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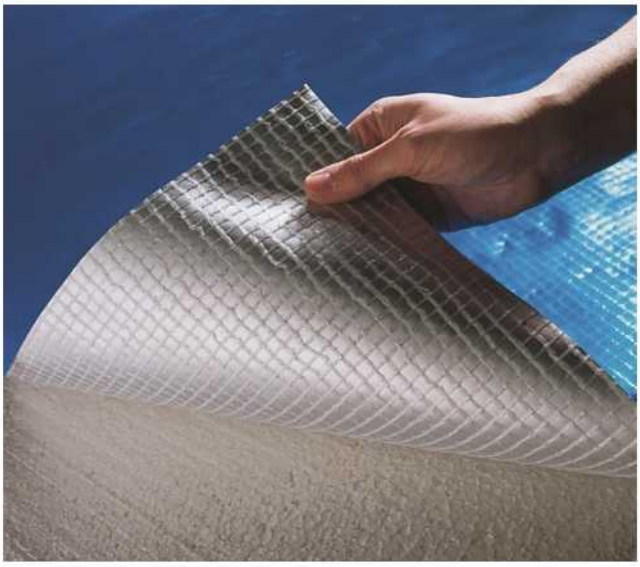
Agrément Certificate
13/5069
Product Sheet 1

VISQUEEN MEMBRANES

VISQUEEN GAS BARRIER

This Agrément Certificate Product Sheet[1] relates to Visqueen Gas Barrier, a low-density polyethylene gas barrier and damp-proof membrane, for use in concrete ground floors above and 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'.



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, methane and carbon dioxide gases into the building (see section 7).

Resistance to puncture — the membrane has a high 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 membrane 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 installed (see section 13).

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: 7 October 2016

John Albon – Head of Approvals Construction Products

Claire Curtis-Thomas
Chief Executive

Originally certificated on 10 December 2013

Certificate amended on 16 February 2017 to update company name.

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.

Regulations

In the opinion of the BBA, Visqueen 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 this Requirement. See section 7.1 of this Certificate.
Requirement:	**C2(a)**	**Resistance to moisture**
Comment:		When properly installed in a correctly-designed structure, the product 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 product is of an acceptable material. See section 13.1 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 product can contribute to a construction satisfying this Regulation. See section 13.1 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 product 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 section 7.1 of this Certificate.
Standard:	3.4	Moisture from the ground
Comment:		When properly installed in a correctly-designed structure, the product 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 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(a)(i)**	**Fitness of materials and workmanship**
Comment:	**(iii)(b)(i)**	The product is acceptable. See section 13.1 and the *Installation* part of this Certificate.

Regulation:	**26**	**Site preparation and resistance to contaminants**
Comment:		The product can contribute to a structure satisfying the requirements of this Regulation. See sections 7.1 of this Certificate.
Regulation:	**28**	**Resistance to moisture and weather**
Comment:		When properly installed in a correctly-designed structure, the product 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 2016

NHBC accepts the use of Visqueen Gas Barrier, provided it is installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards*, Chapters 4.1 *Land quality — managing ground conditions* and 5.1 *Substructure and ground bearing floors.*

CE marking

The Certificate holder has taken the responsibility of CE marking the product in accordance with harmonised European Standard 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 Visqueen Gas Barrier is a multi-layer polyethylene membrane reinforced with an integral aluminium foil and reinforcing grid. The top surface of the membrane is blue and ribbed, and the underside is silver and has a smooth finish.

1.2 The membrane has the following nominal characteristics:

Thickness* (mm)	0.4 (effective thickness)
Roll length* (m)	25, 50(1)
Roll width* (m)	2(1)
Mass per unit area* ($g \cdot m^{-2}$)	400
Tensile strength* ($N \cdot mm^{-2}$)	
MD	350
CD	350
Elongation* (%)	
MD	17
CD	15
Nail tear resistance* (N)	
MD	358
CD	368
Watertightness* (2 kPa)	pass.

(1) Other widths and lengths are available on request.

1.3 Ancillary products for use with the membrane include:

- Visqueen Double-sided Tape — a butyl, double-sided tape for joints and laps
- Visqueen Gas Resistant Foil Tape — a single-sided jointing tape, suitable for securing laps and joints
- Visqueen Gas Resistant (GR) Lap Tape — a single-sided jointing tape suitable for sealing laps.

1.4 Ancillary products available for use with the membrane but outside the scope of this Certificate are:

- Visqueen pre-formed top hat units — for sealing around service pipe penetrations
- TreadGUARD^{1500} — a 100% recycled, heavy-duty protection layer used to prevent damage to the membrane
- TreadGUARD^{300} — a medium-duty protection blanket used to prevent damage to the membrane
- Visqueen Detailing Strip — used for sealing around column penetrations and for repairs/patching of membranes damaged during installation
- Visqueen Gas Resistant Damp Proof Course — a high-performance damp-proof course (dpc) with low permeability to radon, carbon dioxide and methane gas
- Visqueen Zedex CPT DPC — a high-performance, flexible dpc and cavity tray
- Visqueen GR SAM — aluminium/polyethylene laminate with a modified bitumen adhesive backing, used to maintain gas membrane continuity on vertical surfaces and around complex penetrations and foundations
- Visqueen Geocomposite Drainage and Venting Mat — a 25 and 40 mm thick vent mat which forms a void to collect and transmit water and/or gas adjacent to drainage outlets or collector pipes.

2 Manufacture

2.1 The product 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 being 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 EN ISO 9001 : 2008 by Bureau Veritas (Certificate BE 006239-1/ NL 007913-1).

3 Delivery and site handling

3.1 Rolls are wrapped in low-density polythene film. Each roll has a leaflet enclosed describing the product 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 Visqueen Gas Barrier.

Design Considerations

4 Use

4.1 Visqueen Gas Barrier is satisfactory for use as a gas-resistant barrier to restrict the ingress of radon, methane and carbon dioxide gases 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 *Radon: Guidance on protective measures for new buildings* 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 2 and BS 8000-4 : 1989.

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, Requirement C2(a), section 4.6
Scotland — Mandatory Standard 3.4, clauses 3.4.2, 3.4.4 and 3.4.6
Northern Ireland — Regulation 28(a).

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

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

Table 1 Gas permeability of Visqueen Gas Barrier

Gas	Method	Result
Methane	BS ISO 15105-1	< 0.15 $ml \cdot m^2 \cdot day^{-1} \cdot atm^{-1}$
Carbon dioxide	ISO 2782	14.6 $ml \cdot m^2 \cdot day^{-1} \cdot atm^{-1}$
Radon	K124/02/95 (Czech Technical University)	0.55 x 10-12 $m^2 \cdot s^{-1}$

7.3 BRE Report BR 211 : 2015 recommends a 300 µm thick polyethylene sheet as the minimum required thickness for a radon 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 product meets 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 product will not be damaged by normal foot traffic.

9 Compatibility with other materials

The membrane contains an aluminium foil interplay which may be subject to corrosion by alkaline conditions if damage to the membrane and exposure occurs. However, under normal circumstances, the polyethylene faces of the membrane are compatible with other materials and products typically used in the same areas, with the exception of those containing pitch.

10 Underfloor heating

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

11 Effects of temperature

When the membrane is loose-laid and the joints are taped, the installation temperature should not be below 5°C.

12 Maintenance

As the product is confined under concrete and has suitable durability (see section 13), maintenance is not required. However, any damage occurring before enclosure must be repaired (see section 16).

13 Durability



13.1 Results of artificial ageing tests confirm that a satisfactory retention of physical properties is achieved. The membrane 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 building.

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

Installation

14 General

14.1 Visqueen Gas Barrier must be installed and fixed in accordance with the Certificate holder's instructions and the relevant clauses of BRE Report BR 211 : 2015, and following the guidance of BS 8485 : 2015.

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.

14.3 Unless the base is smooth, a surface blinding of soft sand (or similar material) should be used to prevent puncturing during installation or when concrete screed is being placed.

14.4 If the membrane is installed below a steel-reinforced floor or concrete slab, it should be covered with a screed or Visqueen TreadGUARD^{1500} or TreadGUARD^{300} prior to the positioning of the reinforcement.

14.5 If the membrane is above the slab, its installation should be delayed until just before laying of the screed or flooring, to avoid damage from site traffic.

15 Procedure

15.1 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.

15.2 The membrane is rolled out with the coloured surface uppermost, ensuring that it is properly aligned. All end and side overlaps should be a minimum of 150 mm and prepared in accordance with the Certificate holder's instructions.

15.3 All joints must be bonded with Visqueen Double Sided Tape. Joints are secured with Visqueen Gas Resistant Foil Tape.

15.4 The surface of the gas membrane to be lapped must be dry and dust-free. When using Visqueen Double-sided Tape, the joints are pressed down and well rolled.

15.5 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.

15.6 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.

15.7 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.

15.8 The membrane 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 membrane, and laps sealed with double-sided tape and secured with the butyl tape. All patched areas must extend a minimum of 150 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

17 Tests

17.1 An assessment was made in relation to:

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

17.2 Tests were carried out to determine

- mass per unit area
- density
- water vapour permeability
- water vapour resistance
- static indentation
- dynamic indentation
- low-temperature flexibility
- dimensional stability
- watertightness
- heat ageing at 70°C for 84 days followed by tensile strength and elongation, nail tear resistance and watertightness
- short-term UV ageing, followed by tensile strength and elongation
- tensile strength of joints
- heat ageing of joints at 70°C for 84 days followed by tensile strength
- leakage of 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

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

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

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 *Flexible sheets for waterproofing — Plastic and rubber damp proof sheets including plastic and Rubber basement tanking sheet — Definitions and characteristics*

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

ISO 2782 : 1995 *Rubber, vulcanized or thermoplastic — Determination of permeability to gases*

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.

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