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Agrément Certificate

18/5581

Product Sheet 2

GP TITANTECH WATERPROOFING, GAS AND HYDROCARBON MEMBRANES

GP TITANTANK

This Agrément Certificate Product Sheet⁽¹⁾ relates to GP⁽²⁾ TITANTANK, a self-adhesive membrane comprising GP TITANFLEX⁽³⁾ with a self-adhesive polymer-modified bitumen compound. The product is for use as a damp-proof and waterproofing membrane in internally or externally applied tanking and to protect the building from the ingress of water vapour, radon, methane and carbon dioxide, hydrocarbons and volatile organic compounds (VOCs).

(1) Hereinafter referred to as 'Certificate'.

(2) GP is a registered trademark.

(3) GP TITANFLEX is the subject of Product Sheet 1 of this Certificate.

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.

KEY FACTORS ASSESSED

Resistance to water and water vapour — the product, including joints, will resist the passage of moisture into the interior of a building (see section 6).

Resistance to underground gases — the product is capable of restricting the ingress of radon, methane and carbon dioxide into a building (see section 7).

Resistance to chemicals — the product is chemically resistant when exposed to, and reduces the transmission of, VOCs (see section 8).

Resistance to mechanical damage — the product will accept the limited foot traffic and loads associated with installation and in service (see section 9).

Adhesion — the adhesion of the product to the substrate and to itself is satisfactory (see section 10).

Durability — under normal service conditions, the product will remain effective against the ingress of water and water vapour, and will restrict the ingress of radon, methane, carbon dioxide and VOC vapours for the lifetime of the structure in which it is incorporated (see section 12).

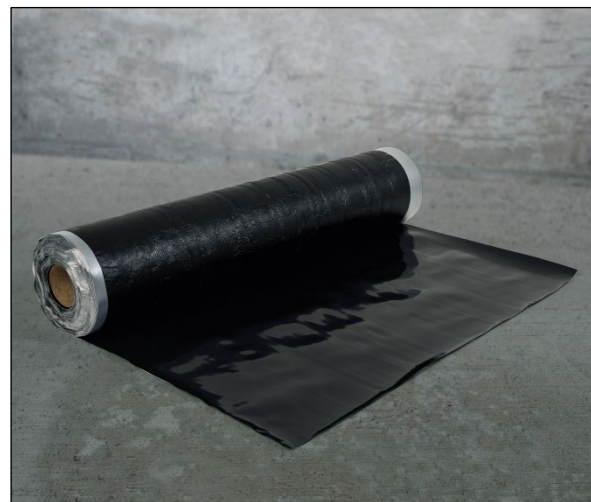
The BBA has awarded this Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of Second issue: 18 August 2022

Originally certificated on 23 October 2018.

Hardy Giesler
Chief Executive Officer



The BBA is a UKAS accredited certification body – Number 113.

The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk. Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

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Regulations

In the opinion of the BBA, GPTITANTANK, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	C1(2)	Site preparation and resistance to contaminants
Comment:		The product can contribute to satisfying this Requirement. See sections 7.1, 7.2 and 8.1 of this Certificate.
Requirement:	C2(a)	Resistance to moisture
Comment:		The product, including joints, will enable a structure to satisfy this Requirement. See section 6 of this Certificate.
Regulation:	7(1)	Materials and workmanship
Comment:		The product is acceptable. See section 12.1 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)	Durability, workmanship and fitness of materials
Comment:		The use of the product satisfies the requirements of this Regulation. See section 12.1 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	3.1	Site preparation – harmful and dangerous substances
Standard:	3.2	Site preparation – protection from radon gas
Comment:		When properly installed in a correctly designed structure, the product forms an effective barrier to the movement of radon, methane and carbon dioxide and VOC vapours within the ground-floor slab, enabling compliance with these Standards, with reference to clauses 3.1.2 ⁽¹⁾⁽²⁾ , 3.1.6 ⁽¹⁾⁽²⁾ and 3.2.2 ⁽¹⁾⁽²⁾ . See sections 7.1, 7.2 and 8.1 of this Certificate.
Standard:	3.4	Moisture from the ground
Comment:		The product, including joints, will enable a structure to satisfy the requirements of this Standard, with reference to clauses 3.4.2 ⁽¹⁾⁽²⁾ , 3.4.4 ⁽¹⁾⁽²⁾ 3.4.6 ⁽¹⁾⁽²⁾ . See section 6 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The product can contribute to meeting the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.
Regulation:	12	Building standards applicable to conversions
Comment:		Comments in relation to the product under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ .

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	23(1)(a)(i)	Fitness of materials and workmanship
Comment:	(iii)(b)(i)	The product is acceptable. See section 12.1 and the <i>Installation</i> part of this Certificate.
Regulation:	26(1)(b)(2)	Site preparation and resistance to contaminants
Comment:		The product can contribute to a construction satisfying the requirements of this Regulation. See sections 7.1, 7.2 and 8.1 of this Certificate.
Regulation:	28	Resistance to moisture and weather
Comment:		The product, including joints, will enable a structure to satisfy the requirement of this Regulation. See section 6 of this Certificate.

Construction (Design and Management) Regulations 2015

Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See section: 3 *Delivery and site handling* (3.1, 3.2 and 3.4 to 3.6) of this Certificate.

Additional Information

NHBC Standards 2022

In the opinion of the BBA, GP TITANTANK, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapters 4.1 *Land quality – managing ground conditions*, 5.1 *Substructure and ground bearing floors*, Clause 5.1.20 *Damp proofing concrete floors* and 5.4 *Waterproofing of basements and other below ground structures*, and Technical Requirement R3, for use externally as a post applied membrane.

Where Grade 2 or 3 protection is required, and the below ground wall retains more than 600 mm (measured from the top of the retained ground to the lowest finished floor level), the product must be used in combination with either a Type B or C waterproofing protection as defined in BS 8102 : 2009.

The Certificate holder should be consulted for approved Type B and C solutions.

In addition, in the opinion of the BBA, the product when installed and used in accordance with this Certificate can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards for Conversions and Renovations*, taking account of other relevant guidance within the chapter and the suitability of the substrate to receive the product.

UKCA and CE marking

The Certificate holder has taken the responsibility of UKCA and CE marking the product in accordance with EN 13967 : 2012.

Technical Specification

1 Description

1.1 GP TITANTANK is a nominal 1.2 mm thick membrane comprising GP TITANFLEX with a self-adhesive polymer-modified bitumen compound applied to one face, leaving a 50 mm wide selvedge to allow taping or hot air welding of side laps. The self-adhesive layer is protected with a siliconized polypropylene release film. The product has the nominal characteristics given in Table 1.

Table 1 Nominal characteristics

Characteristic (unit)	Value
Thickness (mm)	1.2
Roll length (m)	20
Roll width (m)	0.3, 0.9
Mass per unit area ($\text{g}\cdot\text{m}^{-2}$)	1350
Impact resistance (mm)	> 650
Tensile strength [$\text{N}\cdot(50\text{ mm})^{-1}$]	
MD	> 550
CD	> 400
Elongation (%)	> 550
Water vapour transmission ($\text{g}\cdot\text{m}^{-2}\cdot\text{day}^{-1}$)	0.11 – 0.18
Watertightness (60 kPa)	Pass
Nail tear (N)	
MD and CD	> 300
Resistance to static loading (kg)	≥ 20

1.2 Ancillary items for use with the product include:

- GP PRIMER — a bituminous solvent-based primer used to prime masonry substrates prior to the application of GP TITANTANK
- GP TAPE — an extruded double-sided butyl rubber-based tape for sealing overlap joints where hot air welding is not required.

1.3 The Certificate holder recommends the following ancillary items for use with the product, but these materials have not been assessed by the BBA and are outside the scope of this Certificate:

- protection fleece and/or protection boards for use over the membrane to protect it from damage by trafficking during the installation
- fleece-backed butyl sealing tape for use over joints to provide additional protection and a smooth finish
- pre-fabricated corner units and top hats
- specialised sealants and liquid-applied membranes for sealing around penetrations and pile caps
- void-vent geocomposite membranes for use as part of a gas/VOC restrictive system
- angle fillets.

Details of suitable products may be obtained from the Certificate holder.

2 Manufacture

2.1 The product is manufactured by extrusion and laminating processes.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The management systems of the manufacturer have been assessed and registered as meeting the requirements of EN ISO 9001 : 2015 by TÜV Austria (Certificate 010150310/02) and BSI (Certificate Q09303).

3 Delivery and site handling

3.1 GP TITANTANK is available in rolls of 0.3 m x 20 m and 0.9 m x 20 m, packed in cardboard cartons.

3.2 Each carton contains one 0.9 m wide roll or three 0.3 m wide rolls weighing approximately 25 kg.

3.3 The product should be stored in an upright position under clean and dry conditions, at a temperature above 5°C, protected from freezing conditions and high temperatures.

3.4 GP TAPE is available in rolls of 50 mm x 1.5 mm x 10 m, in black. The product is packed into cardboard boxes. Each box contains 12 rolls and has a nominal weight of 1 kg.

3.5 GP PRIMER is supplied in 5 and 25 litre tins.

3.6 The Certificate holder has taken the responsibility of classifying and labelling the product under the *CLP Regulation (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures*. Users must refer to the relevant Safety Data Sheet(s).

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on GP TITANTANK.

Design Considerations

4 Use

4.1 GP TITANTANK is satisfactory for use as a fully bonded Type A waterproofing protection for the waterproofing on new-build underground structures, as defined in BS 8102 : 2009, and as a damp-proofing membrane for solid floors in accordance with the relevant requirements of CP 102 : 1973 Section 3, BS 8000-0 : 2014 and BS 8000-4 : 1989.

4.2 The product can be used internally and externally to provide an effective barrier to the transmission of liquid water where Grades 1 to 3 waterproofing protection is required, as defined in BS 8102 : 2009, Table 2.

4.3 Where Grade 3 waterproofing protection is required, the environment must also be controlled by ventilation, dehumidification and/or air conditioning, as appropriate, to ensure dampness does not occur.

4.4 The product is compatible with concrete, smooth brick and blockwork or screeded substrates, and is resistant to those chemicals likely to be present in normal service conditions.

4.5 The product is also satisfactory for use as a gas-resistant barrier to restrict the ingress of radon, methane and carbon dioxide into buildings from landfill and naturally occurring sources.

4.6 The GP TITANFLEX film component of the membrane is chemically resistant when in contact with hydrocarbons and GP TITANTANK can be used externally applied to restrict the ingress of VOC vapours into the building.

4.7 Buildings in areas of risk should be constructed in accordance with the recommendations of BRE Report BR 211 : 2015, and following the guidance set out in BS 8485 : 2015.

4.8 Buildings in areas at risk of VOCs should follow the guidance detailed in CIRIA C748.

4.9 The product should be protected after installation in accordance with the Certificate holder’s instructions.

4.10 Detailing requirements (eg at service penetrations or movement joints) must be evaluated on a case-by-case basis. The Certificate holder must be consulted for details for a particular application.

5 Practicability of installation

The product should only be installed by installers who have been trained and approved by the Certificate holder. The Certificate holder must be consulted for suitable installers.

6 Resistance to water and water vapour



6.1 The product, including joints, will adequately resist the passage of water under hydrostatic pressure and moisture from the ground and enable a structure to comply with the relevant requirements of the national Building Regulations.

6.2 The product complies with the minimum sheet thickness detailed in the documents supporting the national Building Regulations.

7 Resistance to underground gases



7.1 The product will restrict the ingress of radon, methane and carbon dioxide into buildings from landfill and naturally occurring sources, and satisfy the performance for a gas-resistant membrane as defined in BS 8485 : 2015.

7.2 Measured gas permeability/diffusion values on the unjointed GP TITANFLEX component of the membrane are given in Table 2.

Table 2 Gas permeability and radon diffusion coefficient of GP TITANFLEX component of the membrane

Gas	Method	Result
Methane	ISO 15105-1	
membrane without joint ⁽¹⁾		0.13 ml·m ⁻² ·day ⁻¹ ·atm ⁻¹
membrane with joint ⁽²⁾		≤ 1 ml·m ⁻² ·day ⁻¹ ·atm ⁻¹
Carbon dioxide (membrane without joint) ⁽¹⁾	ISO 15105-1	3.01 ml·m ⁻² ·day ⁻¹ ·atm ⁻¹
Radon	Czech University (method K124/02/95)	1 x 10 ⁻¹² m ² ·s ⁻¹

(1) 0.50 mm thick GP TITANFLEX membrane tested.

(2) Hot air welded joint tested.

7.3 In the opinion of the BBA, the product satisfies the criteria for a radon gas resistant membrane given in BRE Report BR 211 : 2015.

8 Resistance to chemicals



8.1 The GP TITANFLEX component of the membrane is resistant to the chemicals commonly found on construction sites. The results of immersion tests on GP TITANFLEX for a range of chemicals, including hydrocarbons and all those stated within CIRIA Report C748 clause 4.2.1, are given in Table 3. Site-specific examination and assessment should be carried out on a case-by-case basis to establish the suitability for any specific application and the need for additional testing.

Table 3 Resistance to chemicals of GP TITANFLEX Membrane

Test method	Exposure chemical(s)	Retained Tensile strength/elongation (%)	Result
BS EN 14414 : Method A	Sulphuric acid (10% solution)	MD 108/117 CD 118/123	Pass
BS EN 14414 : Method B	Calcium hydroxide solution (saturated)	MD 108/118 CD 107/122	Pass
BS EN 14414 : Method C	Diesel, paraffin, lubricating oil mixture	MD 86/97 CD 80/92	Pass
BS EN 14414 : Method D	Synthetic leachate comprising a mixture of organic acids, glucose, chlorides, sulfates and phosphate	MD 101/103 CD 96/101	Pass
BS EN 14414	Benzene (saturated solution in water)	MD 95/101 CD 102/104	Pass
	Toluene (saturated solution in water)	MD 94/103 CD 91/96	Pass
	Ethyl benzene (saturated solution in water)	MD 99/100 CD 97/95	Pass
	m,p,o-Xylenes (saturated solution in water)	MD 91/93 CD 106/103	Pass
	Tetrachloroethene (PCE) (saturated solution in water)	MD 93/97 CD 102/104	Pass
	Trichloroethene (TCE) (saturated solution in water)	MD 99/102 CD 93/100	Pass
	Hexane (saturated solution in water)	MD 99/100 CD 104/99	Pass
	Napthalene (saturated solution in water)	MD 101/101 CD 93/99	Pass

8.2 Measured vapour transmission rates for a range of commonly encountered VOCs including all those stated within CIRIA Report C748 section 2.3 are given in Table 4. A site-specific risk assessment should be carried out to establish the product's suitability for a particular application.

Table 4 Vapour transmission rates of volatile organic compounds for GP TITANFLEX Membrane⁽¹⁾

Volatile liquid	Method	Result	
		(mg·m ⁻² ·day ⁻¹)	(ml·m ⁻² ·day ⁻¹)
Benzene ⁽²⁾	ISO 15105-2 (Annex B)	3.6	1.04
Toluene ⁽²⁾	ISO 15105-2 (Annex B)	13.8	3.36
Ethyl benzene ⁽²⁾	ISO 15105-2 (annex B)	2.7	0.56
m,p,o-Xylenes ⁽²⁾	ISO 15105-2 (Annex B)	7.7	1.62
Tetrachloroethene (PCE) ⁽²⁾	ISO 15105-2 (Annex B)	26.2	3.54
Trichloroethene (TCE) ⁽²⁾	ISO 15105-2 (Annex B)	54.7	9.32
Napthalene	ISO 15105-2 (Annex B)	< 0.0006	< 0.0001
Hexane ⁽²⁾	ISO 15105-2 (Annex B)	0.6	0.15
Vinyl chloride	ISO 15105-2 (Annex B)	< 0.05	< 0.05 ⁽³⁾
Cis-1,2,-dichloroethene ⁽²⁾	ISO 15105-2 (Annex B)	< 1.1	≤ 0.3
1,1,2,2,-tetrachloroethane ⁽²⁾	ISO 15105-2 (Annex B)	< 0.008	≤ 0.001
1,1,2-trichloroethane ⁽²⁾	ISO 15105-2 (Annex B)	< 0.006	≤ 0.001

(1) Membrane in contact with test gases at saturated vapour pressure unless otherwise noted.

(2) Membrane in contact with the liquid.

(3) 0.05 cm³·m⁻²·day⁻¹·bar⁻¹.

9 Resistance to mechanical damage

9.1 The product can be punctured by sharp objects such as tools and sharp stones, and additional protection must be used prior to trafficking the system. Vehicular traffic must be avoided.

9.2 Provided sufficient care is taken, the product will not be damaged by normal foot traffic.

9.3 The product will provide a waterproof layer capable of accepting minor structural movement without damage.

10 Adhesion

The adhesion of the product to the substrate and to itself, with joints as described in this Certificate, is satisfactory.

11 Maintenance

As the product is confined between the structure and backfill and has satisfactory durability (see section 12), maintenance is not required. However, any damage occurring before enclosure must be repaired (see section 16).

12 Durability



12.1 Under normal service conditions, the product will remain effective against the ingress of water and water vapour, and will restrict the ingress of radon, methane, carbon dioxide and VOC vapours for the lifetime of the structure in which it is incorporated.

12.2 The products will not be affected by short term exposure to ultraviolet (UV) light to allow for installation. Long periods of exposure may however reduce the effectiveness of the membranes and they should be protected from UV as soon as practicable after they are installed.

13 Reuse and recyclability

The product contains polyethylene, which can be recycled.

Installation

14 General

14.1 GP TITANTANK must be installed in accordance with the Certificate holder's instructions and this Certificate, and following the relevant guidance given in BRE Report BR 211 : 2015, BS 8485 : 2015 and CIRIA Report C748 : 2014.

14.2 Particular care should be taken to ensure that the product is incorporated into the building as part of a complete system to prevent the ingress of build-up contaminants; this may require the use of additional methods such as sumps and ventilation.

14.3 Concrete structures should be designed and built in accordance with BS EN 1992-1-1 : 2004 and its UK National Annex.

14.4 Substrates to which the product is to be applied must be sound, clean, free from laitance, dry and free from ice and frost.

14.5 The product must only be applied to surfaces that have a smooth finish, ie they should be free from voids, projections and mortar deposits.

14.6 The product can be installed in all normal site conditions, provided that the air temperature is not below 10°C to prevent the risk of surface condensation.

14.7 For waterproofing applications, GP TITANTANK must be installed in accordance with the relevant requirements of CP 102 : 1973 Section 3, BS 8102 : 2009, BS 8000-0 : 2014, BS 8000-4 : 1989, the Certificate holder's instructions and this Certificate.

14.8 For internal tanking applications the membrane must be fully loaded.

14.9 For chemical and gas resistance applications, it is recommended that the product is installed with hot air welded joints in accordance with the Certificate holder's instructions.

14.10 For VOC resistance applications, the product must be installed with hot air welded joints.

14.11 For damp-proof applications, joints in the membrane can be formed using GP TAPE.

14.12 The product must be protected as soon as possible after it is installed to minimise direct foot trafficking. Direct trafficking by vehicles must be avoided.

15 Procedure

15.1 Prepared surfaces must be primed with GP PRIMER, typically at a coverage rate of between 6 and 10 m² per litre, and allowed to dry before application of the product. Only areas that can be covered with the membrane on the same day should be primed.

15.2 Sharp angles at changes of direction should be avoided by using suitable angle fillets. The Certificate holder should be consulted for suitable products.

15.3 The membrane is cut to length allowing 150 mm for end laps and positioned by partially peeling back the release film and applying the self-adhesive face to the prepared surface.

Self-adhesive lap jointing

15.4 The release film is progressively removed and the membrane pressed firmly onto the wall, using firm hand pressure so that it is fully bonded to the surface.

15.5 The next sheet is laid over the existing edge of the previously applied sheet ensuring a minimum 50 mm edge lap and fixed to the substrate in the same way as the first sheet. Subsequent sheets are applied in the same way.

15.6 Where vertical drops require more than one length of membrane, a minimum overlap of 150 mm should be ensured, with the lower end of the upper length overlapping the upper end of the lower length, ensuring good weathering of the joints. End laps should be staggered.

15.7 Joints can be finished with GP TAPE and with a suitable sealing tape applied over the joint to provide a smooth finish or hot air welded.

15.8 In vertical applications, in cold or very warm weather, the top of the membrane may be temporarily supported with battens.

Hot air welded joints

15.9 The product is rolled out and properly aligned to the structure. All end and side overlaps should be a minimum of 100 mm and prepared in accordance with the Certificate holder's instructions.

15.10 All surfaces must be dry thoroughly before welding.

15.11 Before welding work is carried out, trials must be completed to determine the 'operating window' for the welding equipment, materials and ambient conditions. Typically, the operating window will be between 180 to 240°C at a rate of 1.5 m/min on low air flow. In case of doubt, the Certificate holder should be consulted for advice.

15.12 Side laps are welded using the 50 mm wide selvedge ensuring a minimum of 50 mm wide weld and must be checked for integrity after being formed.

15.13 End laps are sealed using a 100 mm wide strip of GP TITANFLEX laid centrally over the joint and fully welded.

15.14 All service penetrations and direction changes should be properly detailed in accordance with the Certificate holder's instructions. Service ducts should be vented to prevent the possibility of gas accumulating in confined spaces.

15.15 The continuity of the gas protection must extend over the footprint of the building, and the gas membrane must be sealed to a compatible gas-resistant damp-proof course.

15.16 The product should be covered by a screed or other protective layer as soon as possible after installation. If blockwork protection is used, care must be taken to avoid damage to the products during construction.

15.17 For gas and VOC resistance applications, the product installation should be subject to third-party independent validation, in accordance with BS 8485 : 2015.

16 Repair

Any damage to the product must be repaired using a patch of the product, and laps welded or sealed with GP TAPE and secured with the butyl tape. All patched areas must extend a minimum of 100 mm from the damaged area. For gas and VOC resistant applications, a patch of GP TITANFLEX must be used and hot air welded. If required by the local authority, repair work should be confirmed by an independent validation report, as all gas membrane installations should be subject to third-party validation in accordance with BS 8485 : 2015.

Technical Investigations

17 Tests

17.1 Tests were carried out on GP TITANTANK and the results assessed to determine:

- width, straightness and flatness
- mass per unit area
- thickness
- flexibility at low temperature
- airtightness of lap joint (100 mm self-adhesive)
- unrolling at low temperature
- peel adhesion
- resistance to fatigue.

17.2 In addition, tests were carried out on the GP TITANFLEX component and the results assessed to determine:

- visible defects
- characterisation by thermogravimetric analysis
- width, straightness and flatness
- mass per unit area
- thickness
- foldability at low temperature
- tensile strength and elongation
- airtightness of joints (hot air welded)
- shear strength of joints (hot air welded)
- dimensional stability
- resistance to static loading
- effect of heat ageing
- effect of water exposure
- effect of exposure to UV.

18 Investigations

18.1 An evaluation was made of the results of independent test data to establish:

- methane gas transmission (on unjointed and jointed membrane)
- carbon dioxide gas transmission
- radon gas diffusion coefficient
- transmission of vapours from VOC compounds
- tensile strength and elongation
- chemical resistance
- leaching resistance
- resistance to tearing (nail shank)
- resistance to impact
- watertightness at 196.2 kPa hydrostatic pressure (including 100 mm overlap self-adhesive joint).

18.2 The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

Bibliography

BS 8000-0 : 2014 *Workmanship on construction sites — Introduction and general principles*

BS 8000-4 : 1989 *Workmanship on building sites — Code of practice for waterproofing*

BS 8102 : 2009 *Code of practice for protection of below ground structures against water from the ground*

BS 8485 : 2015 + A1 : 2019 *Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings*

EN 13967 : 2012 + A1 : 2017 *Flexible sheets for waterproofing — Plastic and rubber damp proof sheets including plastic and rubber basement tanking sheet — Definitions and characteristics*

BS EN 14414 : 2004 *Geosynthetics — Screening test method for determining chemical resistance for landfill applications*

BS EN 1992-1-1 : 2004 + A1 : 2014 *Eurocode 2: Design of concrete structures — General rules and rules for buildings*

NA + A2 : 14 to BS EN 1992-1-1 : 2004 + A1 : 2014 UK National Annex to *Eurocode 2: Design of concrete structures — General rules and rules for buildings*

BRE Report BR 211 : 2015 *Radon — Guidance on protective measures for new buildings*

CIRIA C748 *Guidance on the use of plastic membranes as VOC vapour barriers*

CP 102 : 1973 *Code of practice for protection of buildings against water from the ground*

EN ISO 9001 : 2015 *Quality management systems — Requirements*

ISO 15105-1 : 2007 *Plastics — Film and sheeting — Determination of gas-transmission rate — Differential-pressure methods*

ISO 15105-2 : 2003 *Plastics — Film and sheeting — Determination of gas-transmission rate — Equal-pressure method*

19 Conditions

19.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page – no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document – it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

19.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

19.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

19.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

19.5 In issuing this Certificate the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

19.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.