Imper Italia SpA
Via Volta 8
10071 Mappano-Borgaro
Torino
Italy
Tel: 00 39 11 222 55 00 Fax: 00 39 11 222 54 80
e-mail: imper@imper.it
website: www.imper.it

BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
97/3422
Product Sheet 1

RUBBERFUSE WATERPROOFING SYSTEMS

RUBBERFUSE SINGLE-PLY ROOF WATERPROOFING SYSTEMS USING SINTOFOIL MEMBRANES

This Agrément Certificate Product Sheet[1] relates to Rubberfuse Single-Ply Roof Waterproofing Systems Using Sintofoil Membranes, for use on limited access roofs and roof gardens.

(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

Weathertightness — the products and joints, when completely sealed and consolidated, will resist the passage of moisture to the interior of the building (see section 6).

Properties in relation to fire — tests indicate that the products will enable a roof to be unrestricted under Building Regulations (see section 7).

Resistance to wind uplift — the products will resist the effects of any wind suction likely to occur in practice (see section 8).

Resistance to foot traffic — the products will accept, without damage, the limited foot traffic and loads associated with installation and maintenance of the system (see section 9).

Resistance to penetration of roots — the membranes will adequately resist plant root penetration (see section 10).

Durability — under normal service conditions the products will provide a durable waterproof covering with a service life of at least 30 years (see section 12).

The BBA has awarded this Certificate to the company named above for the products described herein. These products have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of Second issue: 11 January 2013
Originally certificated on 19 January 1998

Simon Wroe
Head of Approvals — Materials

Greg Cooper
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.

Regulations

In the opinion of the BBA, Rubberfuse Single-Ply Roof Waterproofing Systems Using Sintofoil Membranes, if installed, used and maintained in accordance with this Certificate, will meet or contribute to meeting 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 suitable non-combustible substructures the use of the products will enable a roof to be unrestricted under this Requirement. See sections 7.1 to 7.5 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		Data for water resistance on the membranes, including joints, indicate that the products meet this Requirement. See section 6.1 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The products are acceptable. See section 12 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The use of the products satisfies the requirements of this Regulation. See sections 11, 12 and the *Installation* part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	2.8	Spread from neighbouring buildings
Comment:		On suitable non-combustible substructures the use of the products will be unrestricted by the requirements of clause 2.8.1[1][2] of this Standard. See sections 7.1 to 7.5 of this Certificate.
Standard:	3.10	Precipitation
Comment:		Data examined for water resistance on the membranes, including joints, indicate that the use of the products can enable a roof to satisfy the requirements of clauses 3.10.1[1][2] and 3.10.7[1][2] of this Standard. See section 6.1 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The products 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 products 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

Regulation:	23(a)(i)(iii)(b)(i)	Fitness of materials and workmanship
Comment:		The products are acceptable. See section 12 and the *Installation* part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		Data for water resistance on the membranes, including joints, indicate that the use of the products can 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 suitable non-combustible substructures the use of the products will be unrestricted by the requirements of this Regulation. See sections 7.1 to 7.5 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) and 3 *Delivery and site handling* (3.3).

Additional Information

NHBC Standards 2013

NHBC accepts the use of Rubberfuse Single-Ply Roof Waterproofing Systems Using Sintofoil Membranes, provided they are installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 7.1 *Flat roofs and balconies*.

CE marking

The Certificate holder has taken the responsibility of CE marking the products in accordance with harmonised standard EN 13956 : 2005 for the membranes and ETAG 006 : 2000 for the mechanical fastened kit (ETA 07/0304 issued by ITC). An asterisk (*) appearing in this Certificate indicates that data shown is given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 Rubberfuse Single-Ply Roof Waterproofing Systems Using Sintofoil Membranes are manufactured from flexible polypropylene alloy (FPA). The membranes are available in unreinforced, glass reinforced, or polyester-fleece backed versions.

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

Table 1 Nominal characteristics

Characteristics (units)	Sintofoil ST (Unreinforced)		Sintofoil RG (Reinforced)		Sintofoil FB (Fleece-backed)	
Thickness* (mm)	1.2	1.5	1.2	1.5	1.2	1.5
Width* (m)	1.5 or 2.1		1.5 or 2.1		1.5 or 2.1	
Length (m)	25[1] or 30[2]		25[1] or 30[2]		25[1] or 30[2]	
Mass per unit area* (kg·m^{-2})	1.08	1.35	1.10	1.37	1.24	1.51
Roll weight (kg)	48.6[2] or 56.7[1]	60.8[2] or 70.9[1]	49.5[2] or 57.8[1]	62.1[2] or 72.5[1]	55.8[2] or 65.1[1]	68.0[2] or 79.3[1]
Tensile strength* (N·m^{-2})						
– longitudinal	16		–		16	
– transverse	15		–		15	
Tensile strength* (N per 50 mm)						
– longitudinal	–		600	600	–	
– transverse	–		550	550	–	
Elongation at break* (%)						
– longitudinal	700		700		700	
– transverse	700		700		700	
Nail tear (N)						
– longitudinal	330	450	390	450	450	400
– transverse	240	450	290	400	650	600
Dimensional stability* (%)						
– longitudinal	≤ 0.5		≤ 0.1		≤ 0.5	
– transverse	≤ 0.5		≤ 0.1		≤ 0.5	
Low temperature foldability* (°C)	≤ –40		≤ –40		≤ –40	
Static indentation* (method B)	L25		L25		L25	
Dynamic impact* (mm) (method B)	> 1000		> 1000		> 1000	

(1) Roll width 2.1 m.

(2) Roll width 1.5 m.

1.3 The membranes are available in black, light grey, lead and white. Special colours are available to order.

1.4 Ancillary items for use with the membranes include:

- Rubberfuse FB-SF Adhesive — a solvent-free polyurethane adhesive for bonding Sintofoil FB membrane to compatible substrates
- Rubberfuse Sheet Laminated Metal — metal sheets laminated with Sintofoil film, for use in producing profiles for perimeter flashings, connections, fixings and gutters
- Rubberfuse moulded items — a range of preformed corners, pipe collars, roof drains and decorative profiles, moulded from Rubberfuse compound

- Rubberfuse Insulation Adhesive — a polyurethane adhesive for bonding compatible insulation boards to substrate
- Rubberfuse Flashing/Substrate Adhesive — a solvent-based synthetic rubber adhesive for use at vertical areas and flashing details
- Rubberfuse Fuse Prep Plus — a solvent-based cleaner for cleaning lap areas prior to welding aged or dirty Sintofoil membrane
- Rubberfuse Waterstop Mastic — a butyl mastic, for use at non-exposed compression seals, ie drains and terminations
- Rubberfuse Rubber Sealant — a silicone rubber, used to seal drains and termination bars
- Rubberfuse Fixings — including:
  - 45 mm MAST polyamide locking plate (for use with membrane)
  - 75 mm polypropylene plate combined with a light grey 5.5 mm thread fastener offering a corrosion resistance of greater than 15 Kesternich cycles (for use with insulation)
  - 40 mm by 80 mm polymeric plate equipped with a 'thermal shut' tube, available in various lengths with a 4.8 mm thread fastener (for steel/wood decks) or a 6.1 mm thread fastener (for concrete decks)
- Rubberfuse Walkways — metal sheets laminated with Sintofoil film. The film extends on three sides (selvedges) to allow welding to the field membrane and connection between the walkway sheets
- Rubberfuse Standing Seam Profile — a decorative pre-formed seam welded to the membrane to give the appearance of seamed metal roofing.

2 Manufacture

2.1 The system membranes are manufactured by extrusion of FPA and lamination.

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 Imper Italia SpA has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by Bureau Veritas (Certificate 209130).

2.4 The membranes are manufactured by the Certificate holder and marketed in the UK solely by Integrated Polymer Systems (UK) Ltd., Allen House, Harmby Road, Leyburn, North Yorkshire, DL8 5NS. Tel: 01969 625000; Fax: 01969 623000; e-mail: info@rubberfuse.co.uk.

3 Delivery and site handling

3.1 Membranes are delivered to site in rolls packaged in polyethylene film bearing a self-adhesive tag with product identification, size and production reference date. Each pallet also bears a label with the manufacturer's name, product identification, size and number of rolls.

3.2 Rolls must be stored in a cool, dry area on a clean, level surface, and kept under cover. Rolls must only be unwrapped from packaging at time of installation.

3.3 The ancillary items given in Table 2 are classified under *The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009* (CHIP4). *Classification, Labelling and Packaging of Substances and Mixtures (CLP Regulation) 2009*. These products bear the appropriate hazard warning.

Table 2 Hazard information

Product	Container size (litres)	Flashpoint (°C)	Classification
Rubberfuse FB-SF Adhesive	20	>200	Harmful
Rubberfuse Insulation Adhesive	20	>100	Harmful
Rubberfuse Flashing/Substrate Adhesive[1]	20	<23	Highly flammable
Rubberfuse Fuse Prep Plus[1]	1	21	Harmful, flammable

(1) These components must be stored in accordance with the *Dangerous Substances and Explosive Atmospheres Regulations 2002*.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Rubberfuse Single-Ply Roof Waterproofing Systems Using Sintofoil Membranes.

Design Considerations

4 General

4.1 Rubberfuse Single-Ply Roof Waterproofing Systems Using Sintofoil Membranes are satisfactory for use as waterproofing on flat roofs with limited access in the following specifications:

- Sintofoil ST, RG and FB in mechanically fastened systems
- Sintofoil FB in fully-adhered systems
- Sintofoil ST, RG and FB in loose-laid and ballasted and protected membrane systems, eg roof gardens.

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

4.3 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. For design purposes, 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, etc.

4.4 Decks to which the membranes are to be applied must comply with the relevant requirements of BS 6229 : 2003, BS 8217 : 2005 and, where appropriate, *NHBC Standards* 2013 Chapter 7.1 *Flat roofs and balconies*.

4.5 Insulation systems or materials used in conjunction with the products 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.

4.6 Where contact with low-grade bitumens, coal tar and other oil-based products is likely the advice of the Certificate holder must be sought.

4.7 Recommendations for the design of green roofs and roof garden specifications are available within *The GRO Green Roof Code, Green Roof Code of Best Practice for the UK 2011*, issued by The Green Roof Organisation (GRO).

4.8 For green roofs, inverted roofs and roof gardens, structural decks to which the system is to be applied must be suitable to transmit the dead and imposed loads experienced in service.

4.9 Imposed loads, dead loading and wind loads specifications 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.

4.10 The drainage system for green roofs or roof gardens, must be correctly designed, 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.

5 Practicability of installation

Installation of the membranes must only be carried out by contractors trained and approved by the Certificate holder or the UK marketing company. Details of these can be obtained from the UK marketing company.

6 Weathertightness

6.1 Results of test data confirm that the membranes, and joints in the products, 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 28(b).

6.2 The products are impervious to water and will achieve a weathertight roof covering capable of accepting minor structural movement.

7 Properties in relation to fire

7.1 Tests indicate that a system comprising a 0.7 mm thick profiled galvanized steel deck, one layer of Rubberfuse Vapour Barrier, a 50 mm thick layer of rock wool insulation and one layer of 1.2 mm thick, reinforced Rubberfuse/Sintofoil RG/FR, mechanically fastened, will be unrestricted.

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

7.3 In the opinion of the BBA, a roof garden incorporating the products covered with a drainage layer of gravel 100 mm thick and a soil layer of minimum 300 mm thick will be unrestricted.

7.4 In the opinion of the BBA, when used in irrigated roof gardens, the use of the products 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 36(b).

7.5 The designation of other specifications (eg when used on combustible substrates) should be confirmed by:

England and Wales — test or assessment in accordance with Approved Document B, Appendix A, Clause A1

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

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

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

8 Resistance to wind uplift

8.1 In mechanically fastened systems, the number of fixings and their position will depend on:

- wind uplift forces to be resisted
- elastic limit of the membrane
- the pull-out strength of fixing screws
- appropriate safety factors.

8.2 The number of fixings used must be established by reference to the wind uplift forces calculated in accordance with BS EN 1991-1-4 : 2005 and the UK National Annex on the basis of the maximum permissible loads.

8.3 Test data from wind uplift testing and small scale testing are given in Table 3.

Table 3 Admissible load per fastener

Fastener type	Washer/sleeve	Substrate	Membrane	Admissible load per Fastener – W_{adm} (N)
PS 4.8 mm	TPP 80 x 40 plate	0.75 mm profiled metal sheet	ST RG	654(1) 464(1)
BS 5.5 mm	PP 45 mast plate	0.75 mm profiled metal sheet	ST RG	726(2) 726(2)
BS 5.5 mm	TPP 80 x 40 plate	0.75 mm profiled metal sheet	ST RG	581(1) 581(1)
BS 4.8 mm	TPP 80 x 40 plate	0.75 mm profiled metal sheet	ST RG	654(2) 464(1)
HD 6.1 mm	PP 45 mast plate	0.75 mm profiled metal sheet	ST RG	515(1) 515(1)
HD 6.1 mm	TPP 80 x 40 plate	Concrete	ST RG	640(1) 454(1)
BNRF 5.7	TPP 80 x 40 plate	Concrete	ST RG	660(2) 469(1)
HD 6.1 mm	PP 45 mast plate	Concrete	ST RG	640(1) 454(1)

(1) Value calculated from small scale resistance to wind uplift testing.

(2) Value calculated from full scale resistance to wind uplift testing.

8.4 Results of test data show that the adhesion of a fully-adhered system to a prepared concrete or wood substrate is sufficient to resist the effects of wind forces, elevated temperature and thermal shock conditions likely to occur in practice. Satisfactory adhesion to other substrates must be confirmed by test.

8.5 Where the membrane is fully adhered to insulation boards, the resistance to wind uplift will be dependent on the cohesive strength of the insulation and the method by which it is secured to the roof deck. This must be taken into account when the insulation material is selected.

8.6 The ballast requirements for loose-laid and ballasted systems must be calculated in accordance with the relevant parts of BS EN 1991-1-4 : 2005 and the UK National Annex. When using gravel ballast the system must always be loaded with a minimum depth of 50 mm of aggregate. In areas of high-wind exposure, the Certificate holder's advice must be sought. Alternatively, concrete slabs on suitable supports can be used.

8.7 When used, soil and ballast must not be of a type that will be removed or become delocalised due to wind scour experienced on the roof.

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

9 Resistance to foot traffic

Data indicate that the membranes can withstand, without damage, the limited foot traffic and light concentrated loads associated with the installation and maintenance operations. However, care must be taken to avoid sharp objects or concentrated loads. Where regular traffic is envisaged, eg maintenance of lift equipment, a walkway must be provided using either Rubberfuse Walkways (mechanically fastened or adhered systems) or concrete slabs supported on bearing pads.

10 Resistance to penetration of roots

Results of tests indicate that the membranes are resistant to root penetration and can be used in roof waterproofing systems for roof gardens and green roofs.

11 Maintenance

11.1 Systems must be the subject of annual inspections and maintenance to ensure continued performance. The exposed membrane must be free from the build-up of silt and other debris and unwanted vegetation must be cleared.

11.2 Any damage must be repaired in accordance with section 17 and the Certificate holder's instructions.

11.3 Green roofs and roof gardens must be the subject of regular inspections, particularly in autumn after leaf fall and in the spring to ensure unwanted vegetation and other debris are cleared from the roof and drainage outlets. Guidance is available within *The GRO Green Roof Code — Green Roof Code of Best Practice for the UK 2011*.

12 Durability

Performance in use and accelerated weathering tests confirm that satisfactory retention of physical properties is achieved. The available evidence indicates that the membranes should have a service life of at least 30 years.

13 Reuse and recyclability

The product comprises polypropylene and polyester, which can be recycled.

Installation

14 General

14.1 Installation of Rubberfuse Single-Ply Roof Waterproofing Systems Using Sintofoil Membranes must be carried out by trained and approved installers working in accordance with the relevant Clauses of the Certificate holder's instructions and BS 8000-4 : 1989.

14.2 Conditions on site should be those for normal roof waterproofing work. Deck surfaces must be dry, clean, and free from sharp projections such as nail heads and concrete nibs. When used over a rough substrate in loose-laid, protected roof or mechanically fastened systems, a suitable protection layer must be placed over the substrate.

14.3 Installation must not be carried out during wet weather (eg rain, fog, snow) nor when the temperature is below 5°C unless suitable precautions are taken in accordance with the Certificate holder's instructions.

15 Procedure

Fully-adhered system

15.1 The Sintofoil FB is unrolled onto the substrate, without ripples and with a 70 mm overlap.

15.2 The membrane is folded back and Rubberfuse FB-SF adhesive applied to the membrane and substrate at a rate of 0.4 to 0.6 kg·m^{-2}.

15.3 The adhesive must be allowed to dry until tacky (15 minutes to 45 minutes dependent on weather conditions) prior to membrane application.

15.4 Flashing and lap jointing must be carried out as described in section 16.

Mechanically-fastened system

15.5 The membrane is unrolled onto the substrate, without ripples, with a 120 mm overlap.

15.6 The membrane is secured within the lap area using fasteners and seam plates. The maximum distance between each fastening assembly must be 280 mm and the minimum distance between the plates and sheet edge must be 15 mm.

15.7 Flashing and lap jointing must be carried out as described in section 16.

Loose-laid and ballasted and protected roof systems

15.8 The membrane is unrolled onto the substrate, without ripples and with a 70 mm overlap, and mechanically fastened at perimeters. Flashing and lap jointing must be carried out as described in section 16.

15.9 When used in a loose-laid and ballasted system, a suitable protection layer must be laid over the membrane prior to the application of the ballast. When used in protected roof systems a suitable filter layer must be laid over the insulation.

15.10 Loose-laid applications must be covered by at least a 50 mm depth of well-rounded gravel. In areas of high wind exposure, paving slabs set on a suitable support may be considered (eg pads).

15.11 When using a loose-laid application, normal account should be taken in the design of the deck of the extra dead loading due to the weight of the aggregate and/or paving.

16 Jointing and flashing procedure

16.1 Joints are made by hot-air welding, wherever possible by automatic methods rather than by a hand-held hot-air gun. The temperature should be set in accordance with the Certificate holder's instructions.

16.2 The welding area must be dry and clean. If the membrane in the welding area is oxidised due to prolonged outdoor exposure it should be cleaned using Rubberfuse Fuse Prep Plus in accordance with the Certificate holder's instructions.

16.3 The welded width of the joint must be a minimum of 30 mm. Care must be taken to ensure that overheating of the membrane does not occur, as scorching and carbonisation of the membrane will result.

16.4 The seam must be tested with a suitable metal probe and any weakness immediately repaired.

Flashing

16.5 Flashing and detailing must be formed in accordance with the Certificate holder's instructions.

17 Repair

In the event of accidental damage, repairs can be carried out by cleaning the area around the damage and applying a patch of the membrane as described in the relevant parts of section 16 and the Certificate holder's instructions.

Technical Investigations

18 Tests

18.1 An assessment was made of data to EN 13956 : 2005 in relation to:

- thickness*
- mass per unit area*
- flatness
- straightness
- peel resistance of joint*
- shear resistance of joints*
- tensile strength*
- elongation at break*
- dynamic indentation*
- static indentation*
- dimensional stability*
- low temperature foldability*
- resistance to root penetration*.

18.2 An assessment was made of data to ETAG 006 : 2000 on the mechanically fastened system in relation to:

- full scale resistance to wind uplift
- small scale resistance to wind uplift.

18.3 Tests were carried out on samples of the membranes and the results evaluated to determine:

- nail tear resistance
- peel from substrate
- water vapour resistance
- the effect of exposure to UV
- the effect of heat ageing
- long term natural ageing

in order to assess:

- robustness during service
- effectiveness of adhesive bond to substrate
- effect of temperature
- durability.

19 Investigations

19.1 Existing data on fire performance of the reinforced membrane were evaluated.

19.2 A visit to a site in progress for a mechanically fastened system was carried out to assess the practicability of installation.

19.3 Test data on samples from an existing roof were assessed.

19.4 Visits to existing installations over 13 years old were carried out to assess the in-service performance of the exposed systems. Samples were also taken from the installations and subjected to accelerated laboratory ageing and testing. The results indicated that the membranes will retain acceptable physical properties for a period in excess of 30 years.

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- : 2002 *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*
BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*

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

EN 13956 : 2005 *Flexible sheet for waterproofing — Plastic and rubber sheets for roof waterproofing — Definitions and characteristics*

ETAG 006 : 2000 *Guideline for European Technical Approval of Systems of Mechanically Fastened Flexible Roof Waterproofing Membranes*

Conditions of Certification

20 Conditions

20.1 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.

20.2 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.

20.3 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.

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

20.5 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.

20.6 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.

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