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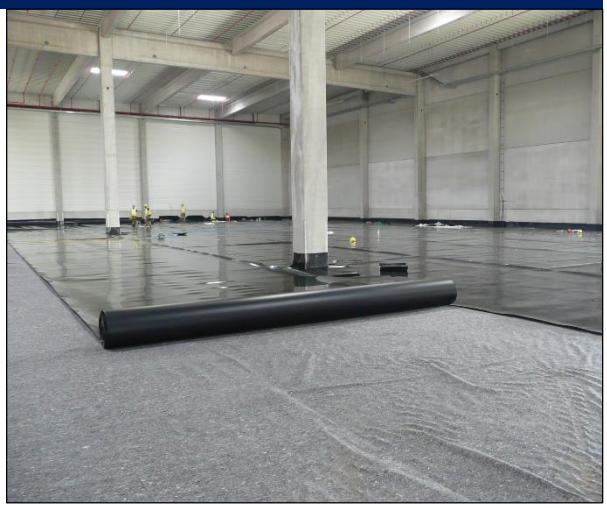
Agrément Certificate
12/4912
Product Sheet 3

JUTA GAS-RESISTANT MEMBRANE

GPH GAS BARRIER



This Agrément Certificate Product Sheet(1) relates to GPH Gas Barrier, a high-density polyethylene (HDPE) membrane, for use as a damp-proof and waterproofing membrane and as an internally or externally applied tanking membrane, to protect the building against moisture and radon, and contributes to restricting methane and carbon dioxide, from the ground.

(1) Hereinafter referred to as '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 membrane provides an effective barrier to the passage of liquid water and water vapour from the ground (see section 6).

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

Resistance to puncture — the membrane has a high resistance to puncture and over a smooth or blinded surface will not be damaged by foot or site traffic (see section 8).

Durability — under normal service conditions, the membrane will remain effective against the ingress of water and water vapour and will restrict the ingress of radon, methane and carbon dioxide for the lifetime of the flooring construction in which it is installed (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 Third issue: 29 October 2018

Originally certificated on 24 October 2014

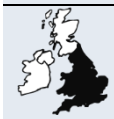
John Albon – Head of Approvals Construction Products

Claire Curtis-Thomas
Chief Executive

Certificate amended on 13 March 2019 to correct Section 6.

Regulations

In the opinion of the BBA, GPH 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:		When properly installed in a correctly designed structure, the membrane forms an effective barrier to radon, and can contribute to satisfying this Requirement. See sections 7.1 and 7.2 of this Certificate.
Requirement:	**C2(a)**	**Resistance to moisture**
Comment:		When properly installed in a correctly designed structure, the membrane forms an effective barrier to the movement of water within the ground-floor slab, enabling compliance with this Requirement. See sections 6.1 and 6.2 of this Certificate.
Regulation:	**7**	**Materials and workmanship**
Comment:		The membrane is of an acceptable material. See section 11.1 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)**	**Durability, workmanship and fitness of materials**
Comment:		The membrane can contribute to a construction satisfying this Regulation. See sections 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:		The membrane will enable a floor to satisfy the requirements of this Standard, 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(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:		When properly installed in a correctly designed structure, the membrane forms an effective barrier to the movement of water within the ground-floor slab, enabling compliance with this Standard, with reference to clauses 3.4.2(1)(2), 3.4.4(1)(2) and 3.4.6(1)(2). See sections 6.1 and 6.2 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The membrane 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(a)(i) (iii)(b)(i)**	**Fitness of materials and workmanship**
Comment:		The membrane is acceptable. See section 11.1 and the *Installation* part of this Certificate.
Regulation:	**26**	**Site preparation and resistance to contaminants**
Comment:		When properly installed in a correctly designed structure, the membrane forms an effective barrier to radon, enabling compliance with this Regulation. See sections 7.1 and 7.2 of this Certificate.
Regulation:	**28**	**Resistance to moisture and weather**
Comment:		When properly installed in a correctly designed structure, the membrane forms an effective barrier to the movement of water within the ground-floor slab, enabling compliance with this Regulation. See sections 6.1 and 6.2 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: 1 *Description* (1.2) of this Certificate.

Additional Information

NHBC Standards 2018

In the opinion of the BBA, GPH 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*, 5.1 *Substructure and ground bearing floors* and 5.4 *Waterproofing of basements and other below ground structures*.

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 membrane should be used in combination with either a Type B or C waterproofing protection.

CE marking

The Certificate holder has taken the responsibility of CE marking the product in accordance with harmonised European Standard BS EN 13967 : 2012. An asterisk (*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 GPH Gas Barrier is a single-layer, HDPE membrane.

1.2 The membrane has the following nominal characteristics:

Thickness (mm)	1.0
Roll length (m)	various
Roll width (m)	various
Mass per unit area ($g \cdot m^{-2}$)	1000
Tensile strength* ($N \cdot 50\ mm^{-1}$)	
Machine direction	900
Cross direction	900

Nail tear resistance*	
Machine direction	650
Cross direction	750
Watertightness (60kPa)*	pass
Colour	
upper surface	black
lower surface	black.

1.3 Ancillary products for use with the membrane include:

- butyl or bitumen tape — for use at joints and laps
- jointing tape — for securing laps and joints
- fixing bolt and steel strip with neoprene seal — for mechanically fixing the membrane to the substrate
- self-sealing screw fix plug — waterproofing fixing.

1.4 Ancillary products for use with the membrane, but outside the scope of this Certificate, include:

- 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 — to provide adhesion for application of bitumen-enhanced geomembranes
- GP Void Vent 25 — cuspated 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
- GR-SAM — gas-resistant self-adhesive membrane
- WP-SAM — self-adhesive waterproofing membrane.

2 Manufacture

2.1 The membrane is manufactured by an extrusion/coating process.

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 Juta a.s. has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 and BS EN ISO 14001 : 2015 by Bureau Veritas (Certificates CZ002814-1 and CZ002815-1 respectively).

3 Delivery and site handling

3.1 Rolls are wrapped in polythene film. Each roll has a leaflet enclosed describing the membrane and installation details. The BBA logo and the number of this Certificate are printed on the leaflet and pallet label.

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

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on GPH Gas Barrier.

Design Considerations

4 Use

4.1 GPH Gas Barrier is satisfactory for use as a gas-resistant barrier to restrict the ingress of radon into buildings from naturally occurring sources. The membrane can also contribute to restricting the passage of methane and carbon dioxide (see section 7).

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 membrane is also satisfactory for use as a damp-proof and waterproof membrane for solid concrete floors and underground structures for internally or externally applied tanking below ground, in accordance with CP 102 : 1973 Section 3, and BS 8102 : 2009, provided it is fully supported and protected.

5 Practicability of installation

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

6 Resistance to water and water vapour

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

6.2 When installed in accordance with the following documents, the membrane will comply with the minimum sheet thickness detailed in the national Building Regulations:

England and Wales — Approved document C, requirements C2(a), Section 4.8 and 4.14
Scotland — Mandatory Standard 3.4, clauses 3.4.2, 3.4.4 and 3.4.6
Northern Ireland — Technical booklet C, Regulation 28(a), Clauses 5.5, 5.13 and 5.17.

6.3 The membrane is impervious to water and provides a waterproof layer capable of accepting minor structural movements without damage.

7 Resistance to underground gases

7.1 The membrane will contribute to restricting the ingress of radon, methane and carbon dioxide into buildings from landfill and naturally occurring sources.

7.2 When used as part of the structural barrier in basement floor and wall constructions conforming to BS 8102 : 2009, Grade 2 and 3 waterproofing, the membrane will contribute to restricting the ingress of radon, methane and carbon dioxide into a building from landfill and naturally occurring sources, with reference to BS 8485 : 2015, Table 5.

7.3 Measured gas permeability/diffusion values on an unjointed membrane are given in Table 1.

Table 1 Gas permeability of GPH Gas Barrier

Gas	Method	Result
Radon	K124/02/95	1.1×10^{-11} $m^2 \cdot s^{-1}$
Methane(1)	BS ISO 15105-1	56.4 $ml \cdot m^{-2} \cdot d^{-1} \cdot atm^{-1}$

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

7.4 BRE Report BR 211 : 2015 recommends a 300 µm thick polyethylene sheet as the minimum required thickness for a gas-resistant membrane. It is generally accepted that other materials with comparable or higher gas resistance are suitable, provided they can withstand the construction process. In the opinion of the BBA, the membrane satisfies these criteria.

8 Resistance to puncture

8.1 The membrane 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 on the membrane's surface prior to and during installation of the protective layer, the membrane will not be damaged by normal foot traffic.

9 Underfloor heating

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

10 Maintenance

As the membrane 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 16).

11 Durability

11.1 The membrane will, under 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 building.

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

12 Reuse and recyclability

The membrane comprises polyethylene, which can be recycled.

Installation

14 General

14.1 GPH Gas Barrier must be installed and fixed in accordance with this Certificate, the Certificate holder's instructions and the relevant clauses of BRE Report BR 211 : 2015 and BS 8485 : 2015. Additional guidance on the use of damp-proof membrane material is available in BS 8000-4 : 2014.

14.2 The membrane 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.

15 Procedure

15.1 The membrane 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.

15.2 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.

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

15.4 When the membrane is laid below the concrete slab, it should be loose-laid to accommodate any small movements.

15.5 All surfaces must be dried thoroughly prior to the application of the butyl tape. A strip of the tape is unrolled over the membrane with its nearest edge 50 mm from the membrane 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. Alternatively, joints can be welded.

15.6 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.

15.7 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 damp-proof course.

15.8 The membrane 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 membrane during construction.

15.9 When used in vertical applications the membrane is mechanically fixed in accordance with the manufacturer's instructions.

16 Repair

Any damage to the membrane must be repaired using a patch of the membrane, and laps 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 installations should be subject to third-party validation, in accordance with BS 8485 : 2015.

Technical Investigations

17 Tests

17.1 An assessment was made of data to BS EN 13967 : 2012 in relation to:

- tensile strength and elongation
- nail tear resistance
- watertightness
- resistance to static loading.

17.2 Tests were carried out to determine:

- thickness, width, density and mass per unit area
- dimensional stability, low temperature flexibility and water vapour permeability
- tensile strength and elongation on controls and after 12 weeks heat ageing at 70°C, and after 100 hours UVB exposure
- watertightness on controls and after 12 weeks heat ageing at 70°C
- nail tear strength on controls and after 12 weeks heat ageing at 70°C
- resistance of joints to air pressure
- tensile strength of joints on controls and after 12 weeks heat ageing at 70°C
- watertightness of joints and fixings at 12 m head of water

to assess:

- membrane characteristics
- durability of the membrane and the joints.

18 Investigations

18.1 An evaluation was made of the results of the test data regarding permeability of radon, methane and carbon dioxide.

18.2 A site visit was conducted to assess practicability of installation.
18.3 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 8000-4 : 2014 *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 *Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings*

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

BS ISO 15105-1 : 2007 *Plastics – Film and Sheeting – Determination of gas transmission rate – Part 1: Differential Pressure methods.*

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

BS EN ISO 14001 : 2015 *Environmental management systems — Requirements with guidance for use*

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

K124/02-95 *Radon diffusion coefficient by Czech Technical University to test number 124-11 – Measurement of radon coefficient*

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 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.