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**Agrément Certificate**  
**20/5743**

Product Sheet 1

### DANOSA LIQUID ROOF WATERPROOFING SYSTEMS

#### DANOFORCE FLEX HP

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to DANOFORCE FLEX HP, a liquid-applied roof waterproofing system for use on limited access and where appropriate pedestrian access roofs, in warm and cold exposed roofs (flat and pitched), on green roofs (flat, zero fall and pitched), protected warm/cold roofs and inverted roofs (flat and zero fall).

(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

**Weather-tightness** — the system will resist the passage of moisture into the interior of a building (see section 6).

**Properties in relation to fire** — the system can enable a roof to be unrestricted under the national Building Regulations (see section 7).

**Adhesion** — the adhesion of the system is sufficient to resist the effects of any likely wind suction and the effects of thermal or other minor movement likely to occur in practice (see section 8).

**Resistance to mechanical damage** — the system will accept, without damage, the limited foot traffic and loads associated with installation, maintenance and pedestrian traffic on defined walkways (see section 9).

**Resistance to root penetration** — the system will resist penetration by plant roots and can be used as a waterproofing layer in green roof specifications (see section 10).

**Durability** — under normal service conditions, the system will provide a durable waterproof covering with a service life of at least 25 years when exposed (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: 20 April 2020

Hardy Giesler  
Chief Executive Officer

*Certificate amended on 23 September 2020 to update zero fall wording.*

*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](http://www.bbacerts.co.uk)  
Readers MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.*

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



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## Regulations

In the opinion of the BBA, DANOFORCE FLEX HP, 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(1)

Comment:

**External fire spread**

The system, in some circumstances, is restricted by this Requirement. See sections 7.4 of this Certificate.

**Requirement:** B4(2)

Comment:

**External fire spread**

On suitable substructures, the system can enable a roof to be unrestricted under this Requirement. See sections 7.1 to 7.3 of this Certificate.

**Requirement:** C2(b)

Comment:

**Resistance to moisture**

The system will enable a roof to satisfy this Requirement. See section 6.1 of this Certificate.

**Regulation:** 7(1)

Comment:

**Materials and workmanship**

The system is acceptable. See section 12.1 and the *Installation* part of this Certificate.



### The Building (Scotland) Regulations 2004 (as amended)

**Regulation:** 8(1)(2)

Comment:

**Durability, workmanship and fitness of materials**

The system satisfies the requirement of this Regulation. See sections 11.1, 11.2 and 12.1 and the *Installation* part of this Certificate.

**Regulation:** 9

Standard:

**Building standards applicable to construction**

Spread from neighbouring buildings

Comment:

On suitable non-combustible substructures, the use of the system can be regarded as having low vulnerability under clause 2.8.1<sup>(1)(2)</sup> of this Standard. See sections 7.1 to 7.3 of this Certificate.

Standard: 3.10

Comment:

Precipitation

The use of the system will enable a roof to satisfy the requirements of this Standard, with reference to clauses 3.10.1<sup>(1)(2)</sup> and 3.10.7<sup>(1)(2)</sup>. See section 6.1 of this Certificate.

Standard: 7.1(a)

Comment:

Statement of sustainability

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

Comment:

**Building standards applicable to conversions**

Comments in relation to the system under Regulation 9, Standards 1 to 6 also apply to this Regulation, with reference to clause 0.12.1<sup>(1)(2)</sup> and Schedule 6<sup>(1)(2)</sup>.

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).



### The Building Regulations (Northern Ireland) 2012 (as amended)

**Regulation:** 23(a)(b)(i)

Comment:

**Fitness of materials and workmanship**

The system is acceptable. See section 12.1 and the *Installation* part of this Certificate.

<b>Regulation:</b>	<b>28(b)</b>	<b>Resistance to moisture and weather</b>
Comment:		The system will enable a roof to satisfy the requirements of this Regulation. See section 6.1 of this Certificate.
<b>Regulation:</b>	<b>36(b)</b>	<b>External fire spread</b>
Comment:		On suitable substructures, the use of the system can 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 section: 3 *Delivery and site handling* of this Certificate.

### Additional Information

#### NHBC Standards 2020

In the opinion of the BBA, DANOFORCE FLEX HP, 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 DANOFORCE FLEX HP is a liquid-applied, glass-reinforced, flexible modified polyester system, available in unpigmented or pre-pigmented versions.

1.2 DANOFORCE FLEX HP consists of:

- DANOFORCE FLEX HP — a flexible, modified polyester resin
- DANOFORCE FLEX HP PIGMENT — a pigment dispersed in polyester resin, available in two standard colours, anthracite grey and light grey; other non-standard colours are available on request
- DANOFORCE CATALYST — 50% dibenzoyl peroxide powder
- GLASSFLEX REINFORCEMENT — a 450 g·m<sup>-2</sup> glass fibre mat for reinforcing the system
- QUARTZ SAND AGGREGATE — an optional surface finish to provide an anti-slip surface if required.

1.3 DANOFORCE FLEX HP has the nominal characteristics of:

Specific gravity	1.33
Gel time at 25°C	18 minutes
Viscosity	1200 – 1600 mPa·s <sup>-1</sup>
Thixotropic index	5.0.

1.4 Ancillary items for use with the system are:

- DANOFORCE PRIMER+ LT — an alternative primer for preparing bituminous, wood, concrete, and other substrates, as approved by the Certificate holder
- DANOFORCE METAL PRIMER — a two-part primer for preparing metal substrates
- M-WASH TREATMENT — a pre-treatment for new galvanized steel or zinc substrates
- ANTIFUNGICIDAL SOLUTION — a fungicide for the removal of algae and moss prior to application
- DANOFORCE TAPING JOINT — a reinforcing tape for use at points of weakness such as detailing, protrusions and over cracks

- DANOFORCE MMA RESIN — a liquid-applied methyl methacrylate resin that may be used over excessive movement joints and other special case applications
- DANOFORCE FLEX HP ACCELERATOR — an additive to allow application at lower temperatures
- DANOFORCE PRIMER+ LT ACCELERATOR — an additive to allow application at lower temperatures
- preformed trims — a range of factory-manufactured GRP trims, including upstand fixing trim, drip trim, fillet trim and flat trim
- ACETONE CLEANER — for use in cleaning tools.

1.5 Ancillary items that can be used in conjunction with the system, but which are outside the scope of this Certificate, are:

- quartz sand — an alternative grit for walkways and balconies
- mineral slate — an alternative grit for walkways and balconies
- DANOFORCE SEALER — a hard finishing wear coat for walkways and balconies.

## 2 Manufacture

2.1 DANOFORCE FLEX HP, DANOFORCE PRIMER+ LT and accelerators are manufactured via a batch-blending process using conventional methods.

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

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

2.3 The management system of the manufacture has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015.

## 3 Delivery and site handling

3.1 DANOFORCE FLEX HP is delivered to site in 15 litre tins bearing the Certificate holder's name, logo, product name, batch number, health and safety data and the BBA logo incorporating the number of this Certificate.

3.2 The system components and ancillary items packaging type and size are given in Table 1.

*Table 1 Packaging*

Component/item	Package type	Weight/Quality
DANOFORCE FLEX HP	Tins	15 litre
DANOFORCE FLEX HP PIGMENT <sup>(1)</sup>	Packs	0.6 and 0.9 kg
GLASSFLEX REINFORCEMENT	Rolls	17, 30 and 100 m <sup>2</sup>
DANOFORCE CATALYST	Pack	0.5 or 1 kg
QUARTZ SAND AGGREGATE	Packs	2.25 or 25 kg
DANOFORCE PRIMER+ LT	Tins	5 litre
DANOFORCE METAL PRIMER	Pack	4 litre
DANOFORCE MMA RESIN	Tins	10 litre
M-WASH TREATMENT	Tins	5 litre
DANOFORCE FLEX HP Accelerator	Tins	1 litre
DANOFORCE PRIMER+ LT Accelerator	Tins	0.5 litre

(1) Extra pigment is sometimes used to improve opacity of the top coat.

3.3 The Certificate holder has taken 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).

The following is a summary of the assessment and technical investigations carried out on DANOFORCE FLEX HP.

### Design Considerations

#### 4 Use

4.1 DANOFORCE FLEX HP is satisfactory for use as a liquid-applied roof waterproofing system on new or existing roofs with limited or pedestrian access in the following specifications:

- exposed warm and cold flat and pitched roofs<sup>(1)</sup>
- protected warm and cold flat and zero fall roofs (ie covered by pavers or other suitable protection)<sup>(1)(2)</sup>
- green (extensive) flat, zero fall and pitched roofs<sup>(1)(2)</sup>
- inverted flat and zero fall roofs<sup>(1)(2)</sup>.

(1) Limited access.

(2) Pedestrian access.

4.2 The system is suitable for use on the following substrates:

- concrete
- asphalt
- plywood<sup>(1)</sup>
- OSB 3<sup>(2)</sup>
- reinforced bitumen membranes (including sanded and mineral surfaced felts)
- insulation<sup>(1)</sup>
- GRP
- single-ply membranes<sup>(2)</sup>
- previously-coated surfaces<sup>(2)</sup>
- small areas of metal incidental to the roof, eg pipe upstands
- small areas of plastic-coated metal incidental to the roof<sup>(1)</sup>.

(1) Grades approved by the Certificate holder.

(2) The advice of the Certificate holder should be consulted on compatibility with the system.

4.3 For the purpose of this Certificate, limited access are defined as those subject only to pedestrian traffic for maintenance of the roof covering, cleaning of gutters, etc. Where traffic in excess of this is envisaged, special precautions such as additional protection to the membrane must be taken; for example, QUARTZ SAND AGGREGATE or similar incorporated into the final coat.

4.4 Flat roofs are defined for the purpose of this Certificate as those having a minimum finished fall of 1:80. Zero fall roofs are those having a finished fall of between 0 to 0.7°. Pitched roofs are those having falls in excess of 1:6. It is particularly important to identify the correct drainage system to ensure that it is effective. Reference should also be made to the appropriate clauses in Liquid Roofing and Waterproofing Association (LRWA) Note 7 — *Specifier Guidance for Flat Roof Falls*.

4.5 For the purpose of this Certificate, green roofs (extensive) are defined as those with a shallow layer of growing medium planted with low-maintenance plants such as mosses, sedums, grasses and some wild flower species.

4.6 Decks to which the system is to be applied must comply with the relevant requirements of BS 6229 : 2003, BS 8217 : 2005 and, where appropriate, *NHBC Standards* 2018, Chapter 7.1.

4.7 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 should be calculated by a suitably experienced and competent individual in accordance with BS EN 1991-1-1 : 2002, BS EN 1991-1-3 : 2003 and BS EN 1991-1-4 : 2005, and their UK National Annexes.

4.8 For green and inverted roofs, structural decks to which the system is to be applied must be capable of transmitting the dead and imposed loads experienced in service.

4.9 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*.

4.10 The drainage system for green roofs must be correctly designed and provision made for access for maintenance. Dead loads for green roofs could also be dramatically increased if the drains become partially or completely blocked, causing waterlogging of the drainage soil layers.

4.11 In inverted roof specifications, the ballast requirements should be calculated by a suitably experienced and competent individual in accordance with the relevant parts of BS EN 1991-1-4 : 2005 and its UK National Annex.

## 5 Practicability of installation

The system is only installed by specialist roofing contractors who have been trained and approved by the Certificate holder.

## 6 Weathertightness



6.1 The system will adequately resist the passage of moisture to the inside of the building and enable a structure to satisfy the relevant requirements of the national Building Regulations.

6.2 The system is impervious to water and will achieve a weathertight roof capable of accepting minor movement without damage.

## 7 Properties in relation to fire



7.1 When tested to DD CEN/TS 1187 : 2012, Test 4, the following flat roof systems achieved a classification under BS EN 13501-5 : 2016 of B<sub>ROOF</sub>(t4):

- a 6 mm calcium silicate board, one coat of DANOFORCE PRIMER + LT at 0.25 litres per m<sup>2</sup>, one coat of DANOFORCE FLEX HP at 1.25 litres per m<sup>2</sup>, a layer of GLASSFLEX REINFORCEMENT and one coat of DANOFORCE FLEX HP at 0.50 litres per m<sup>2</sup>
- a primed 19 mm orientated strand board, a self-adhesive vapour control layer, a 120 mm thick, foil faced polyisocyanurate insulation board bonded with a polyurethane adhesive, one coat of DANOFORCE FLEX HP at 1.25 litres per m<sup>2</sup>, a layer of GLASSFLEX REINFORCEMENT and one coat of DANOFORCE FLEX HP at 0.50 litres per m<sup>2</sup>.

7.2 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 be considered to be unrestricted under the national Building Regulations.

7.3 In the opinion of the BBA, when used in irrigated roof gardens or green roofs, the use of the system will be unrestricted under the requirements of the national Building Regulations.



7.4 The system, when used in pitches of greater than 70°, should not be used on buildings in England and Wales that have a storey at least 18 m above ground level and contain: one or more dwellings, an institution, a room for residential purposes (excluding any room in a hostel, hotel or boarding house), student accommodation, care homes, sheltered housing, hospitals or dormitories in boarding schools.

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

## 8 Adhesion

The adhesion of the system is sufficient to resist the effects of any wind suction, elevated temperatures, thermal shock or minor movement likely to occur in practice.

## 9 Resistance to mechanical damage

9.1 The system can accept, without damage, the limited foot traffic and light concentrated loads associated with installation, maintenance and pedestrian traffic on defined walkways. However, care must be taken to avoid puncture by sharp objects or concentrated loads.

9.2 Results of testing for dynamic and Static indentation are given in Table 2

Test	Results	Method
Dynamic Indentation		EOTA TR 006
Unaged	I <sub>4</sub>	
UV aged <sup>[1]</sup>	I <sub>4</sub>	
Heat aged <sup>[2]</sup>	I <sub>4</sub>	
Static Indentation		EOTA TR 007
Unaged	L <sub>4</sub>	
Water exposure <sup>[3]</sup>	L <sub>4</sub>	

(1) Resistance to weathering: 400 MJ·m<sup>2</sup>, Tested at -10°C W2 (M) to EOTA TR 010.

(2) Heat aged for 100 days at 80°C and tested at -20°C to EOTA TR 011.

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

## 10 Resistance to root penetration

The system will resist penetration by plant roots and can be used as a waterproofing layer in green roof specifications.

## 11 Maintenance



11.1 Maintenance should include checks and operations to ensure that, where applicable:

- where used, protection layers are in good condition
- the exposed surface is free from the build-up of silt and other debris and unwanted vegetation is cleared.

11.2 Green 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 4.9). Guidance is available within the latest edition of *The GRO Green Roof Code — Green Roof Code of Best Practice for the UK*.

11.3 Should a leak occur in the waterproofing layer in green or inverted roof specifications, access to it is achieved by removing the layers above the waterproofing and replacing them following repair.

## 12 Durability



12.1 The system will achieve an initial service life expectancy, for an exposed roof, of at least 25 years. When fully protected and subjected to normal service conditions in an inverted roof specification with an open covering (eg aggregate pavers), the system can provide an effective barrier to the transmission of liquid water and water vapour for the design 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 are necessary (eg protection layer or insulation), the durability of the membrane may be reduced. In these circumstances the Certificate holder should be consulted.

12.3 An estimation cannot be given for the life of green roof specifications owing to the nature of use; however, under normal circumstances, it should be significantly greater than for exposed waterproof coverings.

## Installation

### 13 General

13.1 Installation of DANOFORCE FLEX HP must be carried out in accordance with the Certificate holder's instructions and this Certificate only by specialist roofing contractors trained and approved by the Certificate holder in accordance with their Installation Manual.

13.2 Application of the system is carried out at a minimum substrate temperature and air temperature of 3°C stable (1°C with the use of accelerators), rising to a maximum air temperature of 30°C and substrate temperature of 40°C. The system must not be installed in rain, snow, fog or misty conditions, or when the relative humidity is above 95%.

13.3 Detailing (eg upstands) must be carried out in accordance with the Certificate holder's instructions.

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

### 14 Site and surface preparation

14.1 Substrates on which the system is applied must be properly prepared in accordance with the Certificate holder's instructions.

14.2 Adhesion to substrates depends on the condition and cleanliness of the substrate. Substrates must be visibly dry, sound and free from loose materials or contamination (eg moss or algae). In cases of doubt the advice of the Certificate holder's Technical Department should be sought.

14.3 Any areas of fungal growth or moss must be treated with an approved, proprietary anti-fungal solution to ensure that all spores are destroyed.

14.4 High pressure sand-blasting or water-jetting may be used to remove loose or flaking materials and residues following treatment with the anti-fungal wash, but the substrate must be visibly dry before application of the system.

14.5 Damaged areas of the substrate (eg broken fibre-cement sheets or blistered bitumen roofing felt) must be removed, replaced or repaired.

14.6 Deck surfaces must be free from sharp projections, such as protruding fixing bolts or concrete nibs.

14.7 Gutters and outlets must be checked to ensure that they are, and remain, clear of all debris.

14.8 New galvanized steel and zinc substrates are treated with M-WASH TREATMENT at a coverage rate of 15 m<sup>2</sup> per litre. The wash is allowed to react, and the surface conversion is indicated by a black deposit. The surface residue is washed off with water and dried prior to the application of the primer.

14.9 Metal substrates are primed using DANOFORCE METAL PRIMER at a coverage rate of 5 to 10 m<sup>2</sup> per litre; rough or porous surfaces will significantly reduce coverage rate. The primer should be left to dry for a minimum of 2 hours and ideally between 8 and 24 hours to maximize adhesion. The maximum overcoating period is 14 days; after this period, it may be necessary to rub down and/or re-prime the surface.

14.10 Other substrates are primed, using catalysed DANOFORCE PRIMER + LT at a coverage rate of 4 to 6 m<sup>2</sup> per litre. Porous surfaces should be visually checked to ensure an adequate seal and any suspect areas re-primed as necessary. The primer is allowed to dry for at least one hour before overcoating. If the primed surface is left for longer than seven



days before application of the system, it is necessary to solvent wipe the surface with ACETONE CLEANER prior to the installation of the waterproofing. The catalyst proportion for DANOFORCE PRIMER+ LT is given in Table 3 in respect of the surface/air temperature.

Temperature (°C)	Catalyst addition (%)
3 – 10	3 – 4
10 – 20	2 – 3
20 – 35	2

## 15 Application

15.1 The system is mixed on site by adding the pigment (if required) and then the catalyst to the resin in the correct proportions. The catalyst is added in the proportions given in Table 4, depending on the surface/air temperature, and stirred in accordance with the mixing instructions.

Temperature (°C)	Catalyst addition (%)
3 – 10	4
10 – 15	3
15 – 20	2 – 3
20 – 30	2

15.2 One coat of DANOFORCE FLEX HP is applied to all upstands, detailing, protrusions, cracks, joints, and stepped joints with adjoining dissimilar substrates, and reinforced with DANOFORCE TAPING JOINT or pre-cut strips of GLASSFLEX REINFORCEMENT prior to the application of the main waterproofing. DANOFORCE FLEX HP is allowed to dry before overcoating with the main waterproofing.

15.3 The application is normally in two coats. Depending on the substrate, the first coat of resin is applied at the rates given in Table 5, and GLASSFLEX REINFORCEMENT rolled out and laid with 50 mm side and end laps. Extra resin is immediately applied to achieve a closed, pinhole-free surface.

Substrate	Coverage rate (litres per m <sup>2</sup> )
Smooth concrete	1.25 – 1.30 <sup>(2)</sup>
Plywood	1.25 – 1.30
Asphalt	1.25 – 1.30
Sanded felt	1.25 – 1.30
Mineral felt	1.50 – 2 <sup>(2)</sup>
De-chipped felt/asphalt	1.50 – 2 <sup>(2)</sup>
Single ply	1.25 – 1.30
GRP	1.25 – 1.30
Metal	1.25 – 1.30
Insulation	1.25 – 1.30

(1) The rates given in this Table are indicative only and it is the contractor's responsibility to ascertain the rate used on the specific site.

(2) When applying to very rough, uneven or heavily mineralised surfaces, the coverage rate may be significantly reduced. This should be taken into account when estimating material usage.

15.4 The second coat of resin can be applied as soon as it is practical to do so. However, the maximum period between coats is seven days, after which it is necessary to clean the surface with ACETONE CLEANER allowing a further seven days, application time. The coverage rate for the second coat is 0.5 litres per m<sup>2</sup>.

15.5 Joints subjected to excessive movement may require the use of DANOFORCE MMA RESIN as an alternative bridging material; the Certificate holder should be consulted for advice.

## 16 Repair

Should minor damage occur, it can be rectified by cleaning back to unweathered material, reactivating the surface and applying the DANOFORCE FLEX HP system to the damaged area at the total application rate stated in sections 14 and 15.

## Technical Investigations

## 17 Tests

Tests were conducted on samples of the system and ancillary items, and the results assessed to determine:

- tensile strength and elongation on control, heat aged<sup>(1)</sup> and UV aged<sup>(2)</sup> samples
- tensile adhesion on control, heat aged<sup>(1)</sup> and after water exposed<sup>(3)</sup> samples
- resistance to fatigue on control and after heat ageing<sup>(1)</sup>
- resistance to dynamic impact on control, hard and soft substrates and on a hard substrate at  $-10^{\circ}\text{C}$  on a control, after heat ageing<sup>(1)</sup> and UV ageing<sup>(2)</sup>
- resistance to static indent on control hard and soft substrates and on a hard substrate at  $80^{\circ}\text{C}$  on a control and after water exposure<sup>(3)</sup>.

(1) Heat aged for 200 days at  $70^{\circ}\text{C}$ .

(2) UV aged at  $1000 \text{ MJ}\cdot\text{m}^{-2}$  UV-A.

(3) 180 days surface water exposure at  $60^{\circ}\text{C}$ .

## 18 Investigations

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

18.2 Visits were made to a site in progress to assess the practicability of installation.

18.3 Data on fire performance were evaluated.

## Bibliography

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

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 13501-5 : 2016 *Fire classification of construction products and building elements — Classification using data from external fire exposure to roof tests*

BS EN ISO 9001 : 2015 *Quality management systems — Requirements*

DD CEN/TS 1187 : 2012 *Test methods for external fire exposure to roofs*

EOTA TR 006: *Determination of the resistance to dynamic indentation*

EOTA TR 007: *Determination of the resistance to static indentation*

EOTA TR 010: *Exposure procedure for artificial weathering*

EOTA TR 011: *Exposure procedure for accelerated ageing by heat*

EOTA TR 012: *Exposure procedure for accelerated ageing by hot water*

### 19 Conditions

#### 19.1 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.

19.2 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.

19.3 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.

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

19.5 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.

19.6 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.