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Agrément Certificate
21/5879
Product Sheet 4

GEORG BÖRNER ROOF WATERPROOFING SYSTEMS

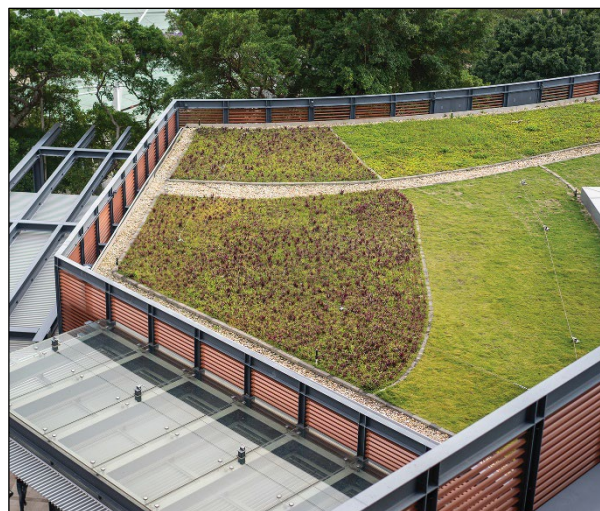
GEORG BÖRNER TORCH-ON SYSTEM

This Agrément Certificate Product Sheet⁽¹⁾ relates to the Georg Börner Torch-on System, for use in exposed flat and pitched roofs with limited access, inverted systems and roof gardens on flat roofs, and in green roofs on flat and pitched roofs.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



KEY FACTORS ASSESSED

Weathertightness — the system, including joints, will resist the passage of moisture into the interior of a building (see section 6).

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

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

Resistance to mechanical damage — the system will accept, without damage, the limited foot traffic and loads associated with the installation and maintenance and the effects of thermal or other minor movement likely to occur in practice (see section 9).

Resistance to root penetration — the system will adequately resist plant root penetration in green roof and roof garden specifications (see section 10).

Durability — under normal service conditions, the system will provide a durable waterproof covering with a service life in excess of 35 years (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: 13 October 2022

Hardy Giesler
Chief Executive Officer

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 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, the Georg Börner Torch-on System, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	B4(1)	External fire spread
Comment:		The system is restricted by this Requirement in some circumstances. See sections 8.5 and 8.6 of this Certificate.
Requirement:	B4(2)	External fire spread
Comment:		The system, when used with a suitable surface protection, may enable a roof to be unrestricted under this Requirement. See sections 8.1, 8.2, 8.3 (Wales only) and 8.4 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		The membranes, including joints, will enable a roof to satisfy this Requirement. See section 6 of this Certificate.
Requirement:	C2(c)	Resistance to moisture
Comment:		The system can contribute to enabling a roof to satisfy this Requirement. See section 7 of this Certificate.
Regulation:	7(1)	Materials and workmanship
Comment:		The system is acceptable. See section 13 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 use of the system satisfies the requirements of this Regulation. See sections 12.1 and 13 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	2.6	Spread to neighbouring buildings
Standard:	2.7	Spread on external walls
Comment:		The system is restricted under clauses 2.6.4 ⁽¹⁾⁽²⁾ and 2.7.2 ⁽¹⁾⁽²⁾ of these Standards respectively in some circumstances. See sections 8.5 and 8.7 of this Certificate.
Standard:	2.8	Spread from neighbouring buildings
Comment:		The system, when applied to a suitable substructure, may enable a roof to be unrestricted under clause 2.8.1 ⁽¹⁾⁽²⁾ of this Standard. See sections 8.1 and 8.2 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The membranes, including joints, will enable a roof to satisfy the requirements of this Standard, with reference to clauses 3.10.1 ⁽¹⁾ and 3.10.7 ⁽¹⁾ . See section 6 of this Certificate.
Standard:	3.15	Condensation
Comment:		The system will enable a roof to satisfy this Standard, with reference to clauses 3.15.1 ⁽¹⁾⁽²⁾ , 3.15.3 ⁽¹⁾⁽²⁾ , 3.15.5 ⁽¹⁾⁽²⁾ and 3.15.6 ⁽¹⁾⁽²⁾ . See section 7 of this Certificate.

Standard: 7.1(a) Statement of sustainability
Comment: The system can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.

Regulation: 12 **Building standards applicable to conversions**
Comment: Comments in relation to the system under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1⁽¹⁾⁽²⁾ and Schedule 6⁽¹⁾⁽²⁾.

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).



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

Regulation: 23(1)(a)(i) **Fitness of materials and workmanship**
Comment: (iii)(b)(i) The system is acceptable. See section 13 and the *Installation* part of this Certificate.

Regulation: 28(b) **Resistance to moisture and weather**
Comment: The membranes, including joints, can satisfy the requirements of this Regulation. See section 6 of this Certificate.

Regulation: 29 **Condensation**
Comment: The system can contribute to a roof satisfying this Regulation. See section 7 of this Certificate.

Regulation: 36(a) **External fire spread**
Comment: The system is restricted by this Regulation in some circumstances. See sections 8.5 and 8.6 of this Certificate.

Regulation: 36(b) **External fire spread**
Comment: On a suitable substructure, the use of the system can enable a roof to be unrestricted under the requirements of this Regulation. See sections 8.1 to 8.4 of this Certificate.

Construction (Design and Management) Regulations 2015

Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See sections: 1 *Description* (1.2) and 3 *Delivery and site handling* (3.3) of this Certificate

Additional Information

NHBC Standards 2022

In the opinion of the BBA, the Georg Börner Torch-on System, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards, 7.1 Flat roofs, terraces and balconies*.

CE marking

The Certificate holder has taken the responsibility of CE marking the membranes in accordance with harmonised European Standard EN 13707 : 2013 and EN 13970 : 2004 respectively.

Technical Specification

1 Description

1.1 The Georg Börner Torch-on System comprises the following waterproofing membranes:

- MONOPLEX SBS PV180 S4 Underlay – a torch-on, elastomeric modified bitumen membrane, reinforced with polyester. The membrane has a slate finish on the upper surface with a thermofusible polyethylene film on the lower surface
- POLY-ELAST PV 180 S4 – a torch on, elastomeric modified bitumen capsheet membrane, reinforced with polyester, with a slate finish on the upper surface and a thermofusible polyethylene film on the lower surface
- POLY-ELAST PV 250 S5 – a torch on, elastomeric modified bitumen capsheet membrane, reinforced with polyester, with a slate finish on the upper surface and a thermofusible polyethylene film on the lower surface
- SK Bit 105 PV Root Protection – a torch-on, elastomeric modified bitumen root resistant membrane, reinforced with a polyester fleece. The membrane has a slate finish on the upper surface and a thermofusible polyethylene film on the lower surface.
- MULTIPLEX Super AL – a torch-on, elastomeric modified bitumen AVCL with a glass fleece/aluminium composite acting as reinforcement. The membrane has a sand finish on the upper surface and a thermofusible polyethylene film on the lower surface.

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

Table 1 Nominal characteristics – waterproofing membranes

Characteristic (unit)	MONOPLEX SBS PV180 S4		SK Bit 105 PV Root Protection
EN Standard CE marked to	EN 13707		EN 13707
Thickness (mm)	4.0		5.2
Roll width (m)	1.0		1.0
Roll length (m)	10.0		5.0
Roll weight (kg)	52		36
Watertightness – one metre head	pass		pass
Tensile strength (N per 50 mm)			
longitudinal	≥ 800		≥ 1000
transverse	≥ 600		≥ 800
Elongation (%)			
longitudinal	≥ 35		≥ 35
transverse	≥ 35		≥ 35
Low temperature flexibility (°C)	-15		≤ -25
Characteristic (unit)	POLY-ELAST PV 180 S4	POLY-ELAST PV 250 S5	MULTIPLEX Super AL
EN Standard CE marked to	EN 13707	EN 13707	EN 13970
Thickness (mm)	4.2	5.2	3.5
Roll width (m)	1.00	1.00	1.00
Roll length (m)	7.5	5.0	7.5
Roll weight (kg)	42.0	37.5	39
Watertightness – one metre head	pass	pass	pass
Equivalent air layer thickness — sd (m)	–	–	≥ 1500
Tensile strength (N per 50 mm)			≥ 400
longitudinal	≥ 900	≥ 800	≥ 400
transverse	≥ 600	≥ 800	
Elongation (%)			≥ 2
longitudinal	≥ 35	≥ 35	≥ 2
transverse	≥ 35	≥ 35	
Low temperature flexibility (°C)	≤ -25	≤ -25	≤ -20
Flow resistance (°C)	≥ 100	≥ 100	≥ 100

1.3 A suitable bitumen primer, in accordance with the Certificate holder's recommendations, should be used for the preparation of substrates prior to the application of the system.

1.4 The following ancillaries, covered by Product Sheets 1 and 2 of this Certificate, can be used in conjunction with the system:

Air and vapour control layer (AVCL)

- DACO-KSD-B – a self-adhesive AVCL

Underlays

- INTER-Stick SK 3 Extra Underlay – a self-adhesive underlay
- DACO-KSU+ Underlay – a self-adhesive underlay

Capsheet for detailing work

- DACO-KSO+ - a cold-applied, self-adhesive bituminous capsheet

2 Manufacture

2.1 The membranes are manufactured by saturating and coating the reinforcement with modified bitumen, then calendaring to the correct thickness. The lower and upper surfaces are applied as appropriate and the sheets are cooled, trimmed and rolled for packaging.

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 Georg Börner Chemisches Werk für Dach Bautenschutz GmbH & Co KG has been assessed and registered as meeting the requirements of EN ISO 9001 : 2015 (Certificate 106760 issued by KIWA International Cert GmbH).

3 Delivery and site handling

3.1 The membranes are delivered to site in rolls with either paper wrappers or tape bands bearing the product name and product dimensions. The rolls are packed on pallets and shrink wrapped in polythene; the pallets bear a label with product number, product name, dimensions and batch number.

3.2 Rolls should be stored upright on a clean, level surface, away from excessive heat and kept under cover. The self-adhesive products should be stored out of direct sunlight.

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).

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Georg Börner Torch-on System.

4 General

4.1 The Georg Börner Torch-on System is satisfactory for use as roof waterproofing on roofs with limited access for the following specifications:

- exposed flat and pitched roofs with limited access (using POLY-ELAST PV 180 S4 or POLY-ELAST PV 250 S5 as capsheets)
- in inverted roofs on flat roofs
- in roof gardens on flat roofs (using SK Bit 105 PV Root Protection as capsheet)
- in green roofs on flat and pitched roofs (using SK Bit 105 PV Root Protection as capsheet).

4.2 Decks to which the system is to be applied must comply with the relevant requirements of BS 6229 : 2018 and BS 8217 : 2005 and, where appropriate, *NHBC Standards 2022*, Chapter 7.1.

4.3 The following terms are defined for the purpose of this Certificate as:

- roof garden (intensive) — a roof with a substantial layer of growing medium with planting that can include shrubs and trees, generally accessible to pedestrians
- green roof (extensive) — a roof with a shallow layer of growing medium planted with low-maintenance plants such as mosses, sedums, grasses and some wildflower species.

4.4 Limited access roofs are defined for the purpose of this Certificate as those subjected only to pedestrian traffic for maintenance of the roof covering, cleaning of gutters, etc. Where traffic in excess of this is envisaged, such as pedestrian access roofs, additional protection must be provided (see section 10 of this Certificate and the relevant clauses of the Certificate holder's installation instructions).

4.5 Flat roofs are defined for the purpose of this Certificate as those having a minimum finished fall of 1:80⁽¹⁾. 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.

(1) *NHBC Standards 2022* require a minimum fall of 1:60 for green roofs and roof gardens.

4.6 Pitched roofs are defined for the purpose of this Certificate as those having a fall in excess of 1:6.

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. Allowance needs to be made for loading deflections to ensure that the free drainage of water is maintained.

4.8 Imposed loads, dead loading and wind loads are 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.

4.9 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 systems for inverted roofs, green roofs or roof gardens must be correctly designed, and the following points should be addressed:

- 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
- additional guidance for inverted roof specifications is given in BBA Information Bulletin No 4 *Inverted roofs – Drainage and U value corrections*.

4.11 Insulation materials to be used in conjunction with the system must be in accordance with the Certificate holder’s instructions and be either:

- as described in the relevant clauses of BS 6229 : 2018, or
- the subject of a current BBA Certificate and used in accordance with, and within the limitations of, that Certificate.

4.12 The NHBC requires that the roof membranes, once installed, are inspected in accordance with *NHBC Standards 2022*, Chapter 7.1, Clause 7.1.12, and undergo an appropriate integrity test, where required. Any damage to the membrane is repaired in accordance with section 16 of this Certificate and reinspected.

5 Practicability of installation

Installation of the system must only be carried out by roofing contractors trained and approved by the Certificate holder.

6 Weathertightness



The waterproofing membranes, including joints, when completely sealed and consolidated, will adequately resist the passage of moisture to the interior of a building and so satisfy the requirements of the national Building Regulations.

7 Condensation



The AVCL provides an effective control to the passage of liquid water and water vapour.

8 Performance in relation to fire



8.1 A roof incorporating the system will be unrestricted by the documents supporting the national Building Regulations with respect to proximity from a boundary in the following circumstances:

- when protected by an inorganic covering (eg gravel or paving slabs) listed in the Annex of Commission Decision 2000/553/EC
- a roof garden covered with a drainage layer of gravel 100 mm thick and a soil layer 300 mm thick
- irrigated green roofs or roof gardens.

8.2 When classified to BS EN 13501-5 : 2016 the systems given in Table 2 achieved B_{ROOF}(t4) for slopes below 10° and will be unrestricted under the national Building Regulations with respect to proximity from a boundary.

Table 2 Systems given B_{ROOF}(t4) classification

Substrate	AVCL	Insulation	Underlay	Capsheet	Classification report number
18 mm plywood	MULTIPLEX Super AL or Daco-KSD-B	glass faced polyisocyanurate (PIR) boards bonded with polyurethane adhesive	MONOPLEX SBS PV180 S4	SK Bit 105 PV Root Protection	19901D ⁽¹⁾
		one layer 50 to 120 mm		POLY-ELAST PV 180 S4 or	21049B ⁽²⁾
		two layers 120 mm or greater		POLY-ELAST PV 250 S5	
		bitumen faced mineral wool boards greater than 60 mm			19901H ⁽³⁾

(1) Fire Classification report, reference 19901D, conducted by Warrington Fire, Gent. Report available from the Certificate holder.

(2) Fire Classification report, reference 21049B, conducted by Warrington Fire, Gent. Report available from the Certificate holder.

(3) Fire Classification report, reference 19901H, conducted by Warrington Fire, Gent. Report available from the Certificate holder.



8.3 In Wales and Northern Ireland, when used on flat roofs with the surface finishes listed below, the roof is also deemed to be unrestricted:

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

8.4 The designation and permissible areas of use of other specifications should be confirmed by reference to the requirements of the documents supporting the national Building Regulations.



8.5 The Certificate holder has declared a reaction to fire classification of Class Eto EN 13501-1 : 2018 for the system.



8.6 In England, Wales and Northern Ireland, the system, when used in pitches of greater than 70°, excluding upstands, should not be used on buildings that have a storey at least 18 m above ground level and which 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 and additionally in Northern Ireland, nursing homes and places of lawful detention.



8.7 In Scotland, the system, when used in pitches of greater than 70°, excluding upstands, should not be used on buildings that have a storey at least 11 m above ground level.

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

9 Resistance to wind uplift

9.1 The adhesion of the POLY-ELAST PV 180 S4 and POLY-ELAST PV 250 S5 is sufficient to resist the effects of wind-suction, elevated temperature and thermal shock conditions likely to occur in practice.

9.2 The resistance to wind uplift for warm roofs 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 selecting a suitable insulation material.

9.3 SK Bit 105 PV Root Protection, when used with a suitable roof garden or green-roof specification, will adequately resist the effects of wind uplift likely to occur in practice.

9.4 The ballast requirements for inverted roof systems must be calculated by a suitable competent and experienced individual in accordance with the relevant parts of BS EN 1991-1-4 : 2005 and its UK National Annex. When using gravel ballast, the products must always be loaded with a minimum depth of 50 mm of aggregate. In areas of high-wind exposure, the Certificate holder's advice should be sought. Alternatively, concrete slabs on suitable supports can be used.

9.5 The soil used in roof gardens and ballast on inverted/protected roofs must not be of a type that will be removed or become delocalised owing to wind scour experienced on the roof.

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

10 Resistance to mechanical damage

10.1 The system can accept, without damage, the foot traffic and light concentrated loads associated with installation and maintenance. Where traffic in excess of this is envisaged, such as for maintenance of lift equipment, a walkway must be provided (for example, using concrete slabs supported on bearing pads). Reasonable care should be taken to avoid puncture by sharp objects or concentrated loads.

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

10.3 The system is capable of accepting minor structural movement while remaining weathertight.

11 Resistance to root penetration

When used in green roofs and roof gardens, the roof waterproofing system will adequately resist penetration by plant roots.

12 Maintenance



12.1 The system must be the subject of six-monthly inspections and maintenance in accordance with the recommendations made in BS 6229 : 2018, Chapter 7 and Certificate holder's own maintenance requirements, where relevant, to ensure continued satisfactory performance.

12.2 Green roofs and roof gardens must be the subject of regular inspections, particularly in autumn after leaf fall and in spring, to ensure unwanted vegetation and other debris are cleared from the roof and drainage outlets (see section 4.10). Guidance is available within the latest edition of *The GRO Green Roof Code – Green Roof Code of Best Practice for the UK*.

12.3 Where damage has occurred, it should be repaired in accordance with section 16 of this Certificate and the Certificate holder's instructions.

13 Durability



When fully protected and subject to 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 roof in which it is incorporated.

14 Reuse and recyclability

The membranes are made from bitumen and polyester, which can be recycled.

Installation

15 General

15.1 Installation of the Georg Börner Torch-on System is carried out in accordance with the Certificate holder's instructions, the relevant clauses of BS 8000-0 : 2014, BS 8000-4 : 1989 and BS 8217 : 2005 and this Certificate.

15.2 Deck surfaces must be dry, clean and free from sharp projections such as nail heads and concrete nibs. If required, the substrate should be prepared using a suitable bitumen primer at the recommended rate.

15.3 The system may be laid in conditions normal to roofing work and must not be laid in rain, snow or heavy fog. If the temperature is below 5°C, suitable precautions must be taken against the formation of condensation on the substrate.

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

15.5 At falls in excess of 5° (1:11) precautions against slippage, and requirements for mechanical fixing as required by BS 8217 : 2005, should be observed. For slopes above 10° (1:5.7), the Certificate holder's Technical Service Department should be contacted for advice.

15.6 Installation of the insulation boards must be carried out in accordance with the insulation manufacturer's instructions.

16 Procedure

AVCL

16.1 Where thermal break insulation is installed, the AVCL must extend up all upstands by a sufficient height to ensure that the insulation is encapsulated.

16.2 MULTIPLEX Super AL is installed by torch-bonding.

16.3 The overlaps are a minimum of 80 to 100 mm wide. The laps are sealed together using a gas torch in accordance with the Certificate holder's instructions.

16.4 Insulation boards are bonded to the AVCL using a suitable polyurethane adhesive.

Waterproofing layer

16.5 Bonding is achieved by melting the lower surface of the membranes using a standard roofer's torch. The membranes must be heated carefully, ensuring that the thermofusible film is completely removed as work proceeds, and the membrane pressed down onto the prepared substrate.

16.6 End laps and side laps for the MONOPLEX SBS PV180 S4 underlay are 80 mm wide and fully bonded, ensuring that a continuous bead of bitumen exudes from the lap.

16.7 The underlay must be taken a sufficient distance up all upstands and protrusions and should be a minimum height of 150 mm above the roof surface.

16.8 Laps between the underlay and the capsheet should be offset by a minimum of 300 mm.

16.9. The capsheet is fully bonded to the underlayer (see 16.5). End laps and side laps are 80 mm wide and fully bonded, ensuring that a continuous bead of bitumen exudes from the lap.

16.10 End laps and side laps for the capsheets are 80 mm wide and fully bonded, ensuring that a continuous bead of bitumen exudes from the lap

16.11 Detailing should be carried out in accordance with the Certificate holder's instructions and following the guidelines specified in the NFRC *Safe2Torch Guidance - For the safe installation of torch-on reinforced bitumen membranes and use of gas torches in the workplace* document.

17 Repair

In the event of damage the capsheet can be effectively repaired, after cleaning the surrounding areas, with a patch of the capsheet bonded over the damaged area in accordance with the Certificate holder's instructions.

Technical Investigations

18 Tests

18.1 Tests were carried out on the MONOPLEX SBS PV180 S4 and the results assessed to determine:

- thickness
- mass per unit area.

18.2 Tests were carried out on POLY-ELAST PV 180 S4 and POLY-ELAST PV 250 S5 and the results assessed to determine:

- thickness
- mass per unit area
- tensile strength and elongation
- low temperature flexibility
- heat resistance.

18.3 Tests were carried out on the SK Bit 105 PV Root Protection and the results assessed to determine:

- thickness
- mass per unit area
- fatigue cycling
- peel strength of joints.

18.4 Tests were carried out on MULTIPLEX Super AL and the results assessed to determine:

- thickness
- mass per unit area
- tensile strength and elongation
- nail tear
- peel strength from concrete substrate of self-adhesive membrane control and heat aged for 28 days.

18.5 Tests were carried out on the combined system and the results assessed to determine:

- static indentation on EPS and concrete
- dynamic indentation on concrete.

18.6 Samples were taken from an existing site and further artificially heat aged to a 35 year equivalent and heat resistance tested.

19 Investigations

19.1 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.

19.2 Data on fire performance were assessed.

19.3 Existing test data were assessed to determine:

- head of water
- tensile strength and elongation
- nail tear
- resistance to impact
- resistance to static loading
- dimensional stability
- resistance to root penetration
- shear strength of joints
- peel strength of joints
- adhesion of granules
- low temperature flexibility after heat ageing
- tensile strength and elongation after heat ageing.

Bibliography

- BS 6229 : 2018 *Flat roofs with continuously supported flexible waterproof coverings — Code of practice*
- BS 8000-0 : 2014 *Workmanship on construction sites — Introduction and general principles*
- 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 + A1 : 2015 *Eurocode 1 — Actions on structures — General actions — Snow loads*
- NA + A1 : 2015 to BS EN 1991-1-3 : 2003 + A1 : 2015 UK National Annex to *Eurocode 1 — Actions on structures — General actions — Snow loads*
- BS EN 1991-1-4 : 2005 + A1 : 2010 *Eurocode 1 — Actions on structures — General actions — Wind actions*
- NA to BS EN 1991-1-4 : 2005 + A1 : 2010 UK National Annex to *Eurocode 1 — Actions on structures — General actions — Wind actions*
- BSEN 13501-5 : 2016 *Fire classification of construction products and building element — Classification using data from external fire exposure to roofs tests*
- EN 13501-1 : 2018 *Fire classification of construction products and building elements — Classification using data from reaction to fire tests*
- EN 13707 : 2013 *Flexible sheets for waterproofing — reinforced bitumen sheets for roof waterproofing — Definitions and characteristics*
- EN 13970 : 2004 *Flexible sheets for waterproofing — Bitumen water vapour control layers — Definitions and characteristics*
- EN ISO 9001 : 2015 *Quality management systems — Requirements*

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.