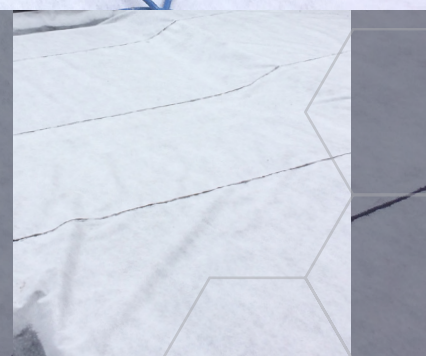


Appendix B



GP® TITANBOND®



GP® TITANBOND® is a pre-applied fully bonded waterproofing membrane incorporating the GP® TITANFLEX® membrane and a heavy duty virgin polypropylene geotextile. The geotextile is laminated to the membrane to provide a dual function; protecting the membrane from damage and providing an integrated 'bond' to poured concrete, ensuring a fully bonded waterproofing barrier which has exceptionally high resistance to ground gases and VOCs. GP® TITANBOND® is used for the gas/waterproofing/tanking of underground structure where harmful ground gases are anticipated.

Thickness	2.0 mm
Width	1.9 m
Length	25 m
Weight	650 g/m ²

TITANTECH®

For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

Handling

Roll weights can be in excess of 20kg and hence appropriate care and equipment is required for unloading and handling.

Storage

Rolls of GP® TITANBOND® should be stored on stable/level ground and stacked not more than five rolls high, with no other material stacked on top. The rolls can be stored outdoors when packaged, but should be protected from exposure to UV.





Feature	Characteristics	Test Method	GP® TITANBOND®
Physical Properties	Thickness	EN 1849-2	2.0 mm
	Width	EN 1849-2	1.9 m
	Length	EN 1849-2	25 m
	Weight	EN 1849-2	650 g/m ²
Hydraulic Press	Water Vapour Transmission Rate	EN 1931	0.11 - 0.18 g/m ² /day
	Water Tightness (60 kPa)	EN 1928	Pass
	Water Tightness (196 kPa - 20 m Water Head) (Basement Application)	EN 1928	Pass
Mechanical Properties	Resistance to Static Load	EN 12730-B	≥ 20 kg
	Puncture Resistance	EN 12236	≥ 2.0 kN
	Tensile Strength (MD)	EN 12311-1	> 550 N/50mm
	Tensile Strength (CMD)	EN 12311-1	> 400 N/50mm
	Tensile Elongation (MD/CMD)	EN 12310-1	> 550 %
	Tear Resistance (MD/CMD)	EN 12310-1	> 300 N
	Resistance to Impact	EN 12691-B	> 1650 mm
	Reaction to Fire	EN 13501-1	E Class
	Concrete Peel Adhesion	ASTM D903 (MOD)	> 3.0 kN/m
	Resistance to Artificial Ageing	EN 1296/EN 1928	Pass
	Resistance to Chemicals	EN 1296/EN 1928	Pass
Compliance and Certification	CE Mark - EN13967:2012		
	NHBC Standards Compliant		
	BS 8485:2015 Compliant (Methane and Carbon Dioxide barrier)		
	CIRIA C748 Compliant (VOC Barrier)		
	BS 8102:2009 Compliant (Type A Waterproofing Barrier)		
Vapour Permeability 100% Concentration	Transmission Rate of Benzene	EN ISO 15105-2	< 3.6 mg/m ² /day
	Transmission Rate of Toluene	EN ISO 15105-2	< 13.8 mg/m ² /day
	Transmission Rate of Ethyl Benzene	EN ISO 15105-2	< 2.7 mg/m ² /day
	Transmission Rate of Xylenes (M,P,O)	EN ISO 15105-2	< 7.7 mg/m ² /day
	Transmission Rate of Hexane	EN ISO 15105-2	< 0.6 mg/m ² /day
	Transmission Rate of Vinyl Chloride	EN ISO 15105-2	< 0.05 mg/m ² /day
	Transmission Rate of Trichloroethene (TCE)	EN ISO 15105-2	< 54.7 mg/m ² /day
	Transmission Rate of Tetrachloroethene (PCE)	EN ISO 15105-2	< 26.2 mg/m ² /day
	Transmission Rate of Naphthalene	EN ISO 15105-2	< 0.0006 mg/m ² /day
	Transmission Rate of Cis-1,2-Dichloroethylene	EN ISO 15105-2	< 1.1 mg/m ² /day
Gas Permeability	Methane Permeability	EN ISO 15105-1	0.13 ml/m ² /day/atm
	Methane Permeability (Jointed)	EN ISO 15105-1	1.00 ml/m ² /day/atm
	Carbon Dioxide Permeability	EN ISO 15105-1	3.01 ml/m ² /day/atm
	Vinyl Chloride Gas Permeability	EN ISO 15105-1	0.04 ml/m ² /day/atm
	Radon Permeability	K124/02/95	1.0 x 10 ⁻¹² m ² /S



Feature	Characteristics	Test Method	GP® TITANFBOND®
Durability and Chemical Resistance	Chemical Resistance - Sulfuric ACID (10% Solution of Sulfuric Acid (H ₂ SO ₄)) 50° For 56 Days	EN 14414-A	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Chemical Resistance - BASIC (Calcium Hydroxide Saturated Suspension) 50° For 56 Days	EN 14414-B	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Chemical Resistance - SOLVENTS (35% Diesel, 35% Paraffin, 30% Oil Hd30 (Vol)) 50° For 56 Days	EN 14414-C	TENSILE STRENGTH RETAINED >80% RESULT - PASS
	Chemical Resistance - SYNTHETIC LEACHATE (Mixture of 14 Acids, Chlorides, Sulphates & Phosphates) 50° For 56 Days	EN 14414-D	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Resistance to Leaching - HOT WATER (Deionised Water) 50° For 56 Days	EN 14415-A	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Resistance to leaching - AQUEOUS ALKALINE (Saturated Calcium Hydroxide) 50° For 56 Days	EN 14415-B	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Resistance to Leaching - ORGANIC ALCOHOL (30% Methanol, 30% Isopropanol, 40% Glycol) 50° For 56 Days	EN 14415-C	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Chemical Resistance - BENZENE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 95% (MD), 102% (CMD) RESULT - PASS
	Chemical Resistance - TOLUENE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 94% (MD), 91% (CMD) RESULT - PASS
	Chemical Resistance - ETHYL BENZENE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 99% (MD), 97% (CMD) RESULT - PASS
	Chemical Resistance - XYLENES - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 91% (MD), 106% (CMD) RESULT - PASS
	Chemical Resistance - TCE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 99% (MD), 93% (CMD) RESULT - PASS
	Chemical Resistance - PCE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 93% (MD), 93% (CMD) RESULT - PASS
	Chemical Resistance - NAPHTHALENE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 101% (MD), 93% (CMD) RESULT - PASS
	Chemical Resistance - HEXANE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 99% (MD), 104% (CMD) RESULT - PASS



JUTA UK

Please contact JUTA
UK Directly for more
information on
GP® TITANBOND®

Installation

GP® TITANBOND® should be installed in accordance with the product installation guidelines, and in accordance with best practice.

Jointing and Sealing

GP® TITANBOND® can be heat welded or taped, with jointing carried out by competent personnel with suitable qualifications in accordance with best practice. GP® TITANBOND® should be overlapped by at least 100mm. If taping joints, only suitable tape must be used, ensuring application with a silicone roller to remove trapped air. JUTA pre-formed details, or self adhesive gas membrane are available for sealing around protuberances.

Accessory Products

- GP® DPC
- GP® TAPE
- GP® OVERTAPE
- JUTA 300TT



**GP®
TITANFLEX®**

GP® TITANFLEX® gas and hydrocarbon barrier is a multi-layer, polyethylene membrane. GP® TITANFLEX® is specifically designed, manufactured, tested and certified to perform as a methane, carbon dioxide, radon ground gas, VOC, Air moisture and hydrocarbon protection system.

TITANTECH®

For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

GP® TITANFLEX® complies with the latest codes of practice as published by BRE, CIRIA (C748) and BSI (BS8485:2015). Suitable for use as ground gas/hydrocarbon protection for NHBC, Green, Amber 1, Amber 2 and Red site characterisations.

Handling

Roll weights can be in excess of 20kg and hence appropriate care and equipment is required for unloading and handling.

Storage

Rolls of GP® TITANFLEX® should be stored on stable/level ground and stacked not more than five rolls high, with no other material stacked on top. The rolls can be stored outdoors when packaged, but should be protected from exposure to UV.

Installation

GP® TITANFLEX® should be installed in accordance with the product installation guidelines, and in accordance with best practice.

Thickness	0.5 mm
Width	2 m
Length	50 m
Weight	500 g/m ²

Certifications



Please
Scan



Rev 2024



Feature	Characteristics	Test Method	GP® TITANFLEX®
Physical Properties	Thickness	EN 1849-2	0.5 mm
	Width	EN 1849-2	2 m
	Length	EN 1849-2	50 m
	Weight	EN 1849-2	500 g/m ²
Hydraulic Press	Water Vapour Transmission Rate	EN 1931	0.11 - 0.18 g/m ² /day
	Water Tightness (60 kPa)	EN 1928	Pass
	Water Tightness (196 kPa - 20 m Water Head) (Basement Application)	EN 1928	Pass
Mechanical Properties	Resistance to Static Load	EN 12730-B	≥ 20 kg
	Puncture Resistance	EN 12236	≥ 2.0 kN
	Tensile Strength (MD)	EN 12311-1	> 550 N/50mm
	Tensile Strength (CMD)	EN 12311-1	> 400 N/50mm
	Tensile Elongation (MD/CMD)	EN 12310-1	> 550 %
	Tear Resistance (MD/CMD)	EN 12310-1	> 300 N
	Resistance to Impact	EN 12691-B	650 mm
	Reaction to Fire	EN 13501-1	E Class
	Resistance to Artificial Ageing	EN 1296/EN 1928	Pass
	Resistance to Chemicals	EN 1296/EN 1928	Pass
Compliance and Certification	CE Mark - EN13967:2012		
	NHBC Standards Compliant		
	CIRIA C748 Compliant		
	BS 8485:2015 Compliant		
Vapour Permeability 100% Concentration	Transmission Rate of Benzene	EN ISO 15105-2	< 3.6 mg/m ² /day
	Transmission Rate of Toluene	EN ISO 15105-2	< 13.8 mg/m ² /day
	Transmission Rate of Ethyl Benzene	EN ISO 15105-2	< 2.7 mg/m ² /day
	Transmission Rate of Xylenes (M,P,O)	EN ISO 15105-2	< 7.7 mg/m ² /day
	Transmission Rate of Hexane	EN ISO 15105-2	< 0.6 mg/m ² /day
	Transmission Rate of Vinyl Chloride	EN ISO 15105-2	< 0.05 mg/m ² /day
	Transmission Rate of Trichloroethene (TCE)	EN ISO 15105-2	< 54.7 mg/m ² /day
	Transmission Rate of Tetrachloroethene (PCE)	EN ISO 15105-2	< 26.2 mg/m ² /day
	Transmission Rate of Naphthalene	EN ISO 15105-2	< 0.0006 mg/m ² /day
	Transmission Rate of CIS-1,2-Dichloroethylene	EN ISO 15105-2	< 1.1 mg/m ² /day
Gas Permeability	Methane Permeability	EN ISO 15105-1	0.13 ml/m ² /day/atm
	Methane Permeability (Jointed)	EN ISO 15105-1	1.00 ml/m ² /day/atm
	Carbon Dioxide Permeability	EN ISO 15105-1	3.01 ml/m ² /day/atm
	Vinyl Chloride Gas Permeability	EN ISO 15105-1	0.04 ml/m ² /day/atm
	Radon Permeability	K124/02/95	1.0 x 10 ⁻¹² m ² /S
	Hydrogen Sulphide Permeability	EN ISO 15105-1	< 0.16 ml/m ² /day/atm



Feature	Characteristics	Test Method	GP® TITANFLEX®
Durability and Chemical Resistance	Chemical Resistance - Sulfuric ACID (10% Solution of Sulfuric Acid (H ₂ SO ₄)) 50° For 56 Days	EN 14414-A	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Chemical Resistance - BASIC (Calcium Hydroxide Saturated Suspension) 50° For 56 Days	EN 14414-B	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Chemical Resistance - SOLVENTS (35% Diesel, 35% Paraffin, 30% Oil Hd30 (Vol)) 50° For 56 Days	EN 14414-C	TENSILE STRENGTH RETAINED >80% RESULT - PASS
	Chemical Resistance - SYNTHETIC LEACHATE (Mixture of 14 Acids, Chlorides, Sulphates & Phosphates) 50° For 56 Days	EN 14414-D	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Resistance to Leaching - HOT WATER (Deionised Water) 50° For 56 Days	EN 14415-A	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Resistance to leaching - AQUEOUS ALKALINE (Saturated Calcium Hydroxide) 50° For 56 Days	EN 14415-B	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Resistance to Leaching - ORGANIC ALCOHOL (30% Methanol, 30% Isopropanol, 40% Glycol) 50° For 56 Days	EN 14415-C	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Chemical Resistance - BENZENE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 95% (MD), 102% (CMD) RESULT - PASS
	Chemical Resistance - TOLUENE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 94% (MD), 91% (CMD) RESULT - PASS
	Chemical Resistance - ETHYL BENZENE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 99% (MD), 97% (CMD) RESULT - PASS
	Chemical Resistance - XYLENES - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 91% (MD), 106% (CMD) RESULT - PASS
	Chemical Resistance - TCE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 99% (MD), 93% (CMD) RESULT - PASS
	Chemical Resistance - PCE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 93% (MD), 93% (CMD) RESULT - PASS
	Chemical Resistance - NAPHTHALENE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 101% (MD), 93% (CMD) RESULT - PASS
	Chemical Resistance - HEXANE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 99% (MD), 104% (CMD) RESULT - PASS



JUTA UK

Please contact JUTA
UK Directly for more
information on
GP® TITANFLEX®

Jointing and Sealing

GP® TITANFLEX® can be heat welded or taped, with jointing carried out by competent personnel with suitable qualifications in accordance with best practice. GP® TITANFLEX® should be overlapped by at least 100mm. If taping joints, only suitable tape must be used, ensuring application with a silicone roller to remove trapped air. JUTA pre-formed details, or self adhesive gas membrane are available for sealing around protuberances.

Accessory Products

- GP® DPC
- GP® Tape
- GP® Self Adhesive Membrane (SAM)
- GP® Primer
- GP® Top Hats and Preformed Corners
- GP® Protection Fleece
- GP® Void Vent (24/40mm)



GP® TITAN TAPE

GP® TITAN TAPE is an extruded butyl tape designed for jointing GP® TITANTECH® barriers and structural waterproofing barriers. The GP® TITAN TAPE is double sided, with release film on both sides to assist with ease of installation. GP® TITAN TAPE is designed to prevent the passage of water, water vapour, air and gas, for use in building construction with waterproof membranes, vapour control layers and ground gas barriers.

Thickness	1.5 mm
Width	100 mm
Length	15 m

TITANTECH®

For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

GP® TITAN TAPE has excellent adhesion to all JUTA membranes, and a wide range of substrates. The flexible composition of the GP® TITAN TAPE makes it highly conformable to irregular surfaces, and it is easy and accurate to use with little to no waste. GP® TITAN TAPE has unrivalled levels of adhesion and is designed to remain flexible throughout the service life.

Application

Application temperature range is +5 to +40°C. Prior to application, all surfaces should be clean, dry and free from frost, grease and loose detritus materials. Apply direct from the reel onto the surface and press along the whole application length to achieve optimal adhesion. Remove the backing paper and offer the opposite surface to the GP® TITAN TAPE and press firmly to seal the joints. JUTA recommends the use of a silicon roller for optimal pressure application to taped joints.





Feature	Characteristics	Test Method	GP® TITAN TAPE
Physical Properties	Thickness	EN 1849-2	1.5 mm
	Width	EN 1849-2	100 mm
	Length	EN 1849-2	15 m
	Packaging	4 rolls/box (50 boxes/pallet)	
	Colour	Black	
Mechanical Properties	Dynamic Tensile Adhesion	Modified PSTC	19 N/cm ²
	Dynamic Shear Adhesion	Modified PSTC	13 N/cm ²
	T-Peel Adhesion to PE Membrane	Modified PSTC	12 N/cm
	Specific Gravity	EN ISO 10563	1.6 g/cm ³
	Moisture Vapour Transmission Rate	EN ISO 15106	0.16 g/m ² /24hr/mm
	Water Tightness (200 kPa) PE Membrane Joint	EN 1928 (MOD)	PASS
	Service Temperature Range	-	-40 to +90 °C
	Radon Transmittance	SP 3873	1.7 x 10 ⁻⁸ m/s

JUTA UK

Please contact JUTA
UK Directly for more
information on GP®
TITAN TAPE

Storage

GP® TITAN TAPE has a shelf life of approximately 24 months when stored flat in original packaging in cool dry conditions.

Compatibility

GP® TAPE is compatible with our full range of waterproof and gas barriers, including:

- GP®1
- GP®2
- GP®H (SAM)
- GP® TITANFLEX®
- GP® Top Hats and Preformed Corners

PD1700

JUTA PD1700 include a high compressive strength Cusate High Density Polyethylene (HDPE) Drainage core with a geotextile filter geotextile bonded to one side. Protection Drainage (PD) 1700 is designed as a high flow medium to alleviate hydrostatic pressure on below ground structures, as well as providing protection to the underlying membrane (gas/waterproofing).

Thickness	8.0 mm
Width	2.0 m
Length	20 m
Weight	620 g/m ²

TITANTECH®

For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

Application

JUTA PD1700 is primarily used for external tanking applications, forming a high compressive strength void, providing a path of least resistance for water, which enables controlled drainage into outlets or connector pies. PD1700 can be used in combination with GP gas/waterproofing barriers to provide both protection and drainage for external tanking application, ensuring gas/waterproofing barrier remains intact and the system performs as intended.

Features and Benefits

Optimised for maximum strength and performance, providing high levels of flow. Complies with the latest codes of practice as published by BS, BRE and CIRIA, and certified to EN13252: Drainage systems. PD1700 is independently tested and verified by UKAS accredited bodies. As CSSW qualified manufacturer, JUTA has the right solutions, optimised for market demands.



Feature	Characteristics	Test Method	PD1700
Mechanical Properties	CBR Puncture Resistance	EN ISO 12236	1700 N
	Tensile Strength (MD/CMD)	EN ISO 10319	14 kN/m
	Tensile Elongation (MD/CMD)	EN ISO 10319	100%
	Compressive Strength	EN ISO 25619	140 kPa
Hydraulic Properties	Pore size (O_{90})	EN ISO 12956	90 μ m
	Permeability (H_{50})	EN ISO 11058	79 l/m ² /s
	In plane water flow	EN ISO 12958	1.83 l/s/m width i = 1.0 @ 20 kPa
	(Hard/soft) platens		1.69 l/s/m width i = 1.0 @ 100 kPa
	(To simulate soil action)		1.53 l/s/m width i = 1.0 @ 200 kPa
	(i) Hydraulic gradient		0.49 l/s/m width i = 0.1 @ 20 kPa
	(i) = 1 simulates vertical application		0.45 l/s/m width i = 0.1 @ 100 kPa
	(i) = 0.1 simulates slope application		0.45 l/s/m width i = 0.1 @ 200 kPa
Physical Properties	Mass per unit area	EN ISO 9864	620 g/m ²
	Thickness	EN ISO 9863-1	8.00 mm
Material Dimensions	Roll Width		2.00 m
	Roll Length		20 m
	Gross roll weight		30 kg

JUTA UK

Please contact JUTA
UK Directly for more
information on PD1700

Installation

PD1700 should be installed with the geotextile facing the soil/backfill, and the direction of water flow. Rolls can be cut to size on site. PD1700 can be held in place prior to backfilling with DS Butyl tape (50 mm wide), or mechanically fixed in the absence of a gas/waterproofing barrier.

Adjacent rolls can be overlapped using the geotextile, secured with DS Butyl tape (50mm). Roll ends can be connected by simply butting the cusped sheet together.

Connection to land drains/collection pipes is achieved by placement within the slotted areas, or removal of the cusped core and wrapping of geotextile around the pipe. Care must be taken not to damage/cut the geotextile during core removal to facilitate the connection.

Backfilling should proceed with caution to avoid undue stress on the PD1700. Compactive effort should be avoided within the first 100mm of the PD1700.

JUTA UK

Please contact JUTA
UK Directly for more
information on PD1700

Handling

Roll weights can be up to 35kg and hence appropriate equipment is required for unloading and handling.

Storage

PD1700 is supplied in packaging designed to protect the product from damage during handling and storage, and degradation as a result of UV exposure. PD1700 should be kept in the supplied packaging until such time as it is required for installation, and then covered within 2 weeks of installation.



geoNETEX A PP

JUTA geoNETEX A PP (300 TT) is a nonwoven geotextile manufactured from UV stabilised, high tenacity, virgin polypropylene fibres that have been mechanically entangled to provide high strength, high extensibility, high loft and excellent abrasion characteristics.

TITANTECH®

For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

Intended for use in separation, filtration and protection functions - JUTA UK's non-woven geotextile range is manufactured from high tenacity virgin polypropylene staple fibres, which have a high resistance to acids, alkalis and most solvents. Polypropylene can be considered as inert acid and alkali attack and is suitable for most geosynthetic applications.

Handling

Roll weights can be 200 kg and hence appropriate equipment is required for unloading and handling e.g. front-end loader, back hoe, forklift (pole truck) or crane.

Storage

Rolls of geotextile should be stored on stable/level ground and stacked not more than five rolls high, with no other material stacked on top. The rolls can be stored outdoors when packed, but should be protected from exposure to UV.

6 m Roll Dimensions	6 m x 100 m
6 m Roll Weight (600 m²)	200 kg
2 m Roll Dimensions	2 m x 100 m
2 m Roll Weight (200 m²)	60 kg



geoNETEX A PP

Feature	Characteristics	Test Method	geoNETEX A PP
Mechanical Properties	Static Puncture Strength (CBR)	BS EN ISO 12236	3.7 kN (- 10%)
	Mass per Unit Area	EN ISO 9864	300 g/m ² (- 20%)
	Thickness @ 2kPa	BS EN ISO 9863:1	1.25 mm (nominal)
	Push Through Displacement	BS EN ISO 12236	65 mm
	Tensile Strength (MD)	BS EN ISO 10319	24 kN/m (- 10%)
	Tensile Strength (CMD)	BS EN ISO 10319	24 kN/m (- 10%)
	Tensile Elongation (MD)	BS EN ISO 10319	65% (± 20%)
	Tensile Elongation (CMD)	BS EN ISO 10319	75 % (± 20%)
	Dynamic Perforation Test	BS EN ISO 13433	15 mm (+ 3)
Hydraulic Test Data	Apparent Pore Size 90% Finer (O ₉₀)	EN ISO 12956	80 µm (± 20)
	Water Flow	BS EN ISO 11058	60 l/s/m ² (- 15)
Durability Data	Resistance to Weathering (UV)	EN 12224	> 90%
	Resistance to Oxidization (100 years)	EN 12226	> 90%
	Microbiological Resistance	EN 12225	No Loss
	Resistance to Liquids	EN 14030	No Loss
Physical Property Data	Roll Dimensions		6.0 m x 100 m 2.0 m x 100 m
	Approximate Roll Weight	For handling guidance	200 kg (600 m ²) 60 kg (200 m ²)
	Fibre Type	High tenacity virgin polypropylene staple fibre with UV inhibitor.	
	Needle Detection	The product is electronically and manually inspected during manufacture.	

JUTA UK

For additional
information or
assistance, please
contact JUTA UK
directly.



GP® SEALANT

GP® SEALANT is a novel low modulus expansion joint sealant and adhesive, especially formulated to ensure bubble free cure event at very high temperature and humidity climatic conditions. The product displays excellent thixotropy allowing its use even in very large voids.

Weight	1.45 gr/cm ³
Cure Rate	2.0 - 3.0 mm/day
Adhesion to Concrete	> 20 kg/cm ² > 2 N/mm ²
CE Certified	EN 15651-1

TITANTECH®

For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

It cures by reaction with atmospheric humidity to produce a joint sealant with a 50% joint movement accommodation factor and excellent adhesion on substrates traditionally problematic for PU Sealants, e.g. glass, aluminium, steel, polycarbonate, etc. The extrusion rate and tooling of the sealant remain the same throughout a very wide range of temperature and humidity conditions.

GP® SEALANT is CE certified according to EN 15651-1, and specifically designed for sealing GP® Membranes reinforcement bar (RE-BAR) penetrations, and complex detailing areas such as fillet, tight corner transitions, terminations to concrete panels, facades, metal frames glass and granite materials. GP® SEALANT exhibits excellent chemical resistance and provides a gas/air tight seal when used in accordance with the instructions provided.





Feature	Characteristics	Test Method	GP® SEALANT
Mechanical Properties	Reaction to Fire	EN ISO 11925-2	CLASS E
	Elastic Recovery (%)	EN ISO 7389	> 70%
	Resistance to Flow (mm)	EN ISO 7390	≤ 3 mm
	Tensile Properties - Secant Modulus @23°C	EN ISO 8339	≤ 0.4 MPa
	Tensile Properties - Secant Modulus @30°C	EN ISO 8339	≤ 0.4 MPa
	Loss of Mass/Volume	EN ISO 10563	≤ 10%
	Specific Weight	ASTM D1475 / DIN53217 / ISO 2811, @20°C	1.45 gr/cm³
	Tack Free Time, @77°F (25°C) & 55% RH		2.5 - 3.5 hours
	Cure Rate		2.0 - 3.0 mm/day
	Service Temperature		-40 to 80°C
	Hardness	ASTM D2240 / DIN 53505 / ISO R868	± 27 Shore A
	Modulus at 100% Elongation	ASTM D412 / EN-ISO-527-3	0.3 N/mm²
	Elongation	ASTM D412 / EN-ISO-527-3	> 700°C
	QUV Accelerated Weathering Test (4hr UV, at 600C (UVB Lamps) & 4hr COND at 500C)	ASTM G53	Passed (> 2000 hrs)
	Thermal Resistance (100 days, 80°C)	EOTA TR011	Passed
	Toxicity		No restrictions after full cure
	Resilience	DIN 52458	> 90%
	Hydrolysis (8% KOH, 15 days @ 50°C)		No elastomeric property change
	HCl (PH=2, 10 days at RT)		No elastomeric property change
	Hydrolysis (H₂O, 30 days cycle 60-100°C)		No elastomeric property change
	Adhesion to Concrete	ASTM D4541	> 20 kg/cm² > 2 N/mm²
	Methane Transmission (1.0mm)	ISO 15105-1	< 42.4 ml/m²/day/atm
	Carbon Dioxide Transmission (1.0mm)	ISO 15105-1	< 221 ml/m²/day/atm
Compliance and Certification	CE Certified - EN165651-1		

JUTA UK

For additional information or assistance, please contact JUTA UK directly.

Application

Slide the sealant into the applicator gun, cut off the very end of the sealant packaging and fit gun with the nozzle that has been cut to deliver the right bead size (min 5 mm). Extrude the sealant into the joint, or around the RE-BAR penetration ensuring that no air is trapped in the joint. Tooling is recommended immediately after the application of sealant. The ratio width to depth should be 2:1 subject to a minimum depth of 10 mm.

Packaging

600CC sausage, 15 sausages per box - applicator gun provided.
12 month shelf life. Use once opened.



GP[®]1 SAM

GP[®]1 SAM, gas protection self adhesive membrane, is a bituminous gas proof and water proof sheet, composed of self-adhesive SBS polymer modified bitumen incorporating GP[®]1 with an upper surface finish of black reinforced LDPE, and a lower surface finish of siliconized release film. GP[®]1 SAM is used for the gas/waterproofing of underground structures where harmful ground gasses are anticipated, and as a self adhesive accessory to GP[®]1.

Thickness	1.2 mm
Width	0.9 m or 0.3 m
Length	20 m
Weight	1100 g/m ²

TITANTECH[®]

For developers of brownfield and contaminated sites the TITANTECH[®] family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

Handling

Roll weights can be in excess of 20 kg (approx 33 kg/roll) and hence appropriate care and equipment is required for unloading and handling. This product is non-toxic nor flammable.

Storage

Rolls of GP[®]1 SAM should be stored on in a cool, dry place, and be protected from exposure to rain, sun, heat and cold temperatures prior to installation. Exposure to sunlight for extended period of time could cause difficulty with removal of the release film.





Feature	Characteristics	Test Method	GP [®] 1 SAM
Physical Properties	Thickness	EN 1849-2	1.2 mm
	Width	EN 1849-2	0.9 or 0.3 m
	Length	EN 1849-2	20 m
	Weight	EN 1849-2	1100 g/m ²
Hydraulic Press	Water Tightness	EN 1928	Pass
	Water Vapour Transmission	EN 1931	0.013 g/m ² /day
Mechanical Properties	Tensile Strength (MD/CMD)	EN 12311-2 (A)	500 N/50mm
	Elongation (MD/CMD)	EN 12311-2 (A)	> 12 %
	Resistance to Static Load	EN 12370	20 kg
	Joint Strength	EN 12317-2	> 30 N
	Durability and Water Tightness (Ageing and Chemicals) 60 kPa	EN 1847	Pass
	Resistance to Nail Tear (MD/CMD)	EN 12310-1	> 300 N
	Resistance to Fire	EN 13501	F Euro Class
Gas Permeability	Methane Permeability	EN ISO 15105-1	< 0.68 ml/m ² /day/atm
	Carbon Dioxide Permeability	EN ISO 15105-1	< 2.81 ml/m ² /day/atm
	Radon Permeability	K124/02/95	8.0 x 10 ⁻¹⁵ m ² /S
Compliance and Certification	CE Mark - EN13967:2012 + A1:2017 Type (A/T)		
	BS 8485:2015 Compliant (Methane and Carbon Dioxide Barrier)		

JUTA UK

Please contact JUTA UK Directly for more information on GP[®]1 SAM

Installation

GP[®]1 SAM should be installed in accordance with the product installation guidelines, and in accordance with BS 8485:2015, and/or BS 8102:2009.

It is recommended that GP[®]1 SAM is not applied in temperatures below 10°C, in colder weather the material can be warmed slightly to aid adhesion.

Accessory Products

- GP[®] Primer
- GP[®] Protection Board
- GP[®] Protection Fleece

GROUND GAS PROTECTION

GP® CRYSTALLINE ACTIVE
BARRIER FLEX 2C
TECHNICAL DATA
SHEET



TITANTECH®



GP®
CAB
FLEX 2C

Two component cementitious/polymer sealing slurry -
(Fast drying, hydrophobic, waterproof).

GP® Crystalline Active Barrier (CAB) Flex 2C is a two component, fast drying grey waterproofing coating system. The A component is a cement-based powder and B component is a liquid polymer. Due to the polymer the coating system is semi flexible. CAB Flex 2C migrates into the substrate and seals the pores of the substrate to achieve excellent bonding to the surface. It is shrinkage compensated and has quick strength development. CAB Flex 2C also has very good abrasion resistance on the substrate.

Features

- Dry mortar
- EN 1504-3 – Class 3 repair mortar barrier
- Watertight against pressurized water (50 bar, depend on surface)
- Frost resistant
- High compressive strength
- Capillary blocking
- Low consumption
- Easy application
- Sprayable
- Suitable as Pile head/Cap sealing

Colour

Grey

Delivery Form

33 kg units
(25 kg comp. A
+ 8 kg comp. B)

Accordance

EN 1504-3 -
Class 3 repair
mortar barrier

TITANTECH®

For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.



**GROUND GAS
PROTECTION**

GP® CRYSTALLINE ACTIVE
BARRIER FLEX 2C
TECHNICAL DATA
SHEET



GP®
CAB
FLEX 2C

Feature	Characteristics	GP® Crystalline Active Barrier (CAB) Flex 2C
Physical Properties	Base component A	Cement, quartz sand, additives
	Base component B	Rubber dispersion, additives
	Colour	Grey
	Processing temperature	+ 5°C up to + 35°C
	Bulk density component A	Approx. 1.6 g/cm³
	Density component B	Approx. 1,01 g/ml Page 2
Properties	Water vapour diffusion resistance factor μ	Approx. 65
	Trafficable	After approx. 4-6 hours
	Loadable	After approx. 3 days
	Applicable	Approx. 45 minutes at 20°C/50% rel. h.
	Curing time	After approx. 48 hours
	Complete curing	After 28 days
	Shrinkage	<0.02%
	Consumption	2.0mm approx. 3 - 3.5 kg/m²
		2.5mm approx. 3.5 - 5 kg/m²
	Minimum thickness	Approx. 2 mm where no pressurised water
		Approx. 2.5 mm where anticipating pressurised water
	Compressive strength	Class R3 (>25 MPa)
	Chloride ion content	< 0.05 %
	Adhesive bond	> 1.0 MPa
	Elastic modulus	> 10 GPa
	Capillary absorption	$\leq 0.5 \text{ kg/m}^2 \times h \text{ 0.5}$
	Reaction to fire	Class A1

JUTA UK

For additional
information or
assistance, please
contact JUTA UK
directly.

Application areas

CAB Flex 2C is used for reliable and permanent waterproofing against pressurised water on positive side (outside) as well as on negative side (inside) of buildings. CAB Flex 2C can be used on vertical and on horizontal surfaces to be waterproofed. It is applicable on nearly all mineral sufficiently solid surfaces with an ideal strength of >1.5 N/mm². Typical application areas are basements, concrete elements, car parking, tunnels, water tanks, wet rooms, or manholes. CAB Flex 2C is also usable as waterproofing under walls, and across pile heads/caps against rising dampness.

Delivery form

33 kg units (25 kg comp. A + 8 kg comp. B).

Storage

6 months (frost-free and dry, +5°C up to +25°C in original packaging).

GROUND GAS PROTECTION

GP® CRYSTALLINE ACTIVE
BARRIER FLEX 2C
TECHNICAL DATA
SHEET



GP® CAB FLEX 2C

Application - Surface preparation

The surface must be dry or slightly damp, sound, absorbent and clean. Bonding inhibiting agents such as grease, oil, formwork oil and all loose particles and dust must be removed before application of CAB Flex 2C. Damaged area like cracks, holes or cavities must be reprofiled. Cavities or surface damages >5mm must be reprofiled. The pores of substrate must be open, so CAB Flex 2C can penetrate. Dusty or salt damaged surface must be treated with Deep Primer prior application of the slurry so the substrate is re-solidified and salts are transferred from soluble to insoluble and during curing time of the slurry no salts can penetrate into the CAB Flex 2C during curing.

JUTA UK

For additional
information or
assistance, please
contact JUTA UK
directly.

Application - Negative/ Positive side waterproofing

CAB Flex 2C must be mixed with using of a slow speed mixer in the designed mixing ration (25 kg by 8 kg). Put component B (please shake it before using) in a mixer (or container provided) and add the whole bag of sealing slurry (component A), mix it until a lump-free compound is attained. After mixing wait 1 minute and mix again. The application on the surface must be done with a hard brush or spraying device. The coating in principle is done by minimum 2 layers, whereby the minimum thickness has to be observed. The first layer must not be completely cured before the second layer is applied or the surface has to be pre-wetted.

The whole system has to be secured against over fast drying (wind, sun etc.), frost and rain. At negative side waterproofing the rel. air humidity should not be higher than 65%. CAB Flex 2C can be covered with coating for water vapor diffusion or plasters.

Recommended tools.

- Hard brush
- Roller
- Gloves
- Safety glasses
- Mixer
- Spraying device



GP®5

GP®5 gas barrier is a multi-layer composite of virgin polyethylene (PE) giving exceptional resistance to the passage of ground gas and organic vapours. It also acts as a high performance DPM.

Thickness	0.4 mm
Width	Various m
Length	Various m
Weight	400 g/m ²

TITANTECH®

For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

GP®5 is suitable for the following applications:

- Carbon dioxide and methane affected sites in accordance with BS 8485:2015 + A1:2019 & NHBC
- Radon affected sites in accordance with BRE211:2015
- Damp protection in accordance with Building Regulations Part C
- Low level VOC contaminated sites (site specific assessment required)

Handling

Roll weights can be in excess of 20kg and hence appropriate care and equipment is required for unloading and handling.

Installation

GP®5 should be installed in accordance with the product installation guidelines, and in accordance with BS 8485:2015.





Feature	Characteristics	Test Method	GP [®] 5
Physical Properties	Thickness	EN 1849-2	0.4 mm
	Width	EN 1849-2	Various m
	Length	EN 1849-2	Various m
	Weight	EN 1849-2	400 g/m ²
Hydraulic Press	Resistance to Water Penetration	EN 1928 (A)	Pass
Mechanical Properties	Resistance to Static Load	EN 12730	> 20 kg
	Tensile Strength (MD)	EN 12311-2 (A)	> 300 N/50mm
	Tensile Strength (CMD)	EN 12311-2 (A)	> 300 N/50mm
	Resistance to Tearing (Nail Shank) MD	EN 12310-1	> 230 N
	Resistance to Tearing (Nail Shank) CMD	EN 12310-1	> 230 N
	Impact Resistance	EN 12691-B	500 mm
	Puncture Resistance	ASTM D 4833	> 160 N
	Puncture Resistance	EN 12236	1.60 kN
	Reaction to Fire	EN 13501-1	E
Vapour Permeability	Methane Permeability	BS EN ISO 15105-1	0.12 ml/m ² /day/atm
	Carbon Dioxide Permeability	BS EN ISO 15105-1	1.53 ml/m ² /day/atm
	Hydrogen Permeability	BS EN ISO 15105-1	68.7 ml/m ² /day/atm
	Benzene Permeability	BS EN ISO 15105-2	0.41 ml/m ² /day
	Oxygen Permeability	BS EN ISO 15105-2	<3 ml/m ² /day
	Radon Permeability	K124/02/95	1.0 x 10 ⁻¹² m ² /s
Fuel Vapour Permeability	Petrol	BS EN ISO 15105-2	(ave.) 3.4 x 10 ⁻¹³ /mol/(m ² .s.Pa)
	Diesel	BS EN ISO 15105-2	(ave.) 3.4 x 10 ⁻¹³ /mol/(m ² .s.Pa)
Durability	Durability Watertightness After Artificial Ageing	EN 1928	Pass
	Durability Watertightness Against Chemicals	EN 1928	Pass
Compliance and Certification	CE Mark - EN 13967:2012		
	NHBC Standards Compliant		
	BS 8485:2015 + A1 2019 Accordant		

JUTA UK

Please contact JUTA UK Directly for more information on GP[®]5

Storage

Rolls of GP[®]5 should be stored on stable/level ground and stacked not more than five rolls high, with no other material stacked on top. The rolls can be stored outdoors when packaged, but should be protected from exposure to UV.



JUTA UK

Please contact JUTA
UK Directly for more
information on GP[®]5

Jointing and Sealing

It is recommended GP[®]5 can be heat welded where possible, with welding carried out by competent personnel with suitable qualifications in accordance with best practice, and guidance contained within BS 8485:2015. GP[®]5 should be overlapped by at least 100mm. If taping joints, only suitable tape must be used, ensuring application with a silicone roller to remove trapped air. JUTA pre-formed details, or self adhesive gas membrane are available for sealing around protuberances.

Accessory Products

- GP[®] DPC
- GP[®] Tape
- GP[®] Self Adhesive Membrane (SAM)
- GP[®] Primer
- GP[®] Top Hats and Preformed Corners
- GP[®] Protection Fleece
- GP[®] Void Vent (24/40mm)



GP® LIQUID BARRIER

GP® LIQUID BARRIER is a multi-use synthetic rubber-based gas-proofing and waterproofing system. It can be specified as a liquid gas proof barrier, a damp/waterproof membrane or both dependent on the project requirement. The product is an elastic, UV-resistant, single component system supplied in red.

TITANTECH®

For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

GP® LIQUID BARRIER is a water-based non-hazardous product, safe and easy to apply direct from the packaging using a roller, brush or airless spray. The product can be applied to dry or damp substrates and dries in approximately one hour to form a tough semi-gloss finish.

Features

- Rapid drying
- Methane and Carbon Dioxide barrier
- Dual-use Damp/Waterproof and gas barrier
- Damp surface tolerant
- Non-toxic
- Excellent bonding strength to common construction substrates
- Good crack-bridging properties
- Resistant to weak mineral acids
- Good Alkali and brine solution resistance

Density	1.5-1.6 g/cm ³ at 20°C
Form Supplied	Viscous Liquid
Pack Size	8 kg / 15 kg (Bespoke sizes available on request)
Colour	Red

Named accessory in



Certifications





Feature	Characteristics	Test Method	GP® LIQUID BARRIER
Physical Properties	Density		1.5-1.6 g/cm³ at 20°C
	Form Supplied		Viscous Liquid
	Pack Size		8 kg / 15 kg (Bespoke sizes available on request)
	Colour		Red
	Shelf Life		18 months (unopened)
	Odour		Latex (Vanilla)
	Drying Time		1 hour at 20°C
Permeability*	Water Vapour Permeability		< 0.5 g/m²/day
	Methane Permeability	EN ISO 15105-1	< 28.8 ml/m²/day/atm
	Carbon Dioxide permeability	EN ISO 15105-1	< 267 ml/m²/day/atm
	Radon Permeability	K124/02/95	< 9.5 x 10 ⁻¹² m²/s
Hydraulic Properties	Water Tightness (60 kPa)	EN 1928	PASS (Watertight at 0.6mm thick)
Properties	Adhesion to concrete		> 1.1 N/mm²
	Static Crack Bridging Ability	BS EN 1062-7 - A	CLASS A5 (> 2.5mm)
	Dynamic Crack Bridging Ability	BS EN 1062-7 - B4.2	No failure - 0.5mm - 20,000 cycles
	Chemical Resistance	BS EN 13529:2003	Resistant to a range of chemicals
	Elongation	ASTM D2370	> 100%
	Dry Film Thickness (DFT)		600 - 1000 µm (2-coats) 600µm - Brush/roller application 1000µm - Airless spray application

*Permeability values based on min. 0.6mm thick.

JUTA UK

For additional information or assistance, please contact JUTA UK directly.

Uses

- Methane, Carbon Dioxide and hydrocarbon vapour suppression
- Seamless liquid-based gas proofing solution
- Waterproofing and gas suppression at ground floor level, basements and subterranean structures
- Tanking applications, retaining walls etc.
- Bunding applications (please verify chemical resistance prior to specification)
- Can be applied under tiled areas for secondary protection in wet areas
- Repairs of floor surfaces; can be applied as a base coat on a damaged surface before application of a self-levelling thin section screed (compatible with latex or cementitious)
- Concrete roof protection
- Silage and sewage tank lining
- Barrier to water vapour for brickwork, blockwork and stonework



JUTA UK

For additional
information or
assistance, please
contact JUTA UK
directly.

Application

All surfaces should be smooth, clean, dry, sound and free from frost, oil, grease, condensation and other contamination. Remove any organic growth with a fungicidal wash as may be necessary.

Non-structural cracks, less than 0.5mm, must be filled. Structural cracks must be first repaired and filled. Fill holes and re-point flush to the finish using a cementitious repair mortar.

Newly laid concrete should have a clean textured surface, internal angles should be filleted with a 45° fillet using a suitable cementitious mortar. For expansion joints, ensure that the product is applied well into the rebate before the expansion media is applied. Other gas membranes must be exposed and lapped with where present.

The minimum ambient temperature for application is 5°C, it is not recommended to apply the product at temperatures below this as specified drying times will not be achieved.

No priming is necessary with this product. To assure that the product fully wets out the substrate the surface may be dampened. There should not be any standing water or soaking.

Product is recommended to be brush, roller or airless spray applied, avoid pouring directly onto a horizontal surface. This may cause puddling during application and increase drying time. Stir the product well for 2 minutes before use.

Should the product require thinning, it is recommended to thin 5% by volume of water initially and evaluate the resulting viscosity. The product should not need to be thinned in normal conditions of storage and use.

Coverage

For a dry film thickness of 0.6mm then apply at 0.85kg/m² per coat (1.7kg/m² per 2-coat system). For the application of a dry film thickness of >0.3mm in a single coat it is recommended that the membrane is applied by airless spray. Using airless spray, a single application dry coat thickness up to 1mm may be attained.

The product can be applied as a single coat in certain applications but two coats is universally recommended. Recommended coating thickness is 300µm (0.3mm) per coat and 600µm (0.6mm) for the overall membrane thickness for best performance. Thicker applied coatings will require greater drying time. Performance is improved where the second coat is applied at right angles to the first but it is not essential to do so. Leave 90-120 minutes before overcoating with the second coat, a touch dry test on the first coat will indicate readiness. It is recommended that the second coat is applied within 24 hours of the first coat. Full cure of the membrane is 48 hours after the second coat application.



JUTA UK

For additional
information or
assistance, please
contact JUTA UK
directly.

Concrete Roofing Applications

Blistering may occur if application is not undertaken as recommended. Blistering results from heat from the sun causing a vapour pressure build below the membrane. This is more likely to occur if the concrete surface is wet so it is recommended for this particular application that the substrate is dry. Ensuring a good bond to the substrate is essential; vigorously brush the first coat into the concrete using a stiff bristled broom. So far as possible avoid application of the membrane on a day with strong, direct sunlight (overcast but dry is ideal). To enhance bonding it may be necessary to prime the roof with a slurry of screeding latex and cement if the original surface condition is poor.

Considerations

It is always advisable to check product compatibility and adhesion by testing on a sample area before starting any sizeable project.

Do not apply if rain is forecast before product can fully dry.

Exercise caution on coating thickness, exceeding recommended coverage rates increases probability of cracking and splitting.

Do not apply this product over bituminous surfaces.

Spray: For further application information please consult the Technical Department.

For cleaning tools use water immediately after use.

Regulatory

All components are REACH (Reg. (EC) No 1907/2006) registered. The product does not contain any Substances of Very High Concern (SVHC).

When designing Type A structures (as classified in BS 8102: 2009), the product, applied correctly, is capable of providing the levels of protection required for Grades 1, 2 & 3 basements.

Toxicity and Safety

Product is not classified as hazardous according to the CLP Regulation (Reg. (EC) No 1272/2008). Refer to the Product Safety Data Sheet for specific information.

Handling and Storage

Store in cool, dry conditions in the original manufacturer packaging. The product has a 18-month shelf life provided the container is unopened. If opened the product should be used within 1 month and sealed air-tight between uses. Longer storage times may result in fillers falling to the base of the container, rigorous and thorough stirring is recommended prior to application.

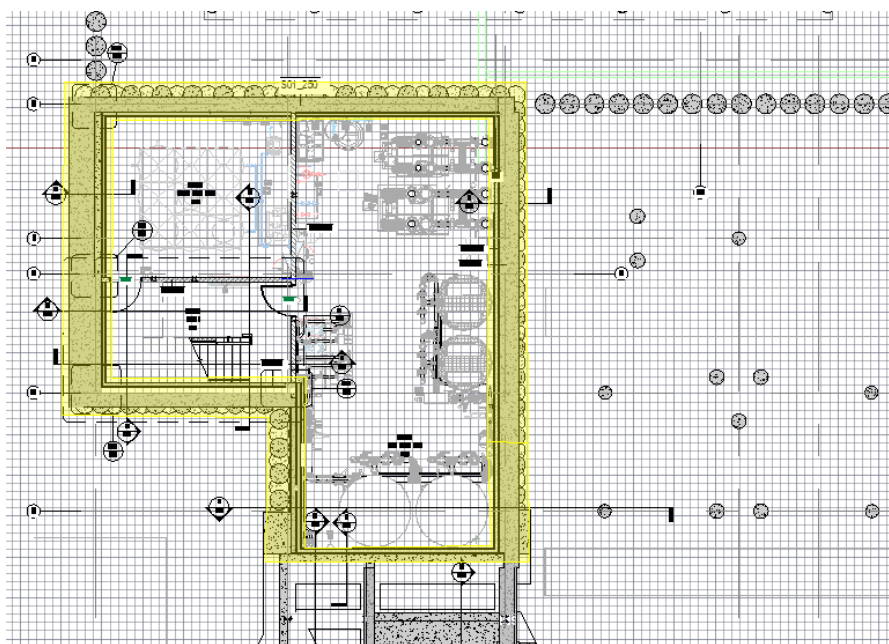
Appendix C

GAS PROTECTION MEASURES VERIFICATION VISUAL INSPECTION RECORD



Site Name:	Radcliffe Civic Hub	Gas Characteristic Situation:	Basic Radon Only
Job Number:	5238	Type of development: (Residential/ commercial/ other)	Commercial
Date:	24/07/24	Building Description:	Multi-Use Civic Hub Including Basement Plant Rooms And Swimming Pools
Verification Engineer:	LM	Foundation Type: (suspended floor/ raft/ other)	Pile And Beam
Weather during inspection:	Warm, Dry, Sunny	Gas Protection Type: (passive/ active)	Passive Radon
Area/ Plot number(s):	Plant room ground floor/ basement substructure detailing		

The box below should be used to present a sketch plan of the building/plot layout, showing locations of all key features of the gas protection system and installation (vents, joins, seals, service penetrations etc). All relative inspection details/comments should be recorded in the table below.



Plant room ground floor/ basement Radon Protection substructure detailing – Area of Installation/ Inspection for given date highlighted Yellow

No.	Item	Comments (see notes)
1 - Passive Venting		
1.1	Sub-floor void	N/A
1.2	External wall airbricks	N/A
1.3	Internal sleeper walls	N/A
1.4	External vent trenches/ ducts	N/A
2 - Active Venting		
2.1	Active venting System details	N/A

No.	Item	Comments (see notes)
3 - Gas Membrane		
3.1	Condition of sub-grade and underside of membrane	<i>Generally acceptable, all concrete substructure surfaces coated with Juta CAB Flex prior to installation of any Radon protection products. Some wind-blown dust noted on surfaces post-installation – refer to comments in 3.5 below.</i>
3.2	Details of gas membrane product used	<i>Juta GP Liquid Barrier Juta GP-TitanFlex Juta TitanBond</i>
3.3	Gas membrane condition (rips/ tears/ penetrations)	<i>Generally very good. No punctures/rips or tears identified.</i>
3.4	Details of joining/ lapping tape products used	<i>Juta Titan Tape</i>
3.5	Lapping design	<i>Overlaps adequate.</i>
3.6	Laps, welds and joint seals	<i>Joints generally completed to a good standard. Visual and mechanical point stress testing identified small number of localised areas where Titan Tape had not adequately bonded to the liquid membrane due to dust. Contractor was advised and these were repaired.</i>
3.7	Service entry seals	<i>N/A</i>
4 – Other comments/ considerations		
4.1		
4.2		
5 - Photographs		
Photograph		Description
		<i>Photograph showing the radon protection measures installed for the plant room ground floor/ basement substructure. GP Liquid barrier (red) applied to all pile caps and substructure concrete as per design. GP Titan Flex membrane (black) and Titan Bond membrane (grey/black) bonded to GP Liquid barrier to allow adequate lapping up shuttering ahead of next phase of concrete pour.</i>
		<i>Photograph showing the radon protection measures installed for the plant room ground floor/ basement substructure. GP Liquid barrier (red) applied to all pile caps and substructure concrete as per design. GP Titan Flex membrane (black) and Titan Bond membrane (grey/black) bonded to GP Liquid barrier to allow adequate lapping up shuttering ahead of next phase of concrete pour.</i>

	Photograph showing the radon protection measures installed for the plant room ground floor/ basement substructure. GP Liquid barrier (red) applied to all pile caps and substructure concrete as per design. GP Titan Flex membrane (black) and Titian Bond membrane (grey/black) bonded to GP Liquid barrier to allow adequate lapping up shuttering ahead of next phase of concrete pour.
	Photograph showing the radon protection measures installed for the plant room basement substructure. GP Liquid barrier (red) applied to all pile caps and substructure concrete as per design.
	Photograph showing the radon protection measures installed for the plant room basement substructure. GP Liquid barrier (red) applied to all pile caps, steelwork protrusions and substructure concrete as per design.
	Photograph showing the radon protection measures installed for the plant room ground floor/ basement substructure. GP Liquid barrier (red) applied to all pile caps and substructure concrete as per design. GP Titan Flex membrane (black) and Titian Bond membrane (grey/black) bonded to GP Liquid barrier to allow adequate lapping up shuttering ahead of next phase of concrete pour.
	Photograph showing the radon protection measures installed for the plant room ground floor/ basement substructure. GP Titan Flex membrane (black) and Titian Bond membrane (grey/black) bonded to GP Liquid barrier at substructure step-down.

	Photograph showing the radon protection measures installed for the plant room ground floor/ basement substructure. GP Titan Flex membrane (black) and Titian Bond membrane (grey/black) bonded to GP Liquid barrier at substructure step-down.
	Photograph showing the radon protection measures installed for the plant room ground floor/ basement substructure. GP Titan Flex membrane (black) bonded to GP Liquid barrier with neat detailing around 90° corner.
	Photograph showing localised minor failure in jointing – TitanTape had failed to bond adequately due to a slight ripple in the membrane and a dusty surface. Contractor completed remedial work to correct and re-bond.
	Photograph showing localised minor failure in jointing – TitanTape had failed to bond adequately due to a slight ripple in the membrane and a dusty surface. Contractor completed remedial work to correct and re-bond.

REMEDIAL ACTIONS REQUIRED

N/A – all minor remedial actions completed

CERTIFICATION

The visual verification inspection was undertaken by a suitably competent IDG verification engineer, in accordance with the requirements of CIRIA C735 and the site-specific Gas Protection Measures Verification Plan.

The Gas Protection Measures for this section of work:	A) Are acceptable and comply with the specification. <i>Final Certification of this section of work is subject to successful Air Lance Integrity Testing to demonstrate compliance.</i>	
	B) Are acceptable and comply with the specification. <i>Air Lance Integrity Testing is not required for this section of work.</i>	✓
	C) Are acceptable but attention is drawn to issues relating to item(s) No.	
	D) Are not acceptable due to issues requiring remedial action as indicated above. <i>This section of work should be re-inspected and verified upon completion of any required remedial works.</i>	
NAME	SIGNATURE	DATE
LIAM MURPHY		02/08/24

Inspection Checklist Notes:

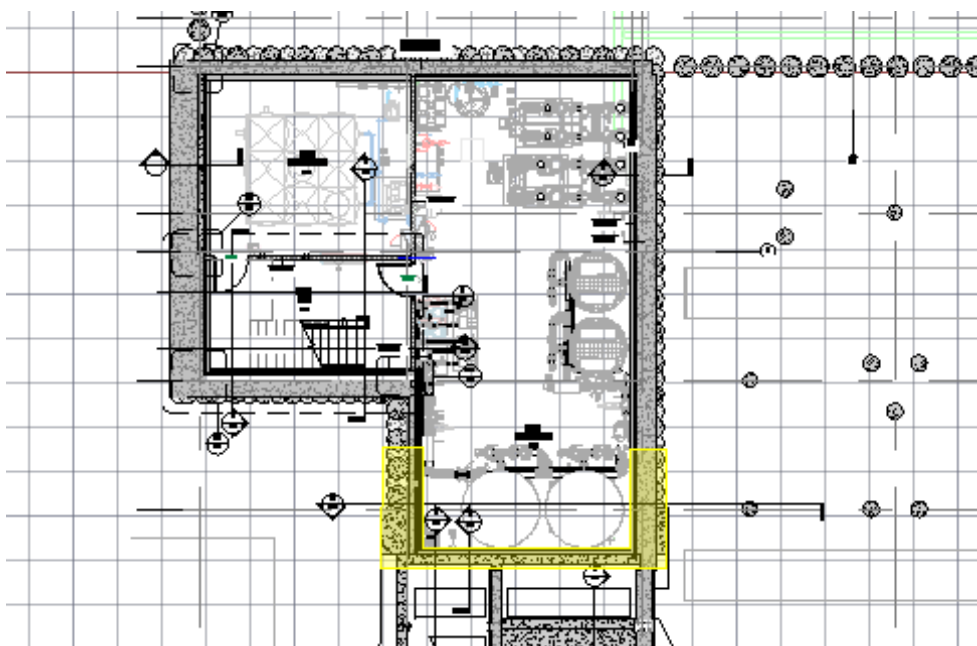
1.1	Sub-floor void	Is a check possible? Void former? Gravel (type/ specification)? Height of void space? Is it clear?
1.2	External wall airbricks	Numbers, size, positions as per design drawing?
1.3	Internal sleeper walls	Ventilation holes (honeycomb brickwork/ pipe crossings)? Size, spacing, location in accordance with design?
1.4	External vent trenches/ ducts	Located/ construction in accordance with design? If open-topped – gravel type, presence of fines? If pipe or other vent, check position and construction for functionality and absence of blockages. Ability of void former to withstand bearing of superstructure?
2.1	System details	Type of air supply: mechanical, natural, combined? Location/ condition/ number of fans and vents? Location and size of inlets? Provision of air-cleaning devices? Supply and exhaust ducting? Alarm provision/ installation? Gas monitoring system in under-floor void?
3.1	Condition of sub-grade and underside of membrane	Check that the sub-grade does not contain rough/uneven surfaces, is appropriately clean and that there are no hard/sharp objects. That protective sand blinding or geotextile (if specified) is present?
3.2	Details of gas membrane product used	Manufacturer and product specification, gauge, colour, brand/name, material, batch/ roll numbers, storage arrangements (to protect from dirt/damage).
3.3	Gas membrane condition (rips/ tears/ penetrations)	Open punctures, tears, rips, stretching? Excessive footprints/ evidence of traffic? Presence of debris? Repairs? Signs of weakness such as raised or sunken indentations? Protection plan in place to restrict access to lain gas membrane?
3.4	Details of joining/ lapping tape products used	Product type, brand, thickness, material, width, colour? Foil backed? Double sided?
3.5	Lapping design	Joints lapped and sealed in accordance with manufacturers requirements/ specification? Minimum overlap ensured? Sections taped twice (double sided and lapping)?
3.6	Laps, welds and joint seals	Welds complete? Appropriate jointing tape used? No creases or folds in sheet edges? Adequately bonded? (confirm by air lance integrity testing as necessary in accordance with the verification plan)
3.7	Service entry seals	Top hats seal arrangements fixed around service entries? Use of jubilee clips? Adequately taped to membrane at joins with double-sided and lapping tape?

GAS PROTECTION MEASURES VERIFICATION VISUAL INSPECTION RECORD



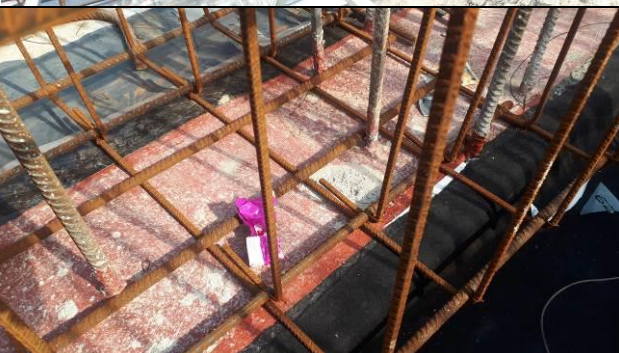
Site Name:	Radcliffe Civic Hub	Gas Characteristic Situation:	Basic Radon Only
Job Number:	5238	Type of development: (Residential/ commercial/ other)	Commercial
Date:	31/07/24	Building Description:	Multi-Use Civic Hub Including Basement Plant Rooms And Swimming Pools
Verification Engineer:	LM	Foundation Type: (suspended floor/ raft/ other)	Pile And Beam
Weather during inspection:	Warm, Dry, Sunny	Gas Protection Type: (passive/ active)	Passive Radon
Area/ Plot number(s):	Plant room ground floor/ basement substructure detailing		

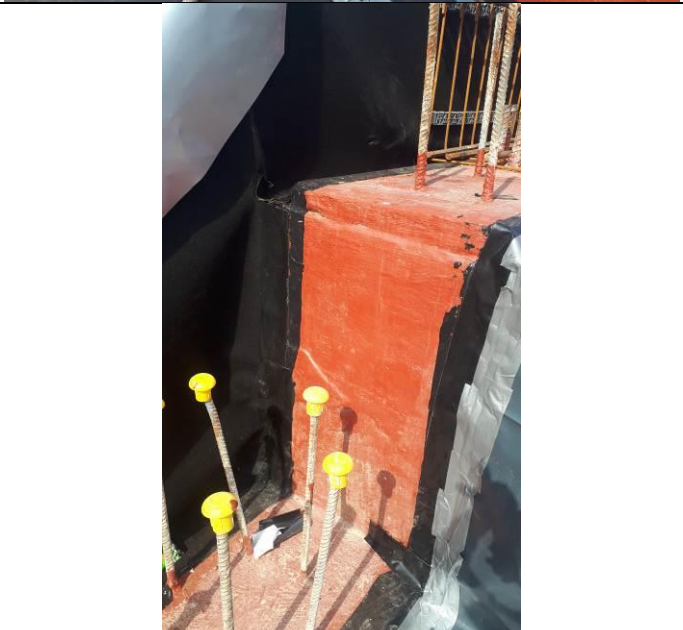
The box below should be used to present a sketch plan of the building/plot layout, showing locations of all key features of the gas protection system and installation (vents, joins, seals, service penetrations etc). All relative inspection details/comments should be recorded in the table below.



Plant room ground floor/ basement Radon Protection substructure detailing – Area of Installation/ Inspection for given date highlighted Yellow

No.	Item	Comments (see notes)
1 - Passive Venting		
1.1	Sub-floor void	N/A
1.2	External wall airbricks	N/A
1.3	Internal sleeper walls	N/A
1.4	External vent trenches/ ducts	N/A
2 - Active Venting		
2.1	Active venting System details	N/A

No.	Item	Comments (see notes)
3 - Gas Membrane		
3.1	Condition of sub-grade and underside of membrane	<i>Generally acceptable, all concrete substructure surfaces coated with Juta CAB Flex prior to installation of any Radon protection products.</i>
3.2	Details of gas membrane product used	<i>Juta GP Liquid Barrier Juta GP-TitanFlex Juta TitanBond</i>
3.3	Gas membrane condition (rips/ tears/ penetrations)	<i>Generally very good. No punctures/rips or tears identified.</i>
3.4	Details of joining/ lapping tape products used	<i>Juta Titan Tape</i>
3.5	Lapping design	<i>Overlaps adequate.</i>
3.6	Laps, welds and joint seals	<i>Joints completed to a good standard., with good adhesion of Titan Tape to Liquid Barrier</i>
3.7	Service entry seals	<i>N/A</i>
4 – Other comments/ considerations		
4.1		
4.2		
5 - Photographs		
Photograph		Description
		<i>Photograph showing the radon protection measures installed for the plant room basement substructure. GP Liquid barrier (red) applied to all pile caps and substructure concrete as per design. GP Titan Flex membrane (black) and Titan Bond membrane (grey/black) bonded to GP Liquid barrier to allow adequate lapping up shuttering ahead of next phase of concrete pour.</i>
		<i>Photograph showing the radon protection measures installed for the plant room basement substructure. GP Liquid barrier (red) applied to all pile caps and substructure concrete as per design. GP Titan Flex membrane (black) and Titan Bond membrane (grey/black) bonded to GP Liquid barrier to allow adequate lapping up shuttering ahead of next phase of concrete pour.</i>
		<i>Photograph showing the radon protection measures installed for the plant room basement substructure. GP Liquid barrier (red) applied to all pile caps and substructure concrete as per design. GP Titan Flex membrane (black) and Titan Bond membrane (grey/black) bonded to GP Liquid barrier to allow adequate lapping up shuttering ahead of next phase of concrete pour.</i>

	Photograph showing the radon protection measures installed for the plant room basement substructure. GP Liquid barrier (red) applied to all pile caps, steelwork protrusions and substructure concrete as per design.
	Photograph showing the radon protection measures installed for the plant room basement substructure. GP Liquid barrier (red) applied to all pile caps and substructure concrete as per design. GP Titan Flex membrane (black) and Titian Bond membrane (grey/black) bonded to GP Liquid barrier on face of concrete beam to allow continuity up to ground floor level ahead of GP5 Membrane being installed.
	Photograph showing the radon protection measures installed for the plant room basement substructure. GP Titan Flex membrane (black) and Titian Bond membrane (grey/black) bonded to GP Liquid barrier at substructure step-down.
	Photograph showing the radon protection measures installed for the plant room basement substructure. GP Titan Bond membrane (black) bonded to GP Liquid barrier with neat detailing around 90° corner.

REMEDIAL ACTIONS REQUIRED

N/A

CERTIFICATION

The visual verification inspection was undertaken by a suitably competent IDG verification engineer, in accordance with the requirements of CIRIA C735 and the site-specific Gas Protection Measures Verification Plan.

The Gas Protection Measures for this section of work:	A) Are acceptable and comply with the specification. <i>Final Certification of this section of work is subject to successful Air Lance Integrity Testing to demonstrate compliance.</i>	
	B) Are acceptable and comply with the specification. <i>Air Lance Integrity Testing is not required for this section of work.</i>	✓
	C) Are acceptable but attention is drawn to issues relating to item(s) No.	
	D) Are not acceptable due to issues requiring remedial action as indicated above. <i>This section of work should be re-inspected and verified upon completion of any required remedial works.</i>	
NAME	SIGNATURE	DATE
LIAM MURPHY		09/08/24

Inspection Checklist Notes:

1.1	Sub-floor void	Is a check possible? Void former? Gravel (type/ specification)? Height of void space? Is it clear?
1.2	External wall airbricks	Numbers, size, positions as per design drawing?
1.3	Internal sleeper walls	Ventilation holes (honeycomb brickwork/ pipe crossings)? Size, spacing, location in accordance with design?
1.4	External vent trenches/ ducts	Located/ construction in accordance with design? If open-topped – gravel type, presence of fines? If pipe or other vent, check position and construction for functionality and absence of blockages. Ability of void former to withstand bearing of superstructure?
2.1	System details	Type of air supply: mechanical, natural, combined? Location/ condition/ number of fans and vents? Location and size of inlets? Provision of air-cleaning devices? Supply and exhaust ducting? Alarm provision/ installation? Gas monitoring system in under-floor void?
3.1	Condition of sub-grade and underside of membrane	Check that the sub-grade does not contain rough/uneven surfaces, is appropriately clean and that there are no hard/sharp objects. That protective sand blinding or geotextile (if specified) is present?
3.2	Details of gas membrane product used	Manufacturer and product specification, gauge, colour, brand/name, material, batch/ roll numbers, storage arrangements (to protect from dirt/damage).
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3.7	Service entry seals	Top hats seal arrangements fixed around service entries? Use of jubilee clips? Adequately taped to membrane at joins with double-sided and lapping tape?