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Agrément Certificate

17/5459

Product Sheet 3

SHIELDFLEX R WATERPROOFING SYSTEMS

SHIELDTEC ROOF WATERPROOFING SYSTEM

This Agrément Certificate Product Sheet⁽¹⁾ relates to the ShieldTEC Roof Waterproofing System, a hot-applied reinforced polymer-modified bitumen applied in two layers, for use as a protected waterproofing system on flat (including those with zero fall), inverted and other protected roofs.

(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

Properties in relation to fire — the use of the system will enable a roof to be unrestricted under the Building Regulations (see section 7).

Resistance to wind uplift — the system will resist the effects of any likely wind suction acting on the roof (see section 8).

Resistance to mechanical damage — the system will accept the limited foot traffic and loads associated with installation and maintenance (see section 9).

Resistance to penetration by roots — when used in conjunction with a root resistant membrane, the system will resist penetration by roots (see section 10).

Durability — under normal service conditions, and when fully protected, the system will provide a durable roof waterproofing for the design life of the roof in which it is incorporated (see section 12).



The BBA has awarded this Certificate to the company named above for the system described herein. This system 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 First issue: 2 November 2017

John Albon – Head of Approvals
Construction Products

Claire Curtis-Thomas
Chief Executive

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.

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Regulations

In the opinion of the BBA, the ShieldTEC Roof Waterproofing System, 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:	B4(2)	External fire spread
Comment:		On flat roofs, the system, when used with suitable surface protection, will enable a roof to be unrestricted under this Requirement. See sections 7.1 to 7.3 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		Tests for water resistance indicate that the system will enable a roof to satisfy this Requirement. See section 6.1 of this Certificate.
Regulation:	7	Materials and workmanship
Comment:		The system is acceptable. See section 12 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Durability, workmanship and fitness of materials
Comment:		Use of the system satisfies the requirements of this Regulation. See sections 11 and 12 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	2.8	Spread from neighbouring buildings
Comment:		On flat roofs, the system, when used with suitable protection, can be regarded as having low vulnerability and will enable a roof to be unrestricted, with reference to clause 2.8.1 ⁽¹⁾⁽²⁾ of this Standard. See sections 7.1 to 7.3 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The system will enable a roof to satisfy the requirements of this Standard, with reference to clauses 3.10.1 ⁽¹⁾⁽²⁾ and 3.10.7 ⁽¹⁾⁽²⁾ . See section 6.1 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The system 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 made in relation to the system 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)(b)(i)	Fitness of materials and workmanship
Comment:		The system is acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The system will enable a roof to satisfy the requirements of this Regulation. See section 6.1 of this Certificate.
Regulation:	36(b)	External fire spread
Comment:		On flat roofs, the system, when used with suitable surface protection, will enable a roof to be unrestricted under the requirements of this Regulation. See sections 7.1 to 7.3 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: 3 *Delivery and site handling* (3.1 to 3.5 and 3.7) of this Certificate.

Additional Information

NHBC Standards 2017

In the opinion of the BBA, the ShieldTEC Roof Waterproofing System, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapter 7.1 *Flat roofs and balconies*.

Technical Specification

1 Description

1.1 The ShieldTEC Roof Waterproofing System comprises:

- ShieldTEC compound — a polymer-modified bitumen blended with other additives which is hot-applied in two layers to provide a waterproofing membrane with a nominal coating thickness of 6 mm
- ShieldFLEECE — a non-woven polyester reinforcement fleece with a nominal weight of 50 g·m⁻² which is embedded between the two layers of ShieldTEC compound
- ShieldFELT PS — a nominal 4 mm thick, polymer-modified bitumen, torch-on membrane reinforced with a nominal 160 g·m⁻² polyester fleece and with a polyethylene film attached to both faces, used over the previous two items to form a final protective layer.

1.2 Ancillary items necessary for some types of installation and included in this assessment are:

- ShieldPRIME — a cold-applied, solvent-based bitumen solution primer for use on concrete and other porous substrates prior to the application of ShieldTEC waterproofing membrane
- ShieldROOT B — a torch-on, SBS-modified bitumen waterproofing membrane with root resistant properties, for use in roof garden applications.

1.3 Other items or components which may be used with the system, but which are outside of the scope of this Certificate, are:

- drainage membranes
- expansion joint systems
- extruded polystyrene insulation boards
- other protection boards/membranes
- polypropylene geotextile root barriers
- retaining profiles
- paving and other ballast
- concrete repair products
- drainage outlet components.

Details of suitable products/specifications may be obtained from the Certificate holder.

2 Manufacture

2.1 ShieldTEC waterproofing membrane is manufactured by a batch process involving the blending of polymer-modified bitumen, fillers and other additives.

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.

3 Delivery and site handling

3.1 ShieldTEC compound is delivered to site in nominal 20 kg blocks packaged in polypropylene-lined cardboard boxes. The blocks are delivered on shrink-wrapped pallets with a maximum of 45 blocks per pallet.

3.2 ShieldFELT PS is supplied as 1 m x 8 m rolls. Rolls are packed on shrink-wrapped pallets with a maximum of 25 rolls per pallet. The product has a mass per unit area of 4.8 kg·m⁻².

3.3 ShieldFLEECE is supplied as 1 m x 500 m rolls. Each roll weighs approximately 25 kg.

3.4 ShieldROOT B is supplied as 1 m x 8 m rolls. Rolls are packed on shrink-wrapped pallets with a maximum of 25 rolls per pallet. The product has a mass per unit area of 5.0 kg·m⁻².

3.5 ShieldPRIME is supplied in 5 and 25 litre drums.

3.6 All components must be stored under cover protected from physical damage and contamination. Rolls of membrane should be stored upright on a clean, level surface, away from heat and kept dry.

3.7 The Certificate holder has the responsibility of classifying and labelling the system components 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 the ShieldTEC Roof Waterproofing System.

Design Considerations

4 Use

4.1 The ShieldTEC Roof Waterproofing System is satisfactory for use as a protected waterproofing layer on flat roofs (including those with zero falls) and podiums with limited access in:

- inverted roof specifications
- protected roof specifications, eg covered by paving or other suitable protection, or
- green roofs and roof garden specifications.

4.2 Limited access roofs are defined for the purpose of this Certificate as those subjected only to pedestrian traffic for such duties as maintenance of the roof covering and cleaning of gutters. Where traffic in excess of this is envisaged, special precautions such as additional protection to the membrane must be taken.

4.3 For the purposes of this Certificate, flat roofs are defined as those having a minimum finished fall of 1:80, and pitched roofs as those having falls in excess of 1:6. For design purposes, twice the minimum fall should be assumed, unless a detailed analysis of the roof is available, including overall and local deflection and direction of falls.

4.4 Zero fall roofs are defined for the purpose of this Certificate as those having a finished fall of less than 1:80. Reference should also be made to the appropriate clauses in *Liquid Waterproofing Roofing Alliance (LWRA) Note 7 – Specifier Guidance for Flat Roof Falls*, especially with regards to reducing the potential for slipping.

4.5 Decks to which the system is to be applied must comply with the relevant requirements of BS 6229 : 2003 and, where appropriate, *NHBC Standards 2017*, Chapter 7.1.

4.6 Structural decks to which the system is to be applied must be suitable to transmit the dead and imposed loads experienced in service. Dead loads, wind loading and imposed loads are calculated in accordance with BS EN 1991-1-1 : 2002, BS EN 1991-1-3 : 2003, BS EN 1991-1-4 : 2005 and their respective UK National Annexes.

4.7 The drainage system for completely flat green roofs or roof gardens must be correctly designed and the correct drainage points identified, and provision made for access for maintenance purposes. Dead loads for green roofs and roof gardens can increase if the drains become partially or completely blocked causing waterlogging of the drainage layer.

4.8 Insulation materials used in conjunction with the system must be a suitable extruded polystyrene (XPS) used in accordance with the manufacturer's instructions.

4.9 In inverted roof specifications the ballast requirements should be calculated in accordance with the relevant parts of BS EN 1991-1-4 : 2005 and its UK National Annex. Additional guidance for inverted roof specifications is given in BBA Information Bulletin No 4 *Inverted roofs – Drainage and U value corrections*.

4.10 Recommendations for the design of green roofs and roof garden specifications are available within the latest edition of *The GRO Green Roof Code – Green Roof Code of Best Practice for the UK*.

4.11 Good practice in respect of the use of vapour control barriers should be followed.

5 Practicability of installation

The system must only be installed by contractors who have been trained and approved by the Certificate holder. Details of these are available from the Certificate holder.

6 Weathertightness



6.1 The system will adequately resist the passage of moisture into the building and enable a roof to comply with the requirements of the national Building Regulations.

6.2 The system is impervious to water and will act as a waterproof layer capable of accepting minor structural movement without damage.

7 Properties in relation to fire



7.1 The system, when used in protected or inverted roof specifications, including an inorganic covering listed in the Annex of Commission Decision 2000/553/EC, can enable a roof to be unrestricted under the national Requirements.

7.2 In the opinion of the BBA, the system, when used in irrigated green roofs or roof gardens, will be unrestricted under the national Requirements.

7.3 The designation of other specifications should be confirmed by:

England and Wales — test or assessment in accordance with Approved Document B, Appendix A, clause 1⁽¹⁾⁽²⁾

(1) Volume 1 (Dwellinghouses).

(2) Volume 2 (Buildings other than dwellinghouses).

Scotland — test to conform to Mandatory Standard 2.8, clause 2.8.1⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — test or assessment by a UKAS-accredited laboratory or an independent consultant with appropriate experience.

7.4 If allowed to dry, plants used in roof gardens may allow flame spread across the roof. This should be taken into consideration when selecting suitable plants. Appropriate planting irrigation and/or protection must be applied to ensure the overall fire-rating of the roof is not compromised.

8 Resistance to wind uplift

8.1 The system will resist the effects of wind suction likely to occur in practice.

8.2 The soil used in intensive plantings must not be of the type that will be removed, or become localised, owing to wind scour experienced on site.

9 Resistance to mechanical damage

9.1 The system will accept the foot traffic and light concentrated loads associated with installation and maintenance. Reasonable care should be taken to avoid puncture by sharp objects or concentrated loads. Where traffic in excess of this is envisaged, such as for maintenance of lift equipment, a walkway should be provided, for example using concrete slabs supported on bearing pads.

9.2 When used over construction joints and minor cracks the system can accommodate the minor structural movement likely to occur in service. The Certificate holder must be consulted for suitable details at expansion joints.

10 Resistance to penetration by roots

When used in conjunction with ShieldROOT B, the system will resist penetration by roots.

11 Maintenance



11.1 Roofs must be the subject of regular inspections, particularly in autumn after leaf fall and in spring, to ensure that unwanted vegetation and other debris are cleared from the roof and drainage outlets (see section 4.6). Guidance is available within the latest edition of *Guidelines to Green Roofing*, published by The Green Roof Organisation (GRO).

11.2 It is imperative that the drainage system of a green roof or roof garden is designed correctly, and provision is made for access for maintenance purposes. Inspection of the drains must be carried out at regular intervals to avoid waterlogging of the garden and the subsequent increase in dead weight load.

12 Durability



12.1 The system, when fully protected and subject to normal service conditions, will provide an effective barrier to the transmission of moisture for the design service life of the roof in which it is incorporated.

12.2 In situations where maintenance or repair of any of the components in the roof structure is necessary (eg the protection layer or insulation), the waterproof integrity of the membrane may be reduced. In these circumstances, the Certificate holder should be consulted.

12.3 An estimate cannot be given for the life of green roof and roof garden specifications owing to the nature of use. However, under normal circumstances, it should be significantly greater than for open coverings.

Installation

13 General

13.1 The ShieldTEC Roof Waterproofing System must be installed in accordance with the Certificate holder's instructions and this Certificate, on a dry and frost-free substrate. After rain or snow, the substrate must be allowed to dry and an adhesion test carried out before installation can commence.

13.2 To assess the suitability of a substrate to receive the waterproofing membrane, adhesion tests must be carried out to ensure adequate adhesion can be achieved. If bonding problems occur, advice must be sought from the Certificate holder.

13.3 Prior to the application of the waterproofing membrane, defects in the substrate such as cracks, irregularities and other areas of potential weakness must be repaired using an approved repair mortar, and the substrate cleaned in accordance with the Certificate holder's instructions. Additional membrane may be used to fill minor depressions in the substrate.

13.4 Cementitious substrates must be conditioned with ShieldPRIME and allowed to dry before application of the waterproofing membrane. All substrates must be free from contamination that may affect the adhesion of the waterproofing membrane. Acceptable adhesion must be confirmed by test.

13.5 The waterproofing membrane must be protected by ShieldFELT PS immediately after installation.

13.6 Detailing must be carried out in accordance with the Certificate holder's instructions.

14 Procedure

14.1 ShieldTEC compound must be heated in an insulated double jacketed boiler, fitted with a stirrer and thermostatically controlled heater. The product must not be subjected to direct flame during melting.

14.2 The application temperature range for the molten ShieldTEC is 140°C to 190°C. The temperature must not exceed 220°C.

14.3 Once molten, ShieldTEC should be discharged from the heater into a suitable container and applied to the roof using a long-handled squeegee.

14.4 Construction joints and cracks must be reinforced with an additional strip of ShieldFLEECE.

14.5 At expansion joints a proprietary joint-sealing system must be used. The Certificate holder must be consulted for details of suitable joint systems and for the detailing of the waterproofing membrane to the joint system.

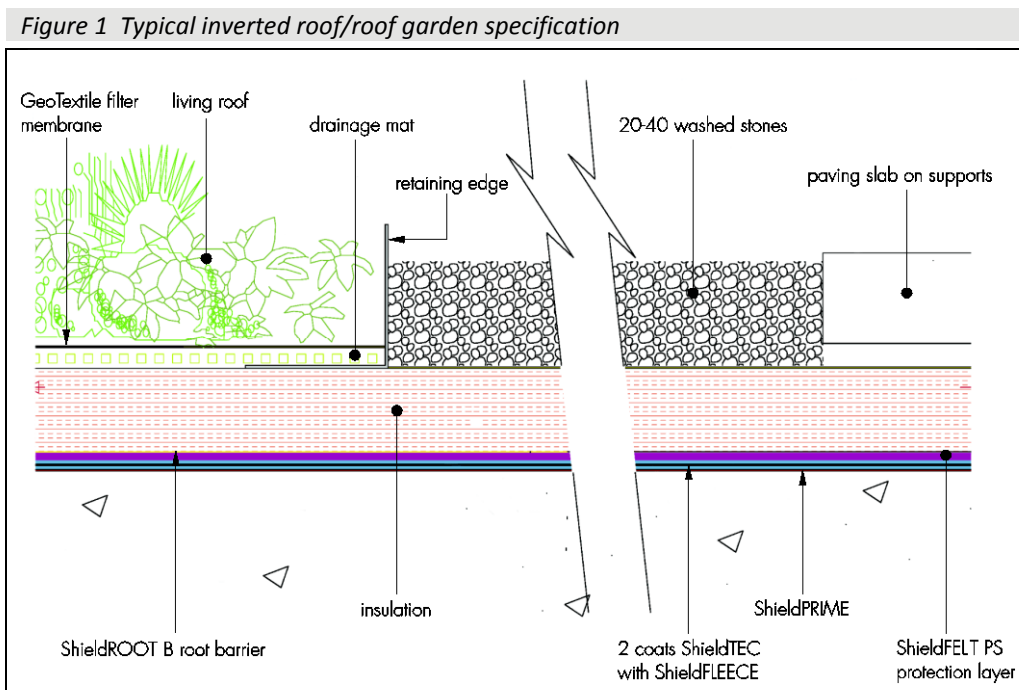
14.5 A first coat of ShieldTEC compound is applied at a minimum thickness of 3 mm.

14.6 ShieldFLEECE is embedded into the first layer of the membrane whilst it is still warm and tacky. Adjacent sheets of ShieldFLEECE must be overlapped by a minimum of 75 mm.

14.7 A second layer of ShieldTEC compound is then applied over the reinforced first layer at a minimum thickness of 3 mm to provide the membrane with a minimum total thickness of 6 mm.

14.8 The system must then be immediately protected by applying ShieldFELT PS using traditional torching techniques and prior to the laying of ballast, paving slabs or other specified surface finish.

14.9 In green roof and roof garden specifications, a layer of ShieldROOT B membrane is applied fully bonded using traditional torching techniques and ensuring minimum 60 mm side laps and 100 mm end laps, prior to installing the specified finish. See Figure 1 for typical inverted/roof garden specifications.



15 Repair

15.1 Damage to the system must be repaired as soon as practicable to ensure that the integrity of the waterproofing is maintained. Repairs must be carried out to reinstate the damaged area to the original specification in accordance with the Certificate holder's instructions.

15.2 Where maintenance or repair of any of the roof components above the waterproofing system are necessary, care must be taken to avoid damage to the system. If damage occurs, it must be repaired as soon as is practicable by the installer.

15.3 Should the system become contaminated by chemicals, oils or greases, the advice of the Certificate holder must be sought on whether any remedial action is required.

Technical Investigations

16 Tests

Tests were carried out on samples of the ShieldTEC Roof Waterproofing System and the results assessed, as follows:

- characterisation tests on the compound to establish fines, penetration, flow and resilience
- characterisation tests on the ShieldFLEECE to establish mass per unit area and tensile properties
- water vapour permeability
- watertightness
- low temperature flexibility
- resistance to fatigue
- resistance to dynamic indentation
- resistance to static indentation
- effect of low temperatures
- effect of high temperatures
- effect of heat ageing
- effect of exposure to surface water.

Bibliography

BS 6229 : 2003 *Flat roofs with continuously supported coverings — Code of practice*

BS EN 1991-1-1 : 2002 *Eurocode 1 — Actions on structures — General actions — Densities, self-weight, imposed loads for buildings*

NA to BS EN 1991-1-1 : 2002 *UK National Annex to Eurocode 1 — Actions on structures — General actions — Densities, self-weight, imposed loads for buildings*

BS EN 1991-1-3 : 2003 + A1 : 2015 *Eurocode 1 — Actions on structures — General actions — Snow loads*

NA to BS EN 1991-1-3 : 2003 + A1 : 2015 *UK National Annex to Eurocode 1 — Actions on structures — General actions — Snow loads*

BS EN 1991-1-4 : 2005 + A1 : 2010 *Eurocode 1 — Actions on structures — General actions — Wind actions*

NA to BS EN 1991-1-4 : 2005 + A1 : 2010 *UK National Annex to Eurocode 1 — Actions on structures — General actions — Wind actions*

17 Conditions

17.1 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.

17.2 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.

17.3 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.

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

17.5 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.

17.6 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.