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Agrément Certificate
10/4744
Product Sheet 4

BAUDER BITUMINOUS ROOFING SYSTEMS

BAUDERFLEX GREEN ROOF WATERPROOFING SYSTEMS

This Agrément Certificate Product Sheet(1) relates to Bauderflex Green Roof Waterproofing Systems, elastomer modified bitumen waterproofing membranes and vapour control layers (AVCLs) for use fully bonded on pitched, flat and zero fall roofs in roof garden or green roof specifications, with limited access.

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

Condensation — roofs incorporating the systems will adequately limit the risk of interstitial and surface condensation (see section 7).

Properties in relation to fire — the systems, when used in a suitable specification, may enable a roof to be unrestricted under the national Building Regulations (see section 8).

Resistance to wind uplift — the systems will resist the effects of any likely wind suction acting on the roof (see section 9).

Resistance to mechanical damage — the systems will accept, without damage, the limited foot traffic and loads associated with installation and maintenance (see section 10).

Resistance to penetration of roots — the systems will adequately resist the penetration of roots (see section 11).

Durability — under normal service conditions, the systems will provide a durable waterproof covering with a service life in excess of 30 years (see section 13).

The BBA has awarded this Certificate to the company named above for the systems described herein. These systems 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 Fourth issue: 24 November 2022

Originally certificated on 23 October 2014

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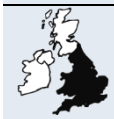
Regulations

In the opinion of the BBA, Bauderflex Green Roof Waterproofing Systems, 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(2)**	**External fire spread**
Comment:		The systems, when used with a suitable surface protection, may enable a roof to be unrestricted under this Requirement. See sections 8.1 to 8.6 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 systems can contribute to enabling a roof to satisfy this Requirement. See section 7 of this Certificate.
Regulation:	**7(1)**	**Materials and workmanship**
Comment:		The systems are acceptable. See section 13.1 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)(2)**	**Fitness of durability and workmanship**
Comment:		The use of the systems satisfies the requirements of this Regulation. See sections 12.1 and 13.1 and the *Installation* part of this Certificate.
Regulation:	**9**	**Building standards applicable to construction**
Standard:	2.8	Spread from neighbouring buildings
Comment:		The systems, when applied to a suitable structure, may enable a roof to be unrestricted under clause 2.8.1(1)(2) of this Standard. See sections 8.1 to 8.6 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 systems will enable a roof to satisfy this Standard, with reference to clauses 3.15.1(1), 3.15.3(1), 3.15.5(1) and 3.15.6(1). See section 7 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The systems 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:		All comments given for the systems 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) (iii)(b)(i)**	**Fitness of materials and workmanship**
Comment:		The systems are acceptable. See section 13.1 and the *Installation* part of this Certificate.
Regulation:	**28(b)**	**Resistance to moisture and weather**
Comment:		The membranes, including joints, will enable a roof to satisfy the requirements of this Regulation. See section 6 of this Certificate.
Regulation:	**29**	**Condensation**
Comment:		The systems can contribute to a roof satisfying this Regulation. See section 7 of this Certificate.
Regulation:	**36(b)**	**External fire spread**
Comment:		On a suitable structure, the use of the systems may enable a roof to be unrestricted by the requirements of this Regulation. See sections 8.1 to 8.6 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, Bauderflex Green Roof Waterproofing Systems, 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, terraces and balconies*.

CE marking

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

Technical Specification

1 Description

1.1 Bauderflex Green Roof Waterproofing Systems comprise the following waterproofing membranes and AVCLs:

- BauderPLANT E 42 — a chemically treated, root penetration resistant, elastomer modified bitumen torch-on mineral finish capsheet reinforced with 250 g·m^{-2} polyester fleece
- Bauder PYE PV 200 S4 – an elastomer modified bitumen, torch-on mica finish capsheet, reinforced with 250 g·m^{-2} polyester fleece, for use in protected specifications
- BauderTEC KSO SN — an elastomer modified bitumen, heat activated self-adhesive, mineral finish detailing capsheet, reinforced with 200 g·m^{-2} glass fibre
- BauderTEC KSO-P SN — an elastomer modified bitumen, heat activated self-adhesive, mineral finish detailing capsheet, reinforced with 215 g·m^{-2} polyester fleece
- Bauder EGV 35 TF — an elastomer modified bitumen, torch-on underlayer reinforced with 100 g·m^{-2} glass fleece

- BauderTEC Sprint DUO — an elastomer modified bitumen, self-adhesive underlayer reinforced with 200 g·m^{-2} glass fleece
- Bauder EVA 35 — an elastomer modified bitumen, torch-on AVCL reinforced with aluminium foil and 60 g·m^{-2} glass fleece
- BauderTHERM DS 1 DUO — an elastomer modified bitumen, heat-activated, self-adhesive AVCL reinforced with 125 g·m^{-2} glass fibre/polyester coated aluminium
- BauderTEC KSD FBS — an elastomer modified bitumen, cold self-adhesive AVCL reinforced with aluminium foil and 200 g·m^{-2} glass fleece.

1.2 The nominal characteristics of the waterproofing membranes and AVCLs are shown in Tables 1 and 2 respectively.

Table 1 Nominal characteristics – waterproofing membranes

Characteristic (unit)	waterproofing membrane					
	BauderPLANT E 42	Bauder PYE PV 200 S4	Bauder EGV 35 TF	BauderTEC Sprint DUO	BauderTEC KSO-PSN	BauderTEC KSO-SN
Thickness (mm)	4.0	4.2	3.5	2.0	4.0	4.0
Roll width (m)	1.0	1	1.0	1.0	1.0	1.0
Roll length (m)	7.5	10	8.0	15.0	5.0	5.0
Mass per unit area (kg·m^{-2})	5.0	5	4.7	2.5	4.6	4.6
Roll weight (kg)	37.5	50	37.6	37.5	23.0	23.0
Tensile strength (N per 50 mm)						
longitudinal	≥ 1000	≥800	≥ 500	≥ 1000	≥ 1000	≥ 1000
transverse	≥ 1000	≥800	≥ 500	≥ 1000	≥ 1000	≥ 1000
Elongation (%)						
longitudinal	≥ 45	≥35	≥ 2	≥ 2	≥ 40	≥ 2
transverse	≥ 45	≥35	≥ 2	≥ 2	≥ 40	≥ 2
Watertightness	pass	pass	pass	pass	pass	pass
Low temperature flexibility (°C)	≤ -36	≤ -25	≤ -10	≤ -30	≤ -30	≤ -30
Flow resistance (°C)	≥ 120	≥ 100	≥ 100	≥ 100	≥100	≥100
Upper surface finish	mineral finish	fine mineral	fine mineral	foil	mineral finish	grey slate
Lower surface finish	thermofusible polyethylene	thermofusible polyethylene	thermofusible polyethylene	peel-off film covering self-adhesive bitumen	peel-off film covering self-adhesive bitumen	peel-off film covering self-adhesive bitumen

Table 2 Nominal characteristics – AVCLs

Characteristic (unit)	AVCL		
	Bauder EVA 35	BauderTHERM DS 1 DUO	BauderTEC KSD FBS
Thickness (mm)	3.5	4.0	2.5
Roll width (m)	1.00	1.08	1.08
Roll length (m)	8.0	7.5	10.0
Mass per unit area ($kg \cdot m^{-2}$)	4.5	4.5	2.5
Roll weight (kg)	36.00	36.45	32.40
Tensile strength (N per 50 mm)			
longitudinal	≥ 400	≥ 400	≥ 1000
transverse	≥ 400	≥ 300	≥ 1000
Elongation (%)			
longitudinal	≥ 2	≥ 2	≥ 2
transverse	≥ 2	≥ 2	≥ 2
Watertightness	pass	pass	pass
Low temperature flexibility (°C)	≤ -10	≤ -25	≤ -25
Water vapour diffusion-equivalent air layer thickness (m)	≥ 1500	≥ 1500	≥ 1500
Upper surface finish	fine mineral	heat-activated bitumen strips with mica between	fine mineral and 80 mm width thermofusible strip
Lower surface finish	thermofusible polyethylene	peel-off film covering self-adhesive bitumen	peel-off film covering self-adhesive bitumen and 80 mm width glass fleece strip

1.3 The Certificate holder recommends the following ancillary items for use with the systems, but these materials have not been assessed by the BBA and are outside the scope of this Certificate:

- BauderGREEN SUB-IM UK — a lightweight growing medium for roof garden specifications
- BauderGREEN SUB-EM UK — a lightweight growing medium for sedum plug planting or use beneath Bauder SB Sedum Blanket, for green roof specifications
- BauderGREEN SUB-MD UK — a single sized aggregate that adds strength to drainage boards used in green roof specifications
- BauderGREEN SUB-SBS UK — top dressing layer for use when sowing seeds
- BauderGREEN Plugs — pre-cultivated sedum, native species and perennial vegetation grown in plug format
- BauderGREEN Flora 3, 5, 7, 9, 11 Seed Mixes — a range of bespoke native wildflower seed mixes for use on green roofs and in biodiverse or brown roof specifications
- BauderGREEN XF301 Sedum Blanket — a single layer sedum system for use in green roof specifications
- BauderGREEN WB — 30 plus species of British native wildflower and herbs incorporated into a pre-cultivated vegetation blanket
- BauderGREEN SB — 12 plus species of sedum growth on a pre-cultivated vegetation blanket
- BauderGREEN FSM 600 and BauderGREEN FSM 1100 — recycled polyester/polypropylene fibre mix mats for protection of the waterproofing layer
- BauderGREEN SV 600 — a recycled polyester/polypropylene fleece for protection of the waterproofing layer when used in green roof specifications
- BauderGREEN GGM 6— a recycled shredded rubber mat for protection of the waterproofing layer when used in green roof specifications
- BauderGREEN PE 02 — a polyethylene membrane used in a double layer between the waterproofing layer and the protection layer
- BauderGREEN FV 125 — a polypropylene fleece for use as a protection layer, preventing fines from washing into the drainage layer
- BauderGREEN SDF — ultraviolet-resistant nylon loops thermally bonded to geotextile facings for use as a filter and drainage layer in green roof specifications
- BauderGREEN DE NF 10 — a high-density polyethylene (HDPE) studded board (10 mm depth), with a geotextile fleece attached to the top face of the studs, for use as a filter and drainage layer
- BauderGREEN DSE 20 — a profiled HDPE studded board (20 mm depth), for use as a water storage and drainage layer in roof garden specifications

- BauderGREEN DSE 40 — a profiled HDPE studded board (40 mm depth), for use as a water storage and multi-directional drainage layer in roof garden specifications
- BauderGREEN DSE 60 — a profiled HDPE studded board (60 mm depth), for use as a water storage and multi-directional drainage layer in roof garden specifications
- BauderGREEN RWR 100 — a protection and water attenuation layer (50 or 100 mm depth) for green and blue roof specifications
- BauderGREEN WSP 75 — a profiled expanded polystyrene board (75 mm depth) for use as a water storage and drainage layer
- BauderGreen WSP 50 – a profiled expanded polystyrene board, 50mm deep, for use as a water storage and drainage layer
- Bauder SA Bonding Primer — for use in preparing substrates prior to installation of self-adhesive membranes
- Bauder Quick Dry Bitumen Primer — for use in preparing substrates prior to installation of torch-applied membranes
- Bauder Activator-Primer — for use in preparing substrates prior to installation of torch-applied or self-adhesive membranes. Also used as an adhesive for bonding two layers of BauderPIR FA-TE insulation together and for bonding GFS/KFS infills onto FA Tapered insulation
- Bauder PU Insulation Adhesive (Tin or Cartridge) — for use in bonding insulation
- BauderPIR M — a polyisocyanurate insulation board, manufactured to BS EN 13165 : 2012, for fully bonding on flat roofs
- BauderPIR T G — a tapered polyisocyanurate insulation board, manufactured to BS EN 13165 : 2012, for fully bonding on flat roofs
- BauderPIR FA G — a tapered polyisocyanurate insulation board, manufactured to BS EN 13165 : 2012, for partially bonding on flat roofs (only for use in conjunction with Bauder self-adhesive underlayers)
- BauderPIR KFS and BauderPIR GFS— for use in conjunction with BauderPIR FA Ginsulation
- BauderPIR FA-TE — a polyisocyanurate insulation board, for use on flat roofs (only for use in conjunction with Bauder self-adhesive underlays).

2 Manufacture

2.1 The waterproofing membranes and AVCLs are manufactured by saturating and coating the reinforcement with styrene-butadiene-styrene (SBS) modified bitumen, then calendering 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 the manufacturer has been assessed and registered as meeting the requirements of EN ISO 9001 : 2015 by ESC Cert GmbH (Certificate 70499/03-21_a).

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 production code. The rolls are packed on pallets and shrink wrapped in polythene.

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 systems 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 Bauderflex Green Roof Waterproofing Systems.

Design Considerations

4 General

4.1 Bauderflex Green Roof Waterproofing Systems are satisfactory for use as fully bonded roof waterproofing systems including AVCLs on:

- pitched up to 25°, flat and zero fall roofs in green roofs (extensive planting) with limited access(1)
- flat and zero fall roofs in roof gardens (intensive planting).

(1) The Certificate holder can advise on specific installation specifications for particular projects.

4.2 Decks to which the systems are 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, additional protection to the membranes must be provided (see section 10 of this Certificate and the relevant sections 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 Zero fall roofs are defined for the purpose of this Certificate as those having a finished fall which can vary between 0 and 1:80(1). Reference should also be made to appropriate clauses in Liquid Roofing and Waterproofing Association (LRWA) Note 7 – *Specifier Guidance for Flat Roof Falls.*

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

4.8 Structural decks to which the systems are 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.

4.9 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.

4.10 Roof garden (intensive roof) specifications can be used on pitches up to 20°, provided the waterproofing system and landscaping are properly supported at the base of the slope and the specification is in accordance with the Certificate holder's recommendations. For pitches above 1:6 (10°), the waterproofing is mechanically fastened, and support battens are incorporated to counteract the shear force imposed by the roof garden build-up.

4.11 Extensive green roof specifications can be used on pitches up to 25° slope (depending on the exact system used), provided that the waterproofing system and landscaping are properly supported at the base of the slope and the specification is in accordance with the Certificate holder's recommendations.

4.12 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*.

4.13 The drainage systems for zero fall roofs, green roofs or roof gardens must be correctly designed, and the following points should be addressed:

- provision made for access for maintenance purposes
- for zero fall roofs, it is particularly important to identify the correct drainage points, to ensure that drainage is sufficient and effective
- dead loads for green roof and roof gardens can increase if the drains become partially or completely blocked causing waterlogging of the drainage layer.

4.14 Insulation materials to be used in conjunction with the systems 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. Minimum finished fall should be assumed, unless a detailed analysis of the roof is available, for example, overall and local deflection and direction of falls.

4.15 The NHBC requires that the waterproofing 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 17 of this Certificate and reinspected.

5 Practicability of installation

The systems must only be installed by contractors who have been 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 into the inside of a building and so satisfy the requirements of the national Building Regulations.

7 Condensation

The AVCLs provide effective control to the passage of liquid water and water vapour.

8 Properties in relation to fire

8.1 When tested in accordance with ENV 1187 : 2002, Test 4, the following system achieved a classification to BS EN 13501-5 : 2005 of $B_{ROOF}(t4)$[(1)] for slopes of 45° and so is unrestricted by the documents supporting the national Building Regulations with respect to proximity to a boundary:

- 18 mm exterior plywood substrate
- a fully bonded 3.5 mm thick, glass reinforced SBS modified bitumen AVCL
- a 100 mm thick BauderPIR insulation board bitumen bonded
- a fully bonded 4.0 mm thick, woven glass reinforced SBS modified bitumen underlayer
- a fully bonded 5.0 mm thick, polyester reinforced SBS modified bitumen capsheet
- a 28 mm thick Bauder Xeroflor XF301 Sedum Blanket.

(1) Fire test and classification reports, reference 256776 and 256777 respectively, conducted by the Building Research Establishment. Report available from the Certificate holder.

8.2 When tested in accordance with BS 476-3 : 2004, the following system achieved an EXT. S.AA.(1) for slopes of 45° and so will also be unrestricted by the documents supporting the national Building Regulations with respect to proximity to a boundary:

- 19 mm exterior plywood substrate
- a fully bonded 3.5 mm thick, glass reinforced SBS modified bitumen AVCL
- a 100 mm thick BauderPIR insulation board bitumen bonded
- a fully bonded 4.0 mm thick, woven glass reinforced SBS modified bitumen underlayer
- a fully bonded 5.2 mm thick, polyester reinforced SBS modified bitumen capsheet
- Bauder Xeroflor XF301 Sedum Blanket.

(1) Fire test report, reference 256774, conducted by the Building Research Establishment. Report available from the Certificate holder.

8.3 When tested in accordance with CN/TS 1187:2012, Test 4, the following system achieved a classification to BS EN13501-5:2016 of $B_{ROOF}(t4)$(1) for slopes of 0 - 10° and so is unrestricted by the documents supporting the national Building Regulations with respect to proximity to a boundary:

- 18 mm OSB
- a 2.5 mm thick, self-adhesive glass and aluminium foil reinforced bituminous AVCL
- a 120 mm thick, adhesive bonded foil faced BauderPIR insulation board
- a 2 mm thick, elastomer modified bitumen, self-adhesive underlay
- a torch applied 5.2 mm thick, bituminous capsheet
- Bauder Xeroflor XF301 Sedum Blanket.

(1) Fire test and classification reports, reference Q100808-1004 and Q100808-1005, conducted by the Building Research Establishment. Report available from the Certificate holder.

8.4 The following system, for a slope of 0° will also be unrestricted by the documents supporting the national Building Regulations with respect to proximity to a boundary:

- 19 mm exterior plywood substrate
- a fully bonded 3.5 mm thick, glass reinforced SBS modified bitumen AVCL
- a 50 mm thick BauderPIR insulation board bitumen bonded
- a fully bonded 4.0 mm thick, woven glass reinforced SBS modified bitumen underlayer
- a fully bonded 5.2 mm thick, polyester reinforced SBS modified bitumen capsheet
- Bauder Xeroflor XF301 Sedum Blanket.

8.5 A roof incorporating the systems will be unrestricted under 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 roof gardens or green roofs.

8.6 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.

8.7 If allowed to dry, the plants used in a roof garden may allow flame spread across the roof. This should be taken into consideration when selecting suitable plants for the roof. 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 bonded membranes is sufficient to resist the effects of wind-suction, elevated temperature and thermal shock conditions likely to occur in practice.

9.2 The soil used in intensive planting should not be of a type that will be removed, or become localised, owing to wind scour on the site.

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

10 Resistance to mechanical damage

10.1 The systems 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 or the manufacturer's walkway sheets). Reasonable care should be taken to avoid puncture by sharp objects or concentrated loads. Where regular foot traffic is envisaged, paving on bearer pads or a similar suitable pedestrian surface should be used.

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 penetration of roots

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

12 Maintenance

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

12.2 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 17 and the Certificate holder's instructions.

13 Durability

13.1 When installed on stable substrates and regularly maintained the system will have a service life in excess of 30 years. When fully protected and subject to normal service conditions in roof garden and green roof specifications, the system can provide an effective barrier to the transmission of liquid water and water vapour transmission for the design life of the roof in which it is incorporated.

13.2 BauderPLANT E 42, when exposed, may suffer some localised loss of mineral surfacing in areas where complex detailing of the roof design 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 Bauderflex Green Roof Waterproofing Systems is carried out in accordance with the Certificate holder's instructions and 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. The substrate should be prepared using Bauder SA Bonding Primer, Bauder Activator-Primer or Bauder Fast Drying Bitumen Primer as specified and at the recommended rate, prior to the installation of the AVCL.

15.3 The systems 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.

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

16 Procedure

16.1 The AVCL is rolled out onto the primed substrate, positioned and cut to length. 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 The AVCL is installed in accordance with the appropriate method for the product, ie torch bonding for Bauder EVA 35 and self-adhesion for BauderTHERM DS 1 DUO and BauderTEC KSD FBS. BauderTEC KSD FBS has an 80 mm width glass fleece on the underside of one side lap and a thermofusible film on the upper surface of the other side lap. These laps are sealed together using hot air or gas torch to extrude a bituminous bead, to provide waterproofing integrity.

16.3 The underlays are installed by torch-bonding for Bauder EGV 35 TF and self-adhesive application for BauderTEC Sprint DUO. The Bauder EGV 35 TF should be fully torch bonded for a distance of 400 mm at perimeters and penetrations such as roof lights, outlets and pipes.

16.4 End and side laps for the underlays must be fully bonded, ensuring that when Bauder EGV 35 TF torch-applied underlay is used, a continuous bead of bitumen exudes from the lap.

16.5 The underlay must be taken a sufficient distance up all upstands and protrusions to ensure a secure lap with the AVCL and should be a minimum height of 150 mm above the roof surface.

16.6 Bonding of the K4E capsheet is achieved by melting the lower surface by torching and pressing the membrane down. Care must be taken not to overheat the membrane.

16.7 BauderTEC KSO SN and BauderTEC KSO-P SN detailing capsheets are to be installed using hot ait welding equipment.

16.8 End and side laps for the capsheet are 100 mm wide and fully bonded, ensuring that a continuous bead of bitumen exudes from the lap. Laps between the membrane and base sheets should be offset by a minimum of 300 mm.

16.9 Detailing should be carried out in accordance with the Certificate holder's instructions and following the guidelines specified in the NFRC Safe2Torch Guidance Document.

17 Repair

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

18 Tests

Tests were conducted on the membranes used in the Bauderflex Green Roof Waterproofing Systems and the results assessed to determine:

- thickness
- mass per unit area
- width
- heat resistance
- slippage
- tensile strength and elongation
- nail test
- dimensional stability
- low temperature flexibility
- fatigue cycling
- watertightness
- water vapour transmission
- wind uplift
- static indentation
- dynamic impact
- shear resistance of joints
- peel strength
- effects of heat ageing
- effects of water.

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.

Bibliography

BS 476-3 : 2004 *Fire tests on building materials and structures — Classification and method of tests for external fire exposure to roofs*

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 + A2 : 18 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 *Eurocode 1: Actions on structures — General action — Wind actions*
NA to BS EN 1991-1-4 : 2005 UK National Annex to *Eurocode 1: Actions on structures — General action — Wind actions*

BS EN 13165 : 2012 *Thermal insulation product for buildings — Factory made rigid polyurethane foam (PUR) products — Specification*

BS EN 13501-5 : 2005 *Fire classification of construction products and building element — Classification using data from external fire exposure to roofs 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*

ENV 1187 : 2002 *Test methods for external fire exposure to roofs*

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.