

Flag-Soprema UK Ltd

Unit 640, The Hub
Avenue West
Skyline 120
Great Notley
Essex CM77 7AA

Tel: 0845 1948727 Fax: 0845 1948728
e-mail: enquiries@flag-soprema.co.uk
website: flag-soprema.co.uk



Agrément Certificate
10/4745
Product Sheet 2

DUOFLEX STRUCTURAL WATERPROOFING

DUOFLEX WATERPROOFING SYSTEM

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to the Duoflex Waterproofing System, for use in forming a waterproof sandwich membrane on new or existing horizontal and vertical surfaces in above-ground and basement constructions or form a damp-proof membrane on solid floors.

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 system will resist the passage of moisture into the building (see section 5).

Resistance to mechanical damage — the system will accept the limited foot traffic and loads associated with the installation and maintenance of the system and the effects of thermal or other minor movement likely to occur in practice without damage (see section 6).

Durability — under normal service conditions the system will provide an effective barrier to the transmission of liquid water and water vapour for the design life of the structure in which it is incorporated (see section 8).

The BBA has awarded this Agrément 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

Simon Wroe
Head of Approvals — Materials

Greg Cooper
Chief Executive

Date of First issue: 8 April 2010

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.

British Board of Agrément
Bucknalls Lane
Garston, Watford
Herts WD25 9BA

tel: 01923 665300
fax: 01923 665301
e-mail: mail@bba.star.co.uk
website: www.bbacerts.co.uk

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Regulations

In the opinion of the BBA, the Duoflex Waterproofing System, 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:	C2(a)	Resistance to moisture
Comment:	Tests for water resistance on the system indicate that it will enable a structure to satisfy this Requirement. See section 5.1 of this Certificate.	
Requirement:	Regulation 7	Materials and workmanship
Comment:	The system is acceptable. See section 8 and the <i>Installation</i> part of this Certificate.	



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)	Fitness and durability of materials and workmanship
Comment:	The use of the system satisfies the requirements of this Regulation. See section 8 and the <i>Installation</i> part of this Certificate.	
Regulation:	9	Building standards — construction
Standard:	3.4	Moisture from the ground
Comment:	Tests for water resistance on the system indicate that it will enable a structure 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 system under Regulation 9, 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) 2000 (as amended)

Regulation:	B2	Fitness of materials and workmanship
Comment:	The system is acceptable. See sections 8 and the <i>Installation</i> part of this Certificate.	
Regulation:	C4(a)	Resistance to ground moisture and weather
Comment:	Tests for water resistance on the system indicate that it will enable a structure to satisfy the requirements of this Regulation. See section 5.1 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 sections: 1 *Description* (1.2), 2 *Delivery and site handling* (2.1 and 2.3) and the *Installation* part of this Certificate.

Non-regulatory Information

NHBC Standards 2008

NHBC accepts the use of the Duoflex Waterproofing System, when installed in accordance with this Certificate, as meeting Technical Requirement R3 in relation to *NHBC Standards* Chapter 5.1 *Substructure and ground bearing floors*, clause M10 *Tanking materials*.

Technical Specification

1 Description

1.1 The Duoflex Waterproofing System is applied in two layers to provide a waterproofing layer with a minimum coating thickness of 6 mm and comprises the following components:

- Elastocol 500 Primer — for priming substrates
- Duoflex Monolithic Membrane — a hot-applied SBS modified bitumen membrane
- Flag-Soprema TR200 — a 50 g·m⁻² spunbond polyester for reinforcing the system
- Flag-Soprema Protection layers — a range of various protection layers including Elastophene 180–25, Sopralene 180–40 and Sopralene Flam 250AR.

1.2 The nominal characteristics of the reinforcement and the above mentioned protection layers are give in Table 1.

Material	Roll width (m)	Roll length (m)	Weight (kg)
Flag-Soprema TR200	1.0	200	10
Elasphene 180-25	1.0	10	31
Sopralene 180-40	1.0	8	39
Sopralene Flam 250AR	1.0	8	45

1.3 Ancillary products outside the scope of this Certificate but used with the system are as follows:

- Flag-Soprema Reinforcement Strip — a polyester reinforced polymer-modified bitumen sheet to reinforce movement areas or at the interface of different materials
- Flag-Soprema Self-Adhesive Joint Sealant — an aluminium lined, SBS modified bitumen, self-adhesive sheet to provide additional joint reinforcement and prevents ingress of the Duoflex when necessary
- Flag-Soprema Sopramat ST — a polyethylene studded membrane with an integral polypropylene filter fabric bonded to the studs for use as a drainage layer.

1.4 Quality control checks are performed on incoming raw materials, during production and on the finished components.

2 Delivery and site handling

2.1 The Duoflex Monolithic Membrane is delivered to site in 20 kg blocks packed in boxes and placed on a pallet and shrunk wrapped in plastic. The boxes and the pallets bear the product's name and the boxes also bear the date of packaging.

2.2 Reinforcement and protection layers are packaged with labels bearing the product trade name and should be stored under cover and kept dry.

2.3 The Elastocol 500 Primer is delivered to site in 5 or 30 litre cans. The product is classified under *The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009 (CHIP4)* and bears the appropriate hazard warning label. The flashpoint and hazard classification are given in Table 2.

Flashpoint (°C)	Classification
25	flammable ⁽¹⁾ , harmful

(1) The product should be stored in accordance with the *Highly Flammable Liquids and Liquefied Petroleum Gases Regulations (1972)*.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Duoflex Waterproofing System.

Design Considerations

3 General

3.1 The Duoflex Waterproofing System is satisfactory for use as a sandwich membrane, for above- and below-ground waterproofing within a structure of concrete, brickwork, blockwork or masonry, or as a damp-proof membrane for solid floors.

3.2 The membrane is compatible with the substrate and is resistant to those chemicals likely to occur in normal practice.

3.3 Where contact with materials used as damp-proof courses is likely, consideration must be given to the thermal stability of that material, due to the high temperatures reached during installation.

4 Practicability of installation

The system should only be installed by trained and approved contractors using specialist equipment. Details of these are available from the Certificate holder.

5 Weathertightness



5.1 Results of test data confirm that the membrane will adequately resist the passage of moisture to the inside of the building and so meet or satisfy the relevant requirements of the national Building Regulations:

England and Wales — Approved Document C, Requirement C2(a), Section 4.7

Scotland — Regulation 9, Mandatory Standard 3.4, clauses 3.4.2 to 3.4.7

Northern Ireland — Regulation C4(a).

5.2 The system is impervious to water and will act as a waterproofing layer capable of accommodating minor structural movements without damage (see the *Technical Investigations* section, Table for *Physical properties — system*).

6 Resistance to mechanical damage

6.1 Results of test data indicate that the system can accept, without damage, the limited foot traffic and light concentrated loads associated with installation and maintenance operations. Reasonable care is required, however, to avoid puncture by sharp objects, (see the *Technical Investigations* section, Table for *Physical properties — system*).

6.2 Persons should wear soft-soled footwear and any equipment carried onto the membrane should be placed on suitable protection to prevent damage to the system.

6.3 When used over construction or expansion joints, the membrane can accommodate the minor structural movement likely to occur under normal service conditions without damage. The methods described in section 10.3 should be followed (see the *Technical Investigations* section, Table for *Physical properties — system*).

7 Maintenance

As the product is either, protected by a wall, backfill or screed and has suitable durability (see section 8), maintenance is not required. However, it must be ensured that damage occurring prior to installation of the protection is repaired (see section 11).

8 Durability



The system, when fully protected and subject to normal service conditions, will provide an effective barrier to the transmission of liquid water and water vapour for the design life of the structure in which it is incorporated (see the *Technical Investigations* section, Tables for *Physical properties — compound* and *Physical properties — system*).

Installation

9 General

9.1 The Duoflex Waterproofing System must be installed in accordance with the relevant requirements of BS 8102 : 2009, CP 102 : 1973 and the Certificate holder's instructions.

9.2 Concrete or screeded surfaces should have a smooth finish, free from loosely-adhering material and sharp protrusions. Concrete should be dry and dust free. Surfaces must be conditioned with Elastocol 500 Primer and allowed to dry, before application of the membrane.

9.3 Vertical surfaces of brickwork, blockwork and, if necessary masonry, should be 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.

10 Procedure

10.1 The Duoflex Monolithic Membrane compound is heated in a thermostatically controlled bitumen boiler. The nominal temperature range for the molten membrane is 155°C to 180°C. The temperature of the melt must never exceed 210°C.

10.2 The molten membrane is discharged from the boiler into a suitable container and applied to the substrate using long-handled rubber squeegees for horizontal surfaces and a suitable spreader for vertical surfaces.

10.3 At expansion joints up to 12 mm wide (with less than 50% movement), a strip of Flag-Soprema Reinforcement Strip, extending 75 mm either side of the joint, is fully encapsulated in the Duoflex Monolithic Membrane as additional reinforcement. At structural movement joints greater than 12 mm and up to 50 mm wide (maximum 50% total movement), a proprietary joint system should be installed. The Certificate holder should be consulted for suitable products.

10.4 The first layer of the molten membrane is applied at a rate of 3 kg·m⁻².

10.5 The Flag-Soprema TR200 reinforcement should be embedded by lightly brushing it into the first layer of the membrane whilst it is still warm and tacky. The reinforcement overlaps should be at least 75 mm wide.

10.6 The second layer of membrane is applied over the top of the Flag-Soprema TR200 at a rate of 3 kg·m⁻².

10.7 Once the membrane is applied the appropriate protective membrane is then installed, whilst the second layer of the membrane is still hot, in accordance with the Certificate holder's instructions prior to applying any insulation and ballast defined by the specification.

10.8 When used for internal tanking, the membrane should be loaded against back pressure in accordance with BS 8102 : 2009.

11 Repair

Any damage to the system must be repaired as soon as possible and before the application of the floor or surface protection. The system may be repaired by removing the damaged area and reinstating the system to the original specification. The advice of the Certificate holder should be sought.

Technical Investigations

12 Tests

12.1 Samples were obtained from the manufacturer for the purpose of testing. The results of these tests are summarised in Tables 3 and 4.

Table 3 Physical properties — compound

Test (units)	Mean results	Method
Penetration (dmm)		ASTM D 5329
unaged	74	
re-melted ⁽¹⁾	75	
prolonged heating ⁽²⁾	84	
Flow (mm)		ASTM D 5329
unaged	<1	
re-melted ⁽¹⁾	<1	
prolonged heating ⁽²⁾	1	
Low temperature flexibility		CAN/CGSB-37.50-M89
unaged	0	
heat aged 200 days at 70°C	10	
water exposure 180 days at 60°C	10	

(1) Re-melted 7 times at 200°C.

(2) Prolonged heating for 5 hours at 205°C.

Table 4 Physical properties — system

Test (units)	Mean results	Method
6 m head of water	pass	MOAT 27 : 5.1.4.2
Water vapour transmission rate ($\text{g}\cdot\text{m}^{-2}\cdot\text{day}^{-1}$)	0.25	BS 3177 (25°C/RH 75%)
Water vapour resistance ($\text{MN}\cdot\text{s}\cdot\text{g}^{-1}$)	822	BS 3177 (25°C/RH 75%)
Dynamic indentation ⁽¹⁾		EOTA TR 006
unaged	L_4	
heat aged 200 days at 70°C	L_4	
Static indentation ⁽¹⁾		EOTA TR 007
unaged	L_4	
water exposure 180 days at 60°C	L_4	
Resistance to fatigue		EOTA TR 008
unaged	pass	
heat aged 200 days at 70°C	pass	

(1) System included a protection sheet.

12.2 The following tests were also carried out on components of the system:

Compound

- fines content

Reinforcement

- thickness
- mass per unit area
- tensile strength

Protection layer

- thickness
- tensile strength.

13 Investigations

13.1 The manufacturing process was examined, including the methods adopted for quality control.

13.2 A site in progress was carried out to assess the practicability of installation.

Bibliography

- BS 3177 : 1959 *Method for determining the permeability to water vapour of flexible sheet materials used for packaging*
- BS 8102 : 2009 *Code of practice for protection of below ground structures against water from the ground*
- ASTM D 5329 : 2004 *Standard Test Methods for Sealants and Fillers, Hot-Applied, for Joints and Cracks in Asphaltic and Portland Cement Concrete Pavements*
- CAN/CGSB 37.50 M-89 *Hot-Applied Rubberized Asphalt for Roofing and Waterproofing*
- CP 102 : 1973 *Code of practice for protection of buildings against water from the ground*
- EOTA Technical Report TR 006 (May 2004), *Determination of the resistance to dynamic indentation [Liquid Applied Roof Waterproofing Kits (LARVK)]*
- EOTA Technical Report TR 007 (May 2004), *Determination of the resistance to static indentation [Liquid Applied Roof Waterproofing Kits (LARVK)]*
- EOTA Technical Report TR 008 (May 2004), *Determination of the resistance to fatigue movement [Liquid Applied Roof Waterproofing Kits (LARVK)]*
- MOAT No 27 : 1983 *General Directive for the Assessment of Roof Waterproofing Systems*

14 Conditions

14.1 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.

14.2 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.

14.3 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
- 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.

14.4 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.

14.5 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.

