Icopal Ltd
BMI House
2 Pitfield
Kiln Farm
Milton Keynes MK11 3LW

Tel: 01908 015760
e-mail: technical.uk@bmigroup.com
website: www.icopal.co.uk

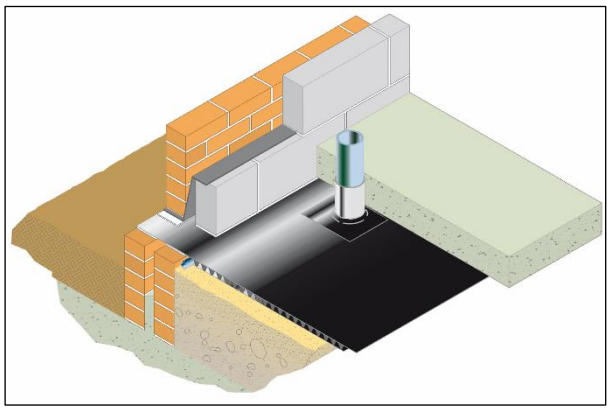
Agrément Certificate
00/3668
Product Sheet 1

MONARFLEX GAS-RESISTANT MEMBRANES

MONARFLEX REFLEX SUPER GAS-RESISTANT MEMBRANE

This Agrément Certificate Product Sheet(1) relates to Monarflex Reflex Super Gas-Resistant Membrane, for use above or below concrete ground floor slabs not subject to hydrostatic pressure, as a gas barrier and damp-proof membrane (dpm) 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 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 12).

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

On behalf of the British Board of Agrément

Date of Sixth issue: 24 June 2020

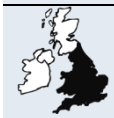
Originally certificated on 18 February 2000

Hardy Giesler
Chief Executive Officer

British Board of Agrément
Bucknalls Lane
Watford
Herts WD25 9BA
©2020
tel: 01923 665300
clientservices@bbacerts.co.uk
www.bbacerts.co.uk

Regulations

In the opinion of the BBA, Monarflex Reflex Super Gas-Resistant 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 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)**	**Preparation of site 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(1)**	**Materials and workmanship**
Comment:		The product is acceptable. See section 12.1 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 use of the product satisfies the requirements of this Regulation. See section 12.1 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 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) 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 clauses 3.4.2(1)(2), 3.4.4(1)(2) and 3.4.6(1)(2) of this Standard. 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:		All comments given for 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 12.1 and the *Installation* part of this Certificate.

Regulation:	**26(2)**	**Site preparation and resistance to contaminants**
Comment:		The product can contribute to a structure satisfying the requirements of this Regulation. See section 7.1 of this Certificate.
Regulation:	**28(a)**	**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* (1.3) of this Certificate.

Additional Information

NHBC Standards 2020

In the opinion of the BBA, Monarflex Reflex Super Gas-Resisitant 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*, 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.

Technical Specification

1 Description

1.1 Monarflex Reflex Super Gas-Resistant Membrane is a gas barrier and dpm used to protect against moisture, radon, methane and carbon dioxide from the ground, comprising a composite six-layer polyethylene membrane encapsulating an aluminium foil and reinforcement grid. The membrane has a thickness of 0.4 mm (excluding the reinforcement grid) and total product thickness of 0.6 mm (including the reinforcement grid).

1.2 The top surface is sand-coloured and ribbed, while the underside is silver with a smooth finish.

1.3 The membrane is manufactured to the nominal characteristics of:

Total Product Thickness (mm)	0.6 (including reinforcement)
Effective thickness (mm)	0.4
Width (m)	2.05
Roll length (m)	25, 50
Roll weight (kg)(1)	23, 46
Mass per unit area ($g \cdot m^{-2}$)	440
Tensile strength (N per 50 mm)	
MD	≥550
CD	≥550
Elongation (%)	
MD	≥15
CD	≥12
Nail tear resistance (N)	
MD	≥300

CD	≥300
Resistance to liquid water	Pass at 2 kPa
Joint strength (N per 50 mm)	
tape Monobond	≥50
welding	≥100.

(1) Pre-welded sheets are available to order.

1.4 Ancillary items for use with the product include:

- Monobond — a 70 mm wide, double-sided gas barrier sealant tape, for joining side and end overlaps
- MonarSeal MRX — a self-adhesive gas membrane for three-dimensional sealing and patching.

2 Manufacture

2.1 The product is manufactured by extrusion and lamination processes.

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

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

2.3 The management systems of the manufacturer have been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by TÜV SUD Slovakia s.r.o. (Certificate Q 1243-3).

3 Delivery and site handling

3.1 Rolls and pre-welded sheets are wrapped in clear polythene film, marked with a label bearing the product name, width and length, and the Certificate holder's address and phone number. The BBA logo incorporating the number of this Certificate is printed on the wrapper.

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

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Monarflex Reflex Super Gas-Resistant Membrane.

Design Considerations

4 Use

4.1 Monarflex Reflex Super Gas-Resistant Membrane 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 dpm in accordance with CP 102 : 1973 Section 3, BS 8000-0 : 2014 and BS 8000-4 : 1989.

5 Practicability of installation

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

6 Resistance to water vapour

6.1 The membrane, including joints, provides an effective barrier to the passage of 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 documents supporting the national Building Regulations.

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 into buildings from landfill and naturally occurring sources, and satisfy the performance criteria for a gas-resistant membrane as defined in BS 8485 : 2015(1).

7.2 Measured methane gas permeability for the membrane is given in Table 1.

Table 1 Methane gas permeability

Gas	Method	Result
Methane	ISO 15105-1 : 2007	≤ 0.12 $ml \cdot m^{-2} \cdot day^{-1} \cdot atm^{-1}$

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

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

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 interply 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 Effects of temperature

The product can be installed in all normal site conditions down to -12°C. The membrane must be dry and free from ice during jointing operations.

11 Maintenance

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

12 Durability

12.1 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.

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

13 Reuse and recyclability

The product comprises polyethylene, which can be recycled.

Installation

14 General

14.1 Monarflex Reflex Super Gas-Resistant Membrane must be installed and fixed in accordance with the Certificate holder's instructions, the relevant clauses of CP 102 : 1973 Section 3, BS 8000-0 : 2014 and BS 8000-4 : 1989.

14.2 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.

14.3 If the membrane is installed below a steel-reinforced floor or concrete slab, it should be covered with a screed or protection boards prior to the positioning of the reinforcement.

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

15 Procedure

15.1 Monarflex Reflex Super Gas-Resistant Membrane must only be applied to surfaces that have a smooth finish, ie free from voids, projections and mortar deposits. Surfaces must also be dry and free from dust and frost.

15.2 Concrete surfaces must 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 pointed to give a smooth surface without sudden changes in level.

15.3 The product is rolled out, ensuring that it is properly aligned. All end and side overlaps must be a minimum of 150 mm, and prepared in accordance with the manufacturer's instructions.

15.4 The surface of the membrane to be lapped must be dry and dust-free. To ensure a watertight bond and gas-tight integrity, all laps and joints must be extrusion welded where possible. When using the specified 70 mm wide Monobond gas sealant tape, the joints must be firmly pressed down and well rolled.

15.5 All service penetrations and direction changes must be properly detailed. Service ducts must be vented to prevent the possibility of gas accumulating in confined spaces.

15.6 The product must extend over the footprint of the building, with a stepped damp-proof course separated with a mortar joint.

15.7 The product must 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 product during construction.

15.8 The membrane installation should be subject to third-party independent validation, in accordance with the BS 8485 : 2015.

16 Repair

Any damage to the product must be repaired using a patch of the membrane welded in place or a patch of MonarSeal MRX self-adhesive gas membrane. All patches must extend a minimum of 150 mm from the damaged area. If required by the local authority, repair work must 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:

- dimensions
- tensile strength and elongation
- nail tear resistance
- resistance to static loading
- impact resistance
- joint strength
- watertightness on controls and following heat ageing
- watertightness after exposure to chemicals
- bitumen compatibility.

17.2 Tests were carried out to determine:

- water vapour transmission and resistance
- resistance to chisel impact
- resistance to leakage
- tensile strength of joints on controls and after 28 days heat ageing at 60°C
- low temperature flexibility
- tensile strength and elongation on controls and after 28 days heat ageing at 60°C and 100 hours UVB exposure
- nail tear strength on controls and after 56 days heat ageing at 60°C
- dimensional stability

in order to assess:

- product characteristics
- durability of the product and joints.

18 Investigations

18.1 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.

18.2 An evaluation was made of data on the permeability of radon, methane and carbon dioxide in relation to the product.

18.3 A site visit was carried out to assess the practicability of installation.

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

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

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

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

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

19 Conditions

19.1 This Certificate:

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

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

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

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

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

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

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

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