228)
110mm x 3m* (A31219)
110mm x 6m* (A31221)



PROVOID GAS VENTING BOLLARDS

Product Code: A31206

Provoid Gas Venting Bollards* – are an integral part of the Provoid Gas Venting System to act as inlets and outlets.

*non-stock item



Case Study - Lime Kilns, East Calder

The new development of 2 residential properties at Lime Kilns, East Calder in Scotland has been provided with a high-quality VOC protection barrier in the form of Protech VOC Flex from the A. Proctor Group.

Prior to construction and in line with the guidance and legislation for brownfield site developments, an investigation of the site revealed the presence of historic VOCs, Methane and CO₂. In full compliance with CIRIA C735 and the guidelines laid out in the British Standard 8485:2015 (+ A1 2019) and CIRIA C748, the geomembrane was installed by the specialist gas membrane contractor Structureseal Services. As laid out in CIRIA C735 the VOC geomembrane was thermal heat welded and all joints air lance tested in accordance with ASTM D4437-08 2013 in conjunction with the third-party validation engineer. The thermal heat welded joints were carried out by approved NVQ Level 2 gas membrane installers, including the installation of the A Proctor Group's Provoid 25 cusped geocomposite subfloor venting blanket to form a passive dispersal layer in conjunction with Provoid ground mounted gully vents to the perimeter of the houses. This combined achieved a "very good performance" passive venting installation fully compliant with BS8485:2015 (+A1 2019) Table 6.

Martin Taylor, Commercial Director of Structureseal Services commented, "we have successfully used Protech VOC Flex on several VOC vapour protection projects. It offers high-performance protection in compliance with CIRIA C748, is extremely robust and has many benefits which make it easy to install on site. One of these being that when the geomembrane is folded the product has "memory", which enhances the speed, finished appearance and quality of the overall installation."

The A. Proctor Group's expert design and specification advice allowed the project at East Calder on behalf of Concept Completed, to achieve a fully compliant design for ground gas protection measures. Working with developers, specifiers and contractors the A. Proctor Group can provide safe, cost-effective and value-engineered solutions. Technical services include CAD detailing and project-specific recommendations utilising the latest guidance and ensure compliance with current legislation and standards including the BS8485:2015 (+ A1 2019) and CIRIA C748. Site Investigation Reports and Gas Monitoring Results can be reviewed and specialist advice can be provided to ensure full compliance and correct product selection.



Specialist Services and Technical Support

Our technical back-up has always been an integral part of our strategic development, with an outlook based on advanced technical solutions, rather than commodity driven.

Our dedicated technical team is focused on providing high quality advice and support to our customers all the way from drawing board to site.



Customer Focused

- Online Technical Advice
- Members Area / Onsite App
- CAD Design / Standard Details
- Site Advice
- CPD Presentations
- Webinars
- Accreditations

Expertise and know-how to support your project

BIM DATA

Available through NBS Chorus and NBS Source, specifiers can now access a full suite of digital products and technical specifications for many of our product solutions. The collaboration with NBS provides architects and designers with a comprehensive technical specification writing service. In addition, specifiers have easy access to the manufacturer's specification data, BIM objects, literature and third-party certifications.

GAS PROTECTION TECHNICAL SUPPORT

We can review Site Investigation Reports including Gas Monitoring Results and advise routes for compliance. Guidance on specifying and using the A. Proctor Group's full range of membranes and vents is available. Our CAD details and project-specific recommendations are CIRIA, NHBC and Building Regulations compliant. We also have close links to specialist installers, qualified to NVQ Level 2 in Gas Membrane Installation as recommended in CIRIA C735.

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
- Acoustic Floor Solutions
- External Airtight Barriers
- Ground Gas Protection
- Thermal Solutions

Get in touch for more information

www.proctorgroup.com | +44 (0) 1250 872261
contact@proctorgroup.com



“ 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



www.proctorgroup.com | +44 (0) 1250 872261
contact@proctorgroup.com

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