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Agrément Certificate
97/3325
Product Sheet 1

GCP STRUCTURAL WATERPROOFING MEMBRANES

BITUTHENE 3000

This Agrément Certificate Product Sheet[1] relates to Bituthene 3000, a self-adhesive damp-proof and waterproof membrane for use in concrete ground floors, above or below the slab, on underground structures and as externally applied tanking below ground. It is also for use to protect the building against radon 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 product, including joints, provides an effective barrier to the passage of water and water vapour from the ground (see section 6).

Resistance to underground gases — the product will restrict the ingress of radon into the building (see section 7).

Resistance to mechanical damage — the product will accept, without damage, the limited foot traffic and loads associated with installation (see section 8).

Adhesion and stability — the adhesion of the product to the substrate and to itself is satisfactory (see section 9).

Durability — under normal service conditions, the product will provide an effective barrier to the transmission of liquid water, water vapour and radon for the lifetime of the structure 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 Third issue: 21 September 2018

John Albon – Head of Approvals Construction Products

Claire Curtis-Thomas
Chief Executive

Originally certificated on 3 February 1997

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.

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

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Regulations

In the opinion of the BBA, Bituthene 3000, 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 product forms an effective barrier to radon enabling compliance with this Requirement. The product can contribute to a structure satisfying this Requirement for protection against methane and carbon dioxide. 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 product will enable a structure to satisfy this Requirement. See section 6.1 of this Certificate.

Regulation: **7** **Materials and workmanship**
Comment: The product is an acceptable material. See section 12 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 and the *Installation* part of this Certificate.

Regulation: **9** **Building standards applicable to construction**
Standard: 3.1 Site preparation – harmful and dangerous substances
Standard: 3.2 Site preparation – protection from radon gas
Comment: When properly installed in a correctly designed structure, the product will restrict the movement of radon within the ground slab and thus contribute to compliance with these Standards, with reference to clauses 3.1.2[(1)(2)], 3.1.6[(1)(2)], 3.1.7[(1)(2)], 3.1.8[(1)(2)], 3.2.1[(1)(2)] and 3.2.2[(1)(2)]. See sections 7.1 and 7.2 of this Certificate.

Standard: 3.4 Moisture from the ground
Comment: The product will enable a structure to satisfy the requirements of this Standard with reference to clauses 3.4.2[(1)(2)], 3.4.4[(1)(2)] and 3.4.6[(1)(2)]. See section 6.1 of this Certificate.

Standard: 7.1(a)(b) 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 12 and the *Installation* part of this Certificate.

Regulation:	**26(a)**	**Preparation of sites and resistance to dangerous and harmful substances**
Comment:		When properly installed in a correctly designed structure, the product forms an effective barrier to radon enabling compliance with this Regulation. The product can contribute to a structure satisfying the requirements of this Regulation for protection against methane and carbon dioxide. See sections 7.1 and 7.2 of this Certificate.
Regulation:	**28(a)**	**Resistance to moisture and weather**
Comment:		When properly installed in a correctly designed structure, the product will enable a structure to satisfy the requirements of this Regulation. See section 6.1 of this Certificate.

Construction (Design and Management) Regulations 2015
Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See sections: 1 *Description* (1.2) and 3 *Delivery and site handling* (3.2, 3.3 and 3.4) of this Certificate.

Additional Information

NHBC Standards 2018

In the opinion of the BBA, Bituthene 3000, 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*, clause 5.1.20 *Damp-proofing concrete floors,* for use below the slab and in sandwich constructions, and 5.4 *Waterproofing of basements and other below ground structures,* for use externally.

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 product must be used in combination with either Type B or C waterproofing protection, as defined in BS 8102 : 2009.

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 Bituthene 3000 is a cold applied, two-ply, self-adhesive, damp-proof membrane comprising a top layer of high performance, high-density polyethylene (HDPE) bonded to a layer of bitumen/polymer adhesive carried on a release paper.

1.2 The nominal characteristics of the product are:

Thickness* (mm)	1.5
Width* (m)	1.0
Roll length (m)	20
Roll weight (kg)	35
Mass per unit area* ($kg \cdot m^{-2}$)	1.5
Watertightness* (60 kPa)	Pass

Tensile strength* (N per 50 mm)	≥200 (longitudinal) and ≥240 (transverse)
Elongation* (%)	≥270 (longitudinal) and ≥220 (transverse)
Nail tear strength* (N)	≥120 (longitudinal) and ≥120 (transverse)
Compatibility with bitumen*	Pass.

1.3 Ancillary items for use with the product are:

- Bituthene B1 Primer — a bituminous solution for priming substrates before application of the membrane on vertical surfaces or suspended slabs
- Bituthene S2 Primer — a synthetic primer for priming 'green' concrete and damp substrates
- Bituthene W2 Primer — a water based surface conditioner for concrete, masonry and wood surfaces.

1.4 Ancillary items for use with the product, but outside the scope of this Certificate, are:

- Bituthene LM — a liquid-applied compound for sealing around penetrations and irregular surfaces
- Bituthene Mastic — a bituminous putty used for sealing irregular surfaces
- GCP Protection — a range of protective layers
- Hydroduct 200 and 220 — a range of vertical drainage sheets.

2 Manufacture

2.1 Bituthene 3000 is manufactured by a compound mixing and coating process. The adhesive compound is blended and applied onto the release paper using traditional knife and roll techniques and then laminated with HDPE film.

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

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

2.3 The management system of the manufacturer, GCP Applied Technologies Inc., has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by Intertek (Certificate QMS-0816a-01).

3 Delivery and site handling

3.1 The product is delivered to site packaged in cardboard containers marked with the roll batch number and bearing the Certificate holder's name and the BBA logo incorporating the number of this Certificate.

3.2 Rolls must be stacked on end and stored under cover, below 30°C. The primers and Bituthene Mastic must be stored in a dry, sealed area for inflammable materials and at a temperature of between 5 and 30°C. The temperature of the separate components of Bituthene LM must not fall below freezing.

3.3 Bituthene B1 and S2 Primers are delivered to site in 5 litre cans and 25 litre drums, and Bituthene W2 Primer is delivered to site in 3.75 litre units. Bituthene LM and Bituthene Mastic are delivered to site in 5.7 and 4.5 litre units respectively.

3.4 The Certificate holder has taken the responsibility of classifying and labelling the product under the *CLP Regulation (EC) No 1272 / 2008 on the classification, labelling and packaging of substances and mixtures.* Users must refer to the relevant Safety Data Sheet(s).

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Bituthene 3000.

Design Considerations

4 Use

4.1 Bituthene 3000 is satisfactory for use as a damp-proof and waterproof membrane in accordance with CP 102 : 1973 Section 2 and BS 8000-4 : 1989, for above or below ground floor slabs, underground structures (such as podium slabs and roofs to underground car parks) and for externally applied tanking below ground in accordance with CP 102 : 1973 and BS 8102 : 2009.

4.2 The product can be used externally to provide an effective barrier to the transmission of liquid water and water vapour where Grades 1 to 3 waterproofing protection is required, as defined in Table 2 of BS 8102 : 2009. The product must not be used for negative side pressure waterproofing applications.

4.3 Where Grade 3 waterproofing protection is required, the environment must also be controlled by use of ventilation, dehumidification and/or air conditioning as appropriate to ensure dampness does not occur. See also the *Additional Information* part of this Certificate relating to the NHBC Standards.

4.4 The membrane is compatible with concrete, smooth brickwork and blockwork or screeded substrates and is resistant to those chemicals likely to occur in normal service conditions.

4.5 The product is satisfactory for use as a radon resistant membrane (see section 7).

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 and water vapour

6.1 The product, including joints, when completely sealed and consolidated, will adequately resist the passage of water and moisture from the ground and so satisfy the relevant requirements of the national Building Regulations.

6.2 The product is impervious to water and will give 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 into buildings from 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 Grade 3 waterproofing, the product will contribute to restricting the ingress of radon 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 the membrane are given in Table 1.

Table 1 Gas permeability of Bituthene 3000

Gas	Method	Result
Radon		
Unjointed	K124/02/95	1.9×10^{-11} $m^2 \cdot s^{-1}$
With self adhesive joint		1.1×10^{-11} $m^2 \cdot s^{-1}$

7.4 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 processes. In the opinion of the BBA, the product satisfies this criteria.

8 Resistance to mechanical damage

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

8.2 Provided there are no sharp objects present on the surface prior to and during installation of the protective layer, the product will not be damaged by normal foot or site traffic.

9 Adhesion and stability

The adhesion of the product to the substrates and to itself is satisfactory. The properties are such as to accommodate minor movements likely to occur under normal service conditions in the structure in which the membrane is incorporated.

10 Effects of temperature

10.1 The product will remain flexible and capable of being formed at the minimum recommended temperatures (see section 13.5).

10.2 When installed correctly and protected immediately after installation, the product should not achieve temperatures to which slippage due to softening of the adhesive layer can occur.

10.3 As best practice, batten termination at the top of a vertical drop may be required.

11 Maintenance

As the membrane is protected by a wall, backfill or screed and has suitable durability (see section 12), maintenance is not required. However, damage occurring prior to installation of the concrete must be repaired (see section 15).

12 Durability

The product, when fully protected and subjected to normal service conditions, will provide an effective barrier to the transmission of liquid water and water vapour, and will restrict the ingress of radon during the lifetime of the building.

Installation

13 General

13.1 Bituthene 3000 must be installed in accordance with the relevant requirements of this Certificate, CP 102 : 1973 Section 2, BS 8102 : 2009 and the Certificate holder's instructions. Additional guidance on the use of damp-proof membrane materials is available in BS 8000-0 : 2014 and BS 8000-4 : 1989. For radon gas-resistant applications, the product must be installed and fixed in accordance with the relevant clauses of BRE Report BR 211 : 2015.

13.2 All surfaces to which the membrane is to be applied must have a smooth finish (ie free from cavities, projections and mortar deposits), and need to be dry and free from frost. Concrete surfaces must be sound. 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.

13.3 In basement constructions, vertical surfaces are primed prior to the application of the membrane with:

- Bituthene B1 Primer at a rate of 10 to 12 m^2 per litre or
- Bituthene S2 Primer at a rate of 9 to 11 m^2 per litre or
- Bituthene W2 Primer at a rate of 7 to 8 m^2 per litre.

13.4 Bituthene S2 Primer enables application of the membrane to 'green' concrete, damp blockwork or brickwork and in damp or marginal weather conditions. Bituthene B1 and W2 Primers can be applied to dry substrates only. All primers must be allowed to dry for a minimum period of one hour, and must be touch dry before application of the membrane.

13.5 The membrane can be installed in all normal site conditions provided the air temperature is not below 5°C, to prevent the risk of surface condensation. The membrane must not be applied externally during snow or rain.

13.6 The membrane must be covered by a 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.

14 Procedure

14.1 The release paper is removed prior to applying the membrane (adhesive side) to the prepared substrate. In all cases, as the sheet is laid, the membrane must be pressed firmly from the middle to prevent trapping air. Joints are made by overlapping adjacent sheets with a minimum overlap of 50 mm at edges and ends.

14.2 All lap joints must be pressed and rolled to form a continuous bond and ensure watertightness.

14.3 At external and internal angles a 300 mm wide reinforcing strip of the product is applied before the membrane is laid. In addition, at internal angles a Bituthene LM or mortar fillet is installed prior to the reinforcing strip.

14.4 When the membrane is applied to the external structure, it must be protected against puncture during backfilling, or subsequently by the backfill, by GCP Protection immediately after installation. Alternatively, Hydroduct 200 and 220 vertical drainage sheets may be used where perimeter drainage is required.

14.5 Where the membrane is applied internally, the horizontally laid membrane is loaded with screed or concrete to resist uplift pressure.

15 Repair

Damage to the membrane can be adequately repaired by patching prior to the application of protection or backfilling. 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

16 Tests

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

- visible defects*
- dimensions and tolerances*
- resistance to impact*

- reaction to fire*
- water vapour transmission*
- tensile strength and elongation* on controls and following 24 weeks at 90°C
- tear resistance*
- watertightness on controls following
  — 12 weeks ageing at 70°C
  — 4 weeks ageing at 70°C subsequent to a compatibility with bitumen test*
  — 1 and 16 weeks immersion in lime water
- resistance to static loading*
- joint strength*.

16.2 Tests were carried out and the results assessed to determine:

- mass per unit area
- ring and ball softening point
- low temperature unrolling
- tensile strength and elongation and low temperature flexibility on controls and following 2 and 8 weeks heat ageing at 60°C, water soak for 4 weeks at 23°C and UV ageing for 500 QUV lamp exposure
- tensile strength of joints on controls and following 4 weeks heat ageing at 60°C, water soak for 1 week at 60°C
- vertical pull-off strength on controls and following 4 weeks at 60°C
- peel strength on controls and following 4 weeks at 60°C
- slippage
- substrate movement.

16.3 Test were carried out to assess:

- product characteristics and the coating medium
- durability of the product, the coating medium and joints
- properties when installed.

17 Investigations

17.1 An evaluation was made of test data on the permeability of radon, methane and carbon dioxide.

17.2 The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

17.3 Visits were made to sites in progress to assess the practicability of installation.

17.4 A user survey was carried out to assess performance in use.

17.5 Data from assessments leading to the issue of the previous Certificate 90/2553 were re-examined.

Bibliography

BRE Report BR 211 : 2015 *Radon : guidance on protective measures for new dwellings*

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 8102 : 2009 *Code of practice for protection of below ground structures against water from the ground*

BS 8485 : 2015 *Code of practice for the characterization and remediation from ground gas in affected areas*

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

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*

18 Conditions

18.1 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.

18.2 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.

18.3 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.

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

18.5 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.

18.6 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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