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**Agrément Certificate**

**13/5069**

Product Sheet 4 Issue 3

**VISQUEEN MEMBRANES**

**VISQUEEN RADON R400 MEMBRANE**

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to Visqueen Radon R400 Membrane, for use as a low-density polyethylene gas barrier and damp-proof membrane in concrete ground floors, above and below the slab not subject to hydrostatic pressure, to protect the building against moisture and radon from the ground.

(1) Hereinafter referred to as 'Certificate'.

**The assessment includes**

**Product factors:**

- compliance with Building Regulations
- compliance with additional regulatory or non-regulatory information where applicable
- evaluation against technical specifications
- assessment criteria and technical investigations
- uses and design considerations

**Process factors:**

- compliance with Scheme requirements
- installation, delivery, handling and storage
- production and quality controls
- maintenance and repair

**Ongoing contractual Scheme elements†:**

- regular assessment of production
- formal 3-yearly review



**KEY FACTORS ASSESSED**

- Section 1. Mechanical resistance and stability
- Section 2. Safety in case of fire
- Section 3. Hygiene, health and the environment
- Section 4. Safety and accessibility in use
- Section 5. Protection against noise
- Section 6. Energy economy and heat retention
- Section 7. Sustainable use of natural resources
- Section 8. Durability

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 are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of Third issue: 25 May 2023

Originally Certificated on 10 December 2013

A handwritten signature in black ink, appearing to read 'Hardy Giesler'.

Hardy Giesler  
Chief Executive Officer

*This BBA Agrément Certificate is issued under the BBA's Inspection Body accreditation to ISO/IEC 17020. Sections marked with † are not issued under accreditation.*

*The BBA is a UKAS accredited Inspection Body (No. 4345), Certification Body (No. 0113) and Testing Laboratory (No. 3537).*

*Readers MUST check that this is the latest issue of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.*

*The Certificate should be read in full as it may be misleading to read clauses in isolation.*

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

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## SUMMARY OF ASSESSMENT AND COMPLIANCE

This section provides a summary of the assessment conclusions; readers should refer to the later sections of this Certificate for information about the assessments carried out.

### Compliance with Regulations

Having assessed the key factors, the opinion of the BBA is that Visqueen Radon R400 Membrane, 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 Building Regulations 2010 (England and Wales) (as amended)

<b>Requirement:</b> C1(2) Comment:	<b>Preparation of site and resistance to contaminants</b> The product can contribute to a construction satisfying this Requirement. See sections 1 and 3 of this Certificate.
<b>Requirement:</b> C2(a) Comment:	<b>Resistance to moisture</b> The product can contribute to a construction satisfying this Requirement. See sections 1 and 3 of this Certificate.
<b>Regulation:</b> 7(1) Comment:	<b>Materials and workmanship</b> The product is acceptable. See sections 8 and 9 of this Certificate.



#### The Building (Scotland) Regulations 2004 (as amended)

<b>Regulation:</b> 8(1) Comment:	<b>Fitness and durability of materials and workmanship</b> The product can contribute to a construction satisfying this Regulation. See sections 8 and 9 of this Certificate.
<b>Regulation:</b> 9 Standard: 3.1 Standard: 3.2 Comment:	<b>Building standards applicable to construction</b> Site preparation – harmful and dangerous substances Site preparation – protection from radon The product can contribute to satisfying the requirements of these Standards, with reference to clauses 3.1.2 <sup>(1)(2)</sup> , 3.1.6 <sup>(1)(2)</sup> , 3.1.7 <sup>(1)(2)</sup> , 3.1.8 <sup>(1)(2)</sup> , 3.2.1 <sup>(1)(2)</sup> and 3.2.2 <sup>(1)(2)</sup> . See sections 1 and 3 of this Certificate.
<b>Standard:</b> 3.4 Comment:	<b>Moisture from the ground</b> The product will enable a structure to satisfy the requirements of this Standard, with reference to clauses 3.4.1 <sup>(1)(2)</sup> , 3.4.2 <sup>(1)(2)</sup> , 3.4.5 <sup>(1)(2)</sup> and 3.4.7 <sup>(1)(2)</sup> . See section 1 of this Certificate.
<b>Standard:</b> 7.1(a) Comment:	<b>Statement of sustainability</b> 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.
<b>Regulation:</b> 12 Comment:	<b>Building standards applicable to conversions</b> 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 <sup>(1)(2)</sup> and Schedule 6 <sup>(1)(2)</sup> .

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).



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

<b>Regulation:</b>	<b>23(1)(a)(i)</b>	<b>Fitness of materials and workmanship</b>
<b>Comment:</b>	<b>(iii)(b)(i)</b>	The product is acceptable. See sections 8 and 9 of this Certificate.
<b>Regulation:</b>	<b>26(1)(b)(2)</b>	<b>Site preparation and resistance to contaminants</b>
<b>Comment:</b>		The product will contribute to a structure satisfying the requirements of this Regulation. See sections 1 and 3 of this Certificate.
<b>Regulation:</b>	<b>28(a)</b>	<b>Resistance to moisture and weather</b>
<b>Comment:</b>		The product will enable a structure to satisfy this Regulation. See sections 1 and 3 of this Certificate.

### Additional Information

#### NHBC Standards 2023

In the opinion of the BBA, Visqueen Radon R400 Membrane, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Technical Requirement R3 and Chapters 4.1 *Land quality – managing ground conditions*, 5.1 *Substructure and ground bearing floors* and 5.2 *Suspended ground floors*.

### Fulfilment of Requirements

The BBA has judged Visqueen Radon R400 Membrane to be satisfactory for use as described in the Certificate. The product has been assessed as a gas barrier to restrict the ingress of radon, and as a damp-proofing membrane, for use in concrete ground floors above and below slabs not subject to hydrostatic pressure, to protect the building against moisture and radon from the ground.

### ASSESSMENT

#### Product description and intended use

The Certificate holder provided the following description for the product under assessment.

Visqueen Radon R400 Membrane is a red co-polymer thermoplastic membrane containing low-density polyethylene.

The membrane has the nominal characteristics given in Table 1.

**Table 1 Nominal characteristics**

Characteristic (unit)	
Thickness (mm)	0.4
Roll length (m)	20 <sup>(1)</sup>
Roll width (m)	4 <sup>(1)</sup>
Mass per unit area (g·m <sup>-2</sup> )	366
Tensile Strength (N·mm <sup>-2</sup> )	
MD	>15
CD	>15
Elongation (%)	
MD	>400
CD	>400
Nail tear resistance (N)	
MD	>150
CD	>150
Resistance to static loading (kg)	20
Watertightness (2kPa)	Pass
Durability (artificial ageing)	Pass
Durability against chemicals	Pass

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

### Ancillary items

The following ancillary items must be used with the product and have been assessed with the product:

- VisqueenPro Double Sided Jointing Tape— a double-sided butyl tape for bonding laps
- Visqueen Gas Resistant Foil Lap Tape — a single-sided jointing tape for sealing laps
- Visqueen GR Lap Tape — a single-sided jointing tape suitable for sealing laps.

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:

- Visqueen Pre-formed Top Hat Units — for sealing around service pipe penetrations
- TreadGUARD1500 — a heavy-duty protection layer used to prevent damage to the membrane
- TreadGUARD300 — a medium-duty protection layer used to prevent damage to the membrane
- VisqueenPro Detailing Strip — a single-sided detailing membrane for sealing awkward or complex junctions e.g. corners, column penetrations, service pipe penetrations, and for repairs/patching of membranes damaged during installation
- Visqueen Gas Resistant Damp Proof Course — a damp-proof course (DPC)
- Visqueen Zedex CPT DPC — a DPC and cavity tray
- Visqueen Gas Resistant Self Adhesive Membrane (GR SAM) — aluminium/polyethylene laminate with a modified bitumen adhesive backing, used to maintain continuity on vertical surfaces and around complex penetrations and foundations
- Visqueen High Performance Tanking Primer — primes surfaces prior to the application of Visqueen Gas Resistant Self Adhesive Membrane (GR SAM)
- Visqueen Gas Vent Mat — a 25 or 40 mm thick venting mat that forms a void to collect high levels of gas concentrations underneath the concrete slab
- Visqueen Radon Sump — a pre-fabricated plastic moulded unit which provides a preferential pathway for radon gas to escape when activated with a mechanical fan.

## **Product assessment – key factors**

The product was assessed for the following key factors, and the outcome of the assessments are shown below. Conclusions relating to the Building Regulations apply to the whole of the UK unless otherwise stated.

# 1 Mechanical resistance and stability

Data were assessed for the following characteristics.

## 1.1 Structural and mechanical properties

1.1.1 Results of tests for mechanical properties are given in Table 2.

Product assessed	Assessment method	Requirement	Result
Visqueen Radon R400 Membrane	Static indentation to BS EN 12730 : 2001 Method A (soft underlay)	Value achieved	20 kg
Visqueen Radon R400 Membrane	Tensile strength to BS EN 12311-2 : 2000 Method B longitudinal	Value achieved	15.36 N·mm <sup>-2</sup>
	Tensile strength to BS EN 12311-2 : 2000 Method B transverse	Value achieved	14.48 N·mm <sup>-2</sup>
Visqueen Radon R400 Membrane	Shear resistance of joints to BS EN 12317-2 : 2000	Value achieved	2.8 N·50mm <sup>-1</sup>
	Resistance to impact to BS EN 12691 : 2018	No leakage	200 mm puncturing tool
Visqueen Radon R400 Membrane	Tear strength to BS EN 12310-1 : 2000 longitudinal	Value achieved	185 N
	Tear strength to BS EN 12310-1 : 2000 transverse	Value achieved	195 N

1.1.2 On the basis of the data assessed, the product can be punctured by sharp objects and care must be taken when handling building materials over the exposed surface.

1.1.3 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.

## 2 Safety in case of fire

Not applicable.

## 3 Hygiene, health and the environment

Data were assessed for the following characteristics.

### 3.1 Weathertightness and damp-proofing

3.1.1 Results of damp-proofing tests are given in Table 3.

**Table 3 Weathertightness and damp-proofing**

Product assessed	Assessment method	Requirement	Result
Visqueen Radon R400 Membrane	Watertightness to EN 1928 : 2000	No leakage after 24 hours exposure to 1 metre head of water	Pass
Visqueen Radon R400 Membrane	Water vapour transmission properties to BS EN 1931 : 2000 Method B	Declared value ± 30%	Pass
Visqueen Radon R400 Membrane with 50 mm overlap, with Visqueen VisqueenPro Double Sided Jointing Tape and Visqueen Gas Resistant Foil Lap Tape	Resistance to leakage at joints under air pressure to MOAT 27 : 1983	No bubbles or any joint degradation	Pass

3.1.2 On the basis of the data assessed the membrane, including joints, provides an effective barrier to the passage of liquid moisture from the ground.

3.1.3 On the basis of data assessed the membrane is impervious to water and provides a waterproofing layer capable of accepting minor structural movements without damage.

### 3.2 Resistance to hazardous ground gases

3.2.1 Results of resistance to hazardous ground gases tests are given in Table 4.

**Table 4 Results of resistance to hazardous ground gases tests**

Product assessed	Assessment method	Requirement	Result
Visqueen Radon R400 Membrane	Radon permeability, SP Technical Research Institute of Sweden internal method	Value achieved	$5.77 \times 10^{-12} \text{ m}^2 \cdot \text{s}^{-1}$

3.2.1 On the basis of data assessed, the product will restrict the ingress of radon into buildings from naturally occurring sources.

3.2.2 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.

## **4 Safety and accessibility in use**

Not applicable.

## **5 Protection against noise**

Not applicable.

## **6 Energy economy and heat retention**

Not applicable.

## **7 Sustainable use of natural resources**

Not applicable.

## 8 Durability

8.1 The potential mechanisms for degradation and the known performance characteristics of the materials in this product were assessed.

8.2 Specific test data were assessed as given in Table 5.

*Table 5 Results of durability tests*

Product assessed	Assessment method	Requirement	Result
Visqueen Radon R400 Membrane	Low temperature flexibility to BS EN 1109 : 1999	Value achieved	-30°C
Visqueen Radon R400 Membrane	Tensile strength to BS EN 12311-2 : 2000 Method B Heat aged at 80°C for 50 days UV aged - 100 hours UVB	No significant deterioration	Pass Pass
Visqueen Radon R400 Membrane	Elongation to BS EN 12311-2 : 2000 Method B Heat aged at 80°C for 50 days UV aged - 100 hours UVB	No significant deterioration	Pass Pass

### 8.3 Service life

8.3.1 Under normal service conditions, the product will have a life of at least the life of the building, provided it is designed, installed, and maintained in accordance with this Certificate and the Certificate holder's instructions.

8.3.2 Long periods of exposure to ultraviolet light will reduce the effectiveness of the product and must be avoided.

## PROCESS ASSESSMENT

Information provided by the Certificate holder was assessed for the following factors:

## 9 Design, installation, workmanship and maintenance

### 9.1 Design

9.1.1 The design process was assessed, and the following requirements apply in order to satisfy the performance assessed in this Certificate.

9.1.2 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.

9.1.3 There will be no adverse effect on the membrane from underfloor heating under normal service conditions. In other circumstances, the certificate's holder advice should be sought, but such advice is outside of the scope of this Certificate.

### 9.2 Installation

9.2.1 Installation instructions provided by the Certificate holder were assessed and judged to be appropriate and adequate.

9.2.2 The product 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 + A1 : 2019. A summary of instructions and guidance are provided in Annex A of this Certificate.

9.2.3 All gas membrane installations must be subject to third-party validation, in accordance with BS 8485 : 2015 + A1 : 2019.

9.2.4 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.

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

9.2.6 If the membrane is installed below a reinforced floor or concrete slab, it must be covered with a screed or protection layer prior to the positioning of the reinforcement.

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

9.2.8 The product must only be installed over a surface that has a smooth finish, ie it must be free from voids, projections and mortar deposits. Surfaces must be dry and free from dust and frost.

9.2.9 All joints must be bonded with Visqueen Double-sided Tape and secured with Visqueen Gas Resistant Foil Tape.

9.2.10 The surface of the gas membrane to be lapped must be dry and dust-free.

9.2.11 All end and side overlaps should be a minimum of 150 mm and prepared in accordance with the Certificate holder's instructions.

9.2.12 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.

### 9.3 Workmanship

9.3.1 Practicability of installation was assessed against BS 8485 : 2015 + A1 : 2019, on the basis of Certificate holder's information and a site visit to witness an installation in progress. To achieve the performance described in this Certificate, installation of the product must be carried out by a competent general builder, or a contractor, experienced with this type of product.

9.3.2 The BBA operates an Approved Installer Scheme for gas membranes; details of approved installer companies are included on the BBA website ([www.bbacerts.co.uk](http://www.bbacerts.co.uk)).

### 9.4 Maintenance and repair

9.4.1 As the product is confined under concrete and has suitable durability, maintenance is not required. However, any damage occurring during installation must be repaired using a patch of the membrane, and bonded with VisqueenPro Double Sided Jointing Tape and sealed with Visqueen Gas Resistant Foil Lap Tape. All patched areas must extend a minimum of 150 mm from the damaged area.

9.4.2 If required by the local authority, repair work should be confirmed by an independent validation report (see section 9.2.3).

## **10 Manufacture**

10.1 The production processes for the product have been assessed, and provide assurance that the quality controls are satisfactory according to the following factors:

10.1.1 The manufacturer has provided documented information on the materials, processes, testing and control factors.

10.1.2 The quality control operated over batches of incoming materials has been assessed and deemed appropriate and adequate.

10.1.3 The quality control procedures and product testing to be undertaken have been assessed and deemed appropriate and adequate.



10.1.4 The process for management of non-conformities has been assessed and deemed appropriate and adequate. An audit of each production location was undertaken, and it was confirmed that the production process was in accordance with the documented process, and that equipment has been properly tested and calibrated.

†10.1.5 The BBA has undertaken to review 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.

## **11 Delivery and site handling**

11.1 The Certificate holder stated that the product is delivered to site in packaging bearing the product name, company name, batch number, health and safety information and weight of contents in kilograms. The BBA logo incorporating the number of this Certificate is printed on the leaflet and pallet label.

11.2 Delivery and site handling must be performed in accordance with the Certificate holder's instructions and this Certificate, including:

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

## ANNEX A – SUPPLEMENTARY INFORMATION

Supporting information in this Annex is relevant to the product but has not formed part of the material assessed for the 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.

### CE marking

The Certificate holder has taken the responsibility of CE marking the product, in accordance with harmonised European Standard EN 13967 : 2012.

### Management Systems Certification for production

The management system of the manufacturer has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by SGS Ltd (Certificate GB17/873194).

### Additional information on installation

#### **General**

- A.1 The membrane is rolled out with the coloured surface uppermost, ensuring that it is properly aligned.
- A.2 When taping the membrane joints, the joints are pressed down and well rolled. Alternatively, joints can be hot-air-welded.
- A.3 The membrane should be covered by a screed or other protective layer as soon as possible after installation.

## Bibliography

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

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 1931 : 2000 *Flexible sheets for waterproofing. Bitumen, plastic and rubber sheets for roof waterproofing — Determination of water vapour transmission properties*

BS EN 12311-2 : 2000 *Flexible sheets for waterproofing — Determination of tensile properties — Plastic and rubber sheets for roof waterproofing*

BS EN 12691 : 2018 *Flexible sheets for waterproofing — Bitumen, plastic and rubber sheets for roof waterproofing — Determination of resistance to impact*

BS EN 12730 : 2015 *Flexible sheets for waterproofing — Bitumen, plastic and rubber sheets for roof waterproofing — Determination of resistance to static loading*

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

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*

MOAT 27 : 1983 *General directive for the assessment of roof waterproofing systems*

## Conditions of Certificate

### Conditions

1 This Certificate:

- relates only to the product 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.

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.

3 This Certificate will be displayed on the BBA website, and the Certificate Holder is entitled to use the Certificate and Certificate logo, provided that the product 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.

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

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

6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product which is contained or referred to in this Certificate is the minimum required to be met when the product 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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