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Agrément Certificate
10/4762
Product Sheet 1

SIPLAST MEMBRANES

PREFLEX AND GRAVIFLEX MEMBRANES

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Preflex and Graviflex Membranes, modified bitumen membranes for use in roof garden applications (including completely flat roof applications).

AGRÉMENT 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

Weathertightness — the product will resist the passage of moisture into the building (see section 5).

Properties in relation to fire — in the opinion of the BBA, the product, when used in a suitable specification, will enable a roof to be unrestricted under Building Regulations (see section 6).

Resistance to wind uplift — resistance to wind uplift is dependent on the top layers of the roof garden green-roof specification (see section 7).

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

Durability — under normal service conditions the product will provide a durable waterproof covering with a service life of at least 25 years (see section 10).

The BBA has awarded this Agrément Certificate to the company named above for the product described herein. The 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

Simon Wroe
Head of Approvals — Materials

Greg Cooper
Chief Executive

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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, Preflex and Graviflex Membranes, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:



The Building Regulations 2000 (as amended) (England and Wales)

Requirement:	B4(2)	External fire spread
Comment:		When used in irrigated roof gardens or green roofs use of the membranes will be unrestricted under this Requirement. See sections 6.1 to 6.4 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		Tests for water resistance on the product, including joints, indicate that the product meets this Requirement. See section 5.1 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The product is acceptable. See section 10.1 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The product can contribute to a construction meeting this Regulation. See sections 9.1, 9.2, 10.1 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards – construction
Standard:	2.8	Spread from neighbouring buildings
Comment:		When used in irrigated roof gardens or green roofs use of the membranes can be regarded as having low vulnerability under clause 2.8.1 ⁽¹⁾⁽²⁾ of this Standard. See sections 6.1, 6.2 and 6.4 of this Certificate.
Standard:	3.10	Precipitation
Comment:		Tests for water resistance of the product indicate that the use of the product 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 5.1 of this Certificate.
Regulation:	12	Building standards – conversions
Comment:		All comments given for this product under Regulation 9 also apply to this Regulation, with reference to clause 0.12 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2000 (as amended)

Regulation:	B2	Fitness of materials and workmanship
Comment:		The product is acceptable. See section 10.1 and the <i>Installation</i> part of this Certificate.
Regulation:	B3(2)	Suitability of certain materials
Comment:		The product is acceptable. See sections 9.1 and 9.2 of this Certificate.
Regulation:	C4(b)	Resistance to ground moisture and weather
Comment:		Tests for water resistance of the product, including joints, indicate that the use of the product will enable a roof to satisfy the requirements of this Regulation. See section 5.1 of this Certificate.
Regulation:	E5(b)	External fire spread
Comment:		When used in irrigated roof gardens or green roofs use of the membranes will be unrestricted under the requirements of this Regulation. See sections 6.1 to 6.4 of this Certificate.

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See section: 2 *Description* (1.2) of this Certificate.

Non-regulatory Information

NHBC Standards 2010

NHBC accepts the use of Preflex and Graviflex Membranes, when installed and used in accordance with this Certificate, as meeting Technical Requirement R3 in relation to *NHBC Standards Chapter 7.1 Flat roofs and balconies*.

General

This Certificate is a Confirmation of Avis Technique 5/03-1733 issued by the Centre Scientifique et Technique du Bâtiment (CSTB) to Siplast – Icopal.

Technical Specification

1 Description

1.1 Preflex and Graviflex Membranes are torch-on, SBS modified bitumen sheets with non-woven polyester reinforcement. Graviflex Capsheet is treated with Preventol 'B' Root Inhibitor.

1.2 The membranes are manufactured to the nominal characteristics given in Table 1.

Characteristic (units)	Preflex Underlay	Graviflex Capsheet
Thickness (mm)	3.0	4.0
Roll width (m)	1.0	1.0
Roll length (m)	10	8
Roll weight (kg)	38.6	40
Weight per unit area of polyester reinforcement ($\text{g}\cdot\text{m}^{-2}$)	120	180
Surface finish		
lower	thermofusible film	thermofusible film
upper	thermofusible film	slate flakes

1.3 Xtra-Seal QD Bitumen Primer — a bitumen primer designed to dry in approximately one hour after application.

1.4 Quality control checks are carried out on the raw materials, the coating mass and the final product.

2 Delivery and site handling

2.1 The membranes are delivered to site in rolls with paper wrappings bearing the product name, manufacturing data, factory name and BBA identification mark incorporating the number of this Certificate. The rolls are packed on pallets and shrunk wrapped in polyethylene.

2.2 Rolls should be stored upright on a clean, level surface, away from excessive heat and kept under cover.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Preflex and Graviflex Membranes.

Design Considerations

3 Use

3.1 Preflex and Graviflex Membranes are satisfactory for use as waterproofing on flat, sloping and completely flat roofs with limited access as a partially or fully bonded system and roof gardens (intensive planting) on flat roofs and green roofs (extensive planting).

3.2 Flat roofs are defined for the purpose of this Certificate as those roofs having a minimum finished fall of 1:80. Pitched roofs are defined for the purpose of this Certificate as those having a fall in excess of 1:6. Completely flat roofs are defined for the purpose of this Certificate as those having a finished fall of less than 1:80.

3.3 When designing flat roofs, twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available, including overall and local deflection, direction of falls.

3.4 For the purposes of this Certificate, in flat roofs, falls of the roof bearing the drainage layer should be between 1:60 and 1:20. The falls are provided by the substrate.

3.5 Structural decks to which the membranes are to be applied must be suitable to transmit the dead and imposed loads experienced in service.

3.6 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 National Annexes.

3.7 Decks to which the membranes are to be applied must also comply with the relevant requirements of BS 6229 : 2003, BS 8217 : 2005 and, where appropriate, *NHBC Standards 2010*, Chapter 7.1.

3.8 Dead loads could also be dramatically increased if the drains become partially or completely clogged causing waterlogging of the drainage soil layers.

3.9 Insulation systems or materials used in conjunction with the membranes must either be:

- as described in BS 8217 : 2005, or
- the subject of a current BBA Certificate and be used in accordance with, and within the limitations of, that Certificate.

4 Practicability of installation

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

5 Weathertightness



5.1 Data confirm that the membrane, and joints in the membranes, when completely sealed and consolidated, will adequately resist the passage of moisture to the inside of the building and so meet the requirements of the national Building Regulations:

England and Wales — Approved Document C, Requirement C2(b), Section 6

Scotland — Mandatory Standard 3.10, clauses 3.10.1 and 3.10.7

Northern Ireland — Regulation C4(b).

5.2 The membranes are impervious to water and, the Graviflex Capsheet will adequately resist penetration of roots. When used in one of the systems described, it will achieve a weathertight roof capable of accepting minor structural movement without damage.

6 Properties in relation to fire



6.1 In the opinion of the BBA a roof garden covered with a drainage layer of gravel 100 mm thick and a soil layer of 300 mm thick will be designated AA.

6.2 In the opinion of the BBA when used in irrigated roof gardens or green roofs the use of the membranes will be unrestricted under the national Requirements:

England and Wales — Requirement B4(2)

Scotland — Mandatory Standard 2.8, clause 2.8.1

Northern Ireland — Regulation E5(b).



6.3 Exposed areas of the capsheet when used with one of the surface finishes detailed in Part iii of Table A5 of Appendix A of Approved Document B of the Building Regulations (England and Wales) or Technical Booklet E Table 4.6, Part iv of the Building Regulations (Northern Ireland) (listed below), would be deemed to be of designation AA:

Surface finishes

- bitumen-bedded stone chippings covering the whole surface to a depth of not less than 12.5 mm
- bitumen-bedded tiles of non-combustible materials
- sand and cement screed, or
- macadam.

6.4 The designation of exposed areas of the capsheet installed to other specifications should be confirmed by:

England and Wales — Test or assessment in accordance with Approved Document B, Appendix A, Clause 1

Scotland — Test to conform to Mandatory Standard 2.8, clause 2.8.1

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

6.5 If allowed to dry, the plants used may allow flame spread across the roof. This situation should be taken into consideration when selecting the plants for the garden. Appropriate planting irrigation and/or protection should be applied to ensure the overall fire-rating of the roof is not compromised by its use.

7 Resistance to wind uplift

7.1 The membrane, when used with a suitable roof garden or green-roof specification, will adequately resist the effects of wind uplift likely to occur in practice.

7.2 The soil used in intensive plantings should not be of a type that will be removed, or become localised due to wind scour experienced on site.

7.3 It should be recognised that the type of plants used could significantly affect the expected wind loads experienced in service.

8 Resistance to foot traffic

8.1 Data indicate that the membranes can withstand, without damage, the limited foot traffic and light concentrated loads associated with the installation and maintenance operations. Reasonable care should be taken, however, to avoid sharp objects or concentrated loads. Where regular traffic is envisaged, ie maintenance of lift equipment, a walkway should be provided using concrete slabs supported on bearing pads.

8.2 Once the green roof or roof garden is installed it can be regarded as a suitable protection for the membrane in use.

9 Maintenance



Roofs should be inspected annually in autumn after leaf fall and in the spring to ensure that vegetation and other debris are cleared from the roof and drainage outlets cleared. Guidance is available within the latest edition of *Guidelines to Green Roofing* The Green Roof Organisation (GRO).

10 Durability



10.1 The membranes, when subjected to normal conditions of use, will retain their integrity for a period in excess of 25 years.

10.2 The mineral surfaced product, when exposed, will suffer some localised loss of mineral surfacing in areas where complex detailing of the roof design is incorporated.

Installation

11 General

11.1 Deck surfaces must be dry, clean and free from sharp projections such as nail heads and concrete nibs.

11.2 Installation of Preflex and Graviflex Membranes is carried out in accordance with the manufacturer's instructions and the relevant Clauses of BS 8000-4 : 1989 and BS 8217 : 2005.

11.3 The membranes may be laid in conditions normal to roofing work and must not be laid in rain, snow or heavy fog, nor if the temperature falls below 5°C, unless precautions against condensation have been taken.

11.4 The Graviflex Capsheet has a mineral surface finish, and when used exposed on areas with limited access, does not require further surface protection.

11.5 The roofing layers must always be installed with staggered overlaps and in such a manner that no counter-seams in the direction of outlets are made.

11.6 Soil or other bulk material should not be stored on one area of the roof prior to installation, to ensure that localised overloading does not occur.

12 Procedures

12.1 Preflex Underlay is fully bonded to the substrate by torching with laps of 60 mm and end laps of 60 mm.

12.2 The Graviflex Capsheet is then fully bonded to the Preflex Underlay by torching with the same width of laps as the underlay.

12.3 Laps between the underlay and capsheet should be offset by a minimum of 100 mm.

13 Repair

In the event of damage the capsheet can be effectively repaired, after cleaning, with pieces of capsheet torch-bonded to the damaged area.

Technical Investigations

14 Tests

14.1 The tests carried out by or on behalf of CSTB included:

- roll weight
- low temperature flexibility
- tensile strength and elongation
- chemical resistance.
- thickness
- heat resistance
- nail tear resistance
- length
- dimensional stability
- root resistance

14.2 Samples of Preflex and Graviflex were obtained from the Certificate holder for testing. The results of the tests carried out by the BBA are summarised in Table 2.

Table 2 Joints

Test (units)	Mean result	Method
Resistance to leakage at joints unaged	No leakage	MOAT 27 : 5.2.1
water exposure ⁽¹⁾	No leakage	
Tensile shear of joints (N per 50 mm) unaged	455	BS EN 12317-1
water exposure ⁽¹⁾	444	
Peel resistance of joints (N per 50 mm) unaged	244	BS EN 12316-1
water exposure ⁽¹⁾	208	

(1) Water exposure for 180 days at 60°C in accordance with EOTA TR 012.

15 Investigations

15.1 Data upon which CSTB Avis Technique 5/03-1733 was based were examined.

15.2 Data from previous assessments of similar products, from the same manufacturer, were used to assess the adhesion performance.

Bibliography

- BS 6229 : 2003 *Flat roofs with continuously supported coverings — Code of practice*
- BS 8000-4 : 1989 *Workmanship on building sites — Code of practice for waterproofing*
- BS 8217 : 2005 *Reinforced bitumen membranes for roofing — 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 *Eurocode 1 — Actions on structures — General actions — Snow loads*
- NA to BS EN 1991-1-3 : 2003 *UK National Annex to Eurocode 1 : Actions on structures — General actions — Snow loads*
- BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*
- NA to BS EN 1991-1-4 : 2005 *UK National Annex to Eurocode 1 : Actions on structures — General actions — Wind actions*
- BS EN 12316-1 : 2000 *Flexible sheets for waterproofing — Determination of peel resistance of joints — Bitumen sheets for roof waterproofing*
- BS EN 12317-1 : 2000 *Flexible sheets for waterproofing — Bitumen sheets for roof waterproofing — Determination of shear resistance of joints*
- EOTA Technical Report TR 012 (May 1999), *Exposure procedure for accelerated ageing by hot water [Liquid Applied Roof Waterproofing Kits (LARWK)]*
- MOAT No 27 : 1983 *General Directive for the Assessment of Roof Waterproofing Systems*

16 Conditions

16.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- 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.

16.2 Publications and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

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

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- remain covered by a valid French Agrément; and
- are reviewed by the BBA as and when it considers appropriate.

16.4 In granting this Certificate, the BBA is not responsible for:

- 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
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

16.5 Any information relating to the manufacture, supply, installation, use and maintenance 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 and maintained. It does not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date 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. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the manufacture, supply, installation, use and maintenance of this product/system.

