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Agrément Certificate
20/5728
Product Sheet 7

JUTA GAS-RESISTANT AND DAMP PROOFING MEMBRANES

GP5 GAS BARRIER

This Agrément Certificate Product Sheet(1) relates to the GP5(2) Gas Barrier, for use as a multilayer thermoplastic gas barrier and damp-proof membrane in concrete ground floors, above or below slabs not subject to hydrostatic pressure, to protect the building against moisture, radon, methane and carbon dioxide from the ground.

(1) Hereinafter referred to as 'Certificate'.
(2) GP is a registered trademark.

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 restrict the passage of moisture into the floor structure (see section 6).

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

Resistance to damage — the product has satisfactory resistance to puncture and on a smooth or blinded surface will not be damaged by foot or site traffic (see section 8).

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 and carbon dioxide during the lifetime of the flooring construction in which it is incorporated (see section 11).

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.

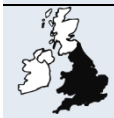
On behalf of the British Board of Agrément

Date of First issue: 26 October 2022

Hardy Giesler
Chief Executive Officer

Regulations

In the opinion of the BBA, the GP5 Gas Barrier, 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 a structure satisfying the conditions of this Requirement. See sections 7.1 and 7.2 of this Certificate.
Requirement:	**C2(a)**	**Resistance to moisture**
Comment:		The product, including joints, will enable a floor to satisfy this Requirement. See section 6 of this Certificate.
Regulation:	**7(1)**	**Materials and workmanship**
Comment:		The product is acceptable. See section 11.1 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)**	**Fitness and durability of materials and workmanship**
Comment:		The use of the product satisfies the requirements of this Regulation. See section 11.1 and the *Installation* 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 within the ground-floor slab, enabling compliance with these Standards, with reference to clauses 3.1.2(1)(2), 3.1.6(1)(2), 3.1.7(1)(2), 3.1.8(1)(2), 3.2.1(1)(2) and 3.2.2(1)(2). See sections 7.1 and 7.2 of this Certificate.
Standard:	3.4	Moisture from the ground
Comment:		The product, including joints, will enable a floor to satisfy the requirements of this Standard, with reference to clauses 3.4.2(1)(2), 3.4.4(1)(2) and 3.4.6(1)(2). See section 6 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The product can contribute to satisfying 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 11.1 and the *Installation* part of this Certificate.

Regulation:	**26(1)(b)(2)**	**Preparation of site and resistance to dangerous and harmful substances**
Comment:		The product can contribute to a construction satisfying the requirements of this Regulation. See sections 7.1 and 7.2 of this Certificate.
Regulation:	**28**	**Resistance to moisture and weather**
Comment:		The product, including joints, will enable a floor to satisfy this Requirement. 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 sections: 1 *Description* (1.2) and 3 *Delivery and site handling* (3.3) of this Certificate.

Additional Information

NHBC Standards 2022

In the opinion of the BBA, the GP5 Gas Barrier, 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* and 5.1 *Substructure and ground bearing floors*.

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 The GP5 Gas Barrier is a multilayer polyethylene membrane (with 7 layers in total).

1.2 The product is available in dark blue/silver colour as standard and has the nominal characteristics shown in Table 1.

Table 1 GP5 Gas Barrier – nominal characteristics

Thickness (mm)	0.4
Roll length (m)	400
Roll width (m)	2 or 4
Mass per unit area ($g \cdot m^{-2}$)	400
Impact resistance (mm)	500
Tensile strength (N per 50 mm)	
MD and CD	> 300
Elongation (%)	> 550
Water vapour transmission ($g \cdot m^{-2} \cdot day^{-1}$)	0.11-0.18
Watertightness (60 kPa)	Pass
Nail tear (N)	
MD and CD	> 230
Resistance to static loading (kg)	> 20

1.3 Ancillary items for use with the product include:

- butyl tape — for use for joints and laps
- jointing tape — for securing laps and joints.

1.4 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:

- GP Top Hats — to seal around entry points to the membrane
- GP Internal Corner Cloaks — prefabricated corner details
- GP External Corner Cloaks — prefabricated corner details
- GP Primer — used to provide adhesion for application of bitumen-enhanced geomembranes
- GP Void Vent 25 — cuspated high-density polyethylene (HDPE) drainage core, with a non-woven polypropylene geotextile separator/filter bonded to one side
- GP Void Vent 40 — cuspated HDPE drainage core, with a non-woven polypropylene geotextile separator/filter bonded to one side
- GP Protection Fleece — to form a protective layer to prevent damage to the membrane
- GP-SAM — gas-resistant self-adhesive membrane
- GP DPC — a gas resistant damp-proof course (dpc).

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 system of the manufacturer has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by TÜV Austria (Certificate 010150310/02).

3 Delivery and site handling

3.1 Rolls are wrapped in polythene film. Each roll bears a label including product name and grade, material specifications, ID number, batch number and date of manufacture.

3.2 The rolls must be stacked on a flat surface, kept under cover and protected from sunlight and mechanical damage.

3.3 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 the GP5 Gas Barrier.

Design Considerations

4 Use

4.1 The GP5 Gas Barrier is 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.

4.2 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.

4.3 The product is also satisfactory for use as a damp-proof membrane in accordance with CP 102 : 1973 Section 3, BS 8000-0 : 2014 and BS 8000-4 : 1989.

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

5 Practicability of installation

The product is designed to be installed by a competent builder or contractor experienced with this type of product.

6 Resistance to water and water vapour

6.1 The product, including joints, provides an effective barrier to the passage of liquid moisture from the ground.

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 membrane for a range of underground gases are given in Table 2.

Table 2 Gas permeability and radon diffusion coefficient of GP5

Gas	Method	Result
Methane(1)	BS ISO 15105-1	0.12 $ml \cdot m^{-2} \cdot day^{-1} \cdot atm^{-1}$
Carbon dioxide	BS ISO 15105-1	1.53 $ml \cdot m^{-2} \cdot day^{-1} \cdot atm^{-1}$
Radon	Czech Technical University in Prague (method K124/02/95) (method C of ISO/TS 11665-13)	9.8×10^{-14} $m^2 \cdot s^{-1}$

(1) BS 8485 : 2015 requires that the methane transmission measured in accordance with BS ISO 15105-1 : 2007 for a gas-resistant membrane is < 40 $ml \cdot m^{-2} \cdot day^{-1} \cdot atm^{-1}$.

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 damage

8.1 The product can be punctured by sharp objects and care should be taken when handling building materials over the exposed surface.

8.2 Provided there are no sharp objects present either below or on the product's surface prior to and during installation of the protective layer, the product will not be damaged by the normal foot traffic and other loads associated with the installation of the product.

9 Underfloor heating

There will be no adverse effects on the product from underfloor heating under normal service conditions. In other circumstances, the Certificate holder's advice should be sought.

10 Maintenance

As the product is confined under concrete and has suitable durability (see section 11), maintenance is not required. However, any damage occurring before enclosure must be repaired (see section 15).

11 Durability

11.1 The product will, in normal circumstances, remain effective against the ingress of water and water vapour, and will restrict the ingress of radon, methane and carbon dioxide during the lifetime of the flooring construction in which it is incorporated.

11.2 Long periods of exposure to ultraviolet light will reduce the effectiveness of the product.

12 Reuse and recyclability

The product contains polyethylene, which can be recycled.

Installation

13 General

13.1 The GP5 Gas Barrier must be installed and fixed in accordance with the Certificate holder's instructions, the relevant clauses of BRE Report BR 211 : 2015 and BS 8485 : 2015, and this Certificate.

13.2 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 or build-up of contaminants; this may require the use of additional methods such as sumps and ventilation.

13.3 The product can be installed in all normal site conditions, provided that the air temperature is not below 5°C (to prevent the risk of surface condensation).

14 Procedure

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

14.2 Concrete surfaces should be dense. Vertical surfaces of brickwork and blockwork must be dry and rendered to provide an even surface. Brickwork or blockwork not rendered must be flush pointed to give a smooth surface without sudden changes in level.

14.3 The membrane is rolled out with the printed side uppermost, ensuring that it is properly aligned. All end and side overlaps should be a minimum of 100 mm where taped and prepared in accordance with the Certificate holder's instructions.

14.4 All surfaces must be dried thoroughly prior to joining.

14.5 Joints can be installed using butyl tape; however, the chemical compatibility must be checked. A strip of the tape is unrolled over the membrane with its nearest edge 50 mm from the edge. The protective paper is removed from the butyl tape prior to rolling an adjacent run of the membrane, which must be carefully unrolled over the jointing tape, ensuring a 100 mm overlap.

14.6 Where doubt exists over the suitability of the butyl tape, the membrane can be welded using hot air or wedge-welding equipment. All laps and junctions must be overlapped by 100 mm. The weld width must be a minimum of 50 mm.

14.7 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 and 240°C at a rate of 3 m.min. In case of doubt, the Certificate holder should be consulted.

14.8 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.

14.9 The continuity of the gas protection must extend over the footprint of the building, and the gas membrane must be sealed to a gas-resistant dpc where required.

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

14.11 The product's installation should be subject to third-party independent validation, in accordance with BS 8485 : 2015.

15 Repair

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

Technical Investigations

16 Investigations

16.1 An evaluation was made of the results of independent test data in relation to:

- visible defects
- thickness
- mass per unit area
- methane gas transmission
- carbon dioxide gas transmission
- radon gas diffusion coefficient
- watertightness (after ageing and after exposure to chemicals)
- resistance to static loading
- resistance to dynamic impact
- tensile strength and elongation
- resistance to tearing (nail shank).

16.2 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

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

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

BS EN ISO 9001 : 2008 *Quality management systems — Requirements*

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

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

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*

17 Conditions

17.1 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.

17.2 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.

17.3 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.

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

17.5 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.

17.6 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.

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