Axter Limited
Harbour Landing
Fox's Marina
The Strand
Wherstead
Ipswich IP2 8NJ

Tel: 01473 724056
e-mail: info@axterltd.co.uk
website: www.axter.co.uk

Agrément Certificate
15/5222
Product Sheet 2 Issue 3

AXTER BITUMEN ROOF WATERPROOFING SYSTEMS

CITYFLOR GREEN ROOF WATERPROOFING SYSTEMS

This Agrément Certificate Product Sheet(1) relates to Cityflor(2) Green Roof Waterproofing Systems, SBS modified bitumen membranes, for use on flat and pitched roofs in roof garden (intensive), green roof (extensive), brown roof, biodiverse roof, and protected terrace/balcony specifications.

(1) Hereinafter referred to as 'Certificate'.
(2) Cityflor is a registered trademark.

The assessment includes

Product factors:

- compliance with Building Regulations
- compliance with additional regulatory or non-regulatory information where applicable
- evaluation against technical specifications
- assessment criteria and technical investigations
- uses and design considerations

Process factors:

- compliance with Scheme requirements
- installation, delivery, handling and storage
- production and quality controls
- maintenance and repair

Ongoing contractual Scheme elements†:

- regular assessment of production
- formal 3-yearly review

KEY FACTORS ASSESSED

Section 1. Mechanical resistance and stability
Section 2. Safety in case of fire
Section 3. Hygiene, health and the environment
Section 4. Safety and accessibility in use
Section 5. Protection against noise
Section 6. Energy economy and heat retention
Section 7. Sustainable use of natural resources
Section 8. Durability

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 Third issue: 23 January 2025

Originally certificated on 24 June 2015

Hardy Giesler
Chief Executive Officer

This BBA Agrément Certificate is issued under the BBA's Inspection Body accreditation to ISO/IEC 17020. Sections marked with † are not issued under accreditation.

The BBA is a UKAS accredited Inspection Body (No. 4345), Certification Body (No. 0113) and Testing Laboratory (No. 0357).

Readers MUST check that this is the latest issue of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.

The Certificate should be read in full as it may be misleading to read clauses in isolation.

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

British Board of Agrément
1st Floor, Building 3, Hatters Lane
Croxley Park, Watford
Herts WD18 8YG

tel: 01923 665300
clientservices@bbacerts.co.uk
www.bbacerts.co.uk

SUMMARY OF ASSESSMENT AND COMPLIANCE

This section provides a summary of the assessment conclusions; readers should refer to the later sections of this Certificate for information about the assessments carried out.

Compliance with Regulations

Having assessed the key factors, the opinion of the BBA is that Cityflor 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 Building Regulations 2010 (England and Wales) (as amended)

Requirement:	**B4(1)**	**External fire spread**
Comment:		The use of the systems on balconies is restricted by this Requirement. See section 2 of this Certificate.
Requirement:	**B4(2)**	**External fire spread**
Comment:		On a suitable substructure, the systems may enable a roof to be unrestricted by this Requirement. See section 2 of this Certificate.
Requirement:	**C2(b)**	**Resistance to moisture**
Comment:		The systems will enable a roof to satisfy this Requirement. See section 3 of this Certificate.
Regulation:	**7(1)**	**Materials and workmanship**
Comment:		The systems are acceptable. See sections 8 and 9 of this Certificate.
Regulation:	**7(2)**	**Materials and workmanship**
Comment:		The use of the systems on balconies is restricted by this Regulation. See section 2 of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)(2)**	**Fitness and durability of materials and workmanship**
Comment:		The systems are acceptable. See sections 8 and 9 of this Certificate.
Regulation:	**8(3)**	**Fitness and durability of materials and workmanship**
Comment:		The use of the systems on balconies is restricted by this Regulation. See section 2 of this Certificate.
Regulation:	**9**	**Building standards – construction**
Standard:	2.2	Separation
Standard:	2.7	Spread on external walls
Comment:		The use of the systems on balconies is restricted by these Standards, with reference to clauses 2.2.7[(1)] and 2.7.2[(1)(2)]. See section 2 of this Certificate.
Standard:	2.8	Spread from neighbouring buildings
Comment:		The systems, when applied to a suitable substructure, may enable a roof to be unrestricted by this Standard, with reference to clause 2.8.1[(1)(2)]. See section 2 of this Certificate.
Standard:	2.8	Spread from neighbouring buildings
Comment:		The systems, when applied to a suitable substructure, may enable a roof to be unrestricted under clause 2.8.1[(1)(2)] of this Standard. See section 2 of this Certificate.

Standard:	3.10	Precipitation
Comment:		The systems will enable a roof to satisfy this Standard, with reference to clauses 3.10.1[(1)(2)] and 3.10.7[(1)(2)]. See section 3 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 – conversion**
Comment:		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)(ii)**	**Fitness of materials and workmanship**
Comment:	**(iii)(iv)(b)(i)**	The systems are acceptable. See sections 8 and 9 of this Certificate.
Regulation:	**23(2)**	**Fitness of materials and workmanship**
Comment		The use of the systems on balconies is restricted by this Regulation. See section 2 of this Certificate.
Regulation:	**28(b)**	**Resistance to moisture and weather**
Comment:		The systems will enable a roof to satisfy this Regulation. See section 3 of this Certificate.
Regulation:	**36(a)**	**External fire spread**
Comment:		The use of the systems on balconies is restricted by this Regulation. See section 2 of this Certificate.
Regulation:	**36(b)**	**External fire spread**
Comment:		On a suitable substructure, the systems may enable a roof to be unrestricted by this Regulation. See section 2 of this Certificate.

Additional Information

NHBC Standards 2025

In the opinion of the BBA, Cityflor 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*, 7.1 *Flat roofs, terraces and balconies*.

In addition, in the opinion of the BBA, the systems when installed and used in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards for Conversions and Renovations*, taking account of other relevant guidance within the chapter and the suitability of the substrate to receive the systems.

The NHBC Standards do not cover the refurbishment of existing roofs.

Fulfilment of Requirements

The BBA has judged Cityflor Green Roof Waterproofing Systems to be satisfactory for use as reinforced modified waterproofing membranes as described in this Certificate. The systems have been assessed for use on flat and pitched roofs, in roof garden (intensive), green roof (extensive), brown roof, biodiverse roof and protected terrace/balcony specifications.

ASSESSMENT

Product description and intended use

The Certificate holder provided the following description for the systems under assessment. Cityflor Green Roof Waterproofing Systems consist of:

Hyranger membranes

- Hyranger 35 PY — a torch-on SBS modified bitumen underlay with a 150 g·m^{-2} polyester reinforcement, a sand finish on the upper face and a thermofusible film on the lower face
- Hyranger 40 PY FP — a torch-on SBS modified bitumen capsheet for exposed areas of the system with a 180 g·m^{-2} polyester reinforcement, a mineral finish on the upper face and a thermofusible film finish on the underside
- Hyranger 25/25 TS — a torch-on SBS modified bitumen underlay with a 50 g·m^{-2} glass reinforcement, a sanded finish on the upper face and thermofusible film finish on the lower face
- Hyranger TS — a torch-on SBS modified bitumen underlay with a 50 g·m^{-2} glass reinforcement, a macroperforated film and sand finish on the upper face, and a thermofusible film on the lower face
- Hyranger TS CPV — a torch-on SBS modified bitumen underlay with a 120 g·m^{-2} polyester reinforcement, a macroperforated and sand finish on the upper face and a thermofusible film on the lower face
- Hyranger TS PY — a torch-on SBS modified bitumen intermediate layer with a 180 g·m^{-2} polyester reinforcement, a sand finish on the upper face and a thermofusible film on the lower face
- Hyranger TS PY (sanded) — a torch-on SBS modified bitumen intermediate layer with a 180 g·m^{-2} polyester reinforcement, a sand finish on the upper face, and a macroperforated film and a sand finish on the lower face
- Hyranger Spot ADH — a self-adhesive SBS modified bitumen underlay with a 120 g·m^{-2} polyester reinforcement, a macroperforated film and sand finish on the upper face, and a silicone release film on the lower face

Matflex membranes

- Matflex PY — a partially-bonded SBS modified bitumen intermediate layer with a 180 g·m^{-2} polyester reinforcement, a sand finish on the upper face, and a macroperforated film and sand finish on the lower face

Topfix membranes

- Topfix FMP — a mechanically fastened SBS modified bitumen underlay with a 120 g·m^{-2} polyester reinforcement, a macroperforated film and sand finish on the upper face, and a thermofusible film finish on the lower face
- Topfix FMP (sanded) — a mechanically fastened SBS modified bitumen underlay with a 120 g·m^{-2} polyester reinforcement, a macroperforated film and sand finish on the upper face, and a sand finish on the lower face
- Topfix PY FMP —a mechanically fastened SBS modified bitumen underlay with a 180 g·m^{-2} polyester reinforcement, a macroperforated film and sand finish on the upper face, and a thermofusible film finish on the lower face

Force membranes

- Force 3000 Trafic — a torch-on, root-resistant, SBS modified bitumen capsheet with a polyester reinforcement (nominal 180 g·m^{-2}), with a mineral finish on the upper face and a thermofusible film on the lower face
- Force 4000 S — a torch-on SBS modified bitumen capsheet with a polyester reinforcement (nominal 180 g·m^{-2}), with a mineral finish on the upper face and a thermofusible film on the lower face
- Force 4000 Trafic — a torch-on, root-resistant, SBS modified bitumen capsheet with a polyester reinforcement (nominal 250 g·m^{-2}), with a slate mineral finish on the upper face and a thermofusible film on the lower face

- Force 4000 Trafic Flame Free — a self-adhesive SBS modified bitumen capsheet, with a polyester reinforcement (nominal 230 g·m^{-2}), with a slate mineral finish and an adhesive overlap area protected with a silicone release film on the upper face, and a silicone release film on the lower face
- Force 4000 Dalle — a torch-on SBS modified bitumen capsheet with a polyester reinforcement (nominal 180 g·m^{-2}), with a thermofusible film on the upper and lower faces
- Force Dalle — a torch-on, root-resistant, SBS modified bitumen capsheet with a polyester reinforcement (nominal 180 g·m^{-2}), with a thermofusible film on the upper and lower faces
- Force Dalle Flame Free — a self-adhesive, root-resistant, SBS modified bitumen capsheet with a polyester reinforcement (nominal 180 g·m^{-2}), with a macro-perforated film and sand finish on the upper face and a silicone release film on the lower face.

The systems components have the nominal characteristics given in Tables 1 to 4.

Table 1 Nominal characteristics of Hyranger membranes

Characteristic (unit)	Hyranger 35 PY	Hyranger 25/25 TS	Hyranger TS	Hyranger TS CPV	Hyranger TS PY/ Hyranger TS PY (sanded)	Hyranger Spot ADH	Hyranger 40 PY FP
Thickness (mm)	3.85	2.65	2.65	2.65	2.65	2.65	3.5
Roll width (m)	1	1	1	1	1	1	1
Roll length (m)	8	7 or 10	7	7 or 10	7	10	5 or 10
Roll weight (kg)	40	25 or 35.7	25	25 or 36	23	32	22 or 45

Table 2 Nominal characteristics of Matflex membranes

Characteristic (unit)	Matflex PY
Thickness (mm)	2.65
Roll width (m)	1
Roll length (m)	8
Roll weight (kg)	23

Table 3 Nominal characteristics of Topfix membranes

Characteristic (unit)	Topfix FMP/Topfix FMP (sanded)	Topfix PY FMP
Thickness (mm)	2.65	2.60
Roll width (m)	1	1
Roll length (m)	7 or 10	7
Roll weight (kg)	25 or 35	25

Table 4 Nominal characteristics of Force/Force Dalle membranes

Characteristic (unit)	Force 4000 S	Force 4000 Trafic	Force 4000 Trafic Flame Free	Force 4000 Dalle	Force Dalle	Force Dalle Flame Free	Force 3000 Trafic
Thickness (mm)	4	4	4	4	4	4	3.20
Roll width (m)	1	1	1	1	1	1	1
Roll length (m)	8	5 and 8	8	8	8	8	5 and 8
Roll weight (kg)	42	25 and 41	46.5	42	42	39.2	22 and 36

Ancillary Items

The following ancillary items are essential to use with the systems and have been assessed with the systems:

- Vernis SA — a synthetic rubber-based primer for use with flame-free systems
- Force 4000 Flame Free

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:

- Vernis Antac — a solvent-based bitumen primer
- Vernis Antac GC — a solvent-based elastomeric bitumen primer
- Vernis Antac ST — a solvent-based bitumen primer
- Vernis Seal — a synthetic resin-based rapid drying pigmented primer
- a range of Axter proprietary green roof systems
- Stickflex – a self-adhesive SBS modified bitumen underlay with a 50 $g \cdot m^{-2}$ glass fibre reinforcement, a self-adhesive receivable film finish on the upper face, and a silicone release film on the lower face
- Additional Axter roofing membranes which can be used in conjunction with Cityflor Green Roof Waterproofing Systems — VAP AL, VAP AL SK, VAP ALU ADH, Hyranger Spot ADH, Hyranger 25/25 TS, Rollstick 21, Roll 25 Alpa, Roll 25 Alpa Alu, Rollstick 31 Alpa, Rollstick 31 Alpa Alu, Stickflex Alu, Stickflex, Stickflex Sanded and Force SA, Vap IND, SK Vap, Antivap and VAP
- Geotextile Filter layer — a 170 $g \cdot m^{-2}$ polyester protection or separation layer for use under heavy protection or paving slabs on supports
- Axter Drainage Membranes and Boards — Axter DRAIN, Hydrodrain/12/20/40, Hydrodrain D500 and Bac Canalis
- Bitumseal — cold-applied polymer-modified bitumen adhesive and sealant
- Mastic Hyrene — cold-applied bitumen adhesive for bonding insulation
- Hyrastik Evo — cold-applied polyurethane adhesive for bonding insulation
- ADH Adhesive — cold-applied adhesive for bonding bitumen and synthetic membranes
- Hytherm insulation products — a range of thermal insulation products.
- 35 PY Angle Reinforcement — polyester-reinforced elastomeric SBS membrane for details reinforcement
- Stickflex PY Angle Reinforcement — Axter NEO-Bitumen flame free polyester-reinforced elastomeric SBS membrane for detail reinforcement
- Starcoat R — cold-applied liquid single component bitumen resin for waterproofing complex details
- Starcoat QC and Starcoat PMMA Liquid Membranes — cold-applied liquid resins for complex detailing (covered by BBA Certificate 13/5031 and 16/5332)
- Axter Adjustable or Fixed-Height Paving and Timber Decking Support System
- Axter Dalle Ceramic — a range of ceramic pavers for use with the Axter Adjustable or Fixed-Height Paving and Timber Decking Support System
- Excel Joint and Excel Park — a polyamide-reinforced elastomeric membrane and jointing system for movement and expansion joints including prefabricated junction pieces (Inter-L and Inter-R)
- prefabricated accessories — rainwater outlets, leaf guards, SVP covers, cable penetration units, hot and cold pipe penetration units, Ax-trims and termination bars.

Applications

Cityflor Green Roof Waterproofing Systems are satisfactory for use as built-up systems on roofs with limited access in:

- roof gardens (intensive) on flat roofs with limited access or pedestrian access
- green roofs (extensive) on flat and pitched roofs with limited access
- biodiverse roofs with limited access or pedestrian access
- brown roofs with limited access or pedestrian access
- protected terrace/balconies with pedestrian access.

Definitions for product and applications inspected

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

- limited access roof — a roof subjected only to pedestrian traffic for maintenance of the roof covering and cleaning of gutters, etc. Where traffic in excess of this is envisaged, additional protection to the membrane must be provided
- pedestrian access roof — a roof not subjected to vehicular traffic
- flat roof — a roof having a minimum finished fall of 1:80[(1)]
- pitched roof — a roof having a fall greater than 1:6
- 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 wild flower species
- biodiverse living roof — a roof with a growing medium selected to allow indigenous plant species to inhabit the roof over time
- brown roof — a roof with a growing medium selected to allow indigenous plant species to inhabit the roof over time; no deliberate planting is undertaken.

(1) *NHBC Standards* 2025 require a minimum fall of 1:60 for green roofs and roof gardens.

Product assessment – key factors

The systems were assessed for the following key factors, and the outcome of the assessments is shown below. Conclusions relating to the Building Regulations apply to the whole of the UK unless otherwise stated.

1 Mechanical resistance and stability

Not applicable.

2 Safety in case of fire

Data were assessed for the following characteristics.2.1 External fire spread

2.1.1 When tested to DD CEN/TS 1187 : 2012, Test 4[(1)(3)(5)(7)] and classified to EN 13501-5 : 2016[(2)(4)(6)(8)], the systems given in Table 5 of this Certificate achieved B_{ROOF}(t4) for slopes below 10°.

Table 5 Tested systems

Layer	System 1[1][2]	System 2[3][4]	System 3[5][6]	System 4[7][8]
Substrate	18 mm OSB board[9]			
AVCL	A 2.0 mm self-adhesive, glass-fibre reinforced SBS modified bitumen membrane - Force SA[9]	A 2.0 mm self-adhesive, glass-fibre reinforced SBS modified bitumen membrane - Force SA[9]	A 2.2 mm self-adhesive Vap Alu ADH vapour control layer / 2.65 mm Hyranger spot ADH / 2.65 mm Hyranger 25/25 TS / 2.0 mm Force SA[9] / 2.0 mm Stickflex[9] / 2.0 mm Stickflex sanded[9]	A 2.2 mm self-adhesive Vap Alu ADH vapour control layer / 2.65 mm Hyranger spot ADH / 2.65 mm Hyranger 25/25 TS / 2.0 mm Force SA [9] / 2.0 mm Stickflex[9] / 2.0 mm Stickflex sanded[9]
Insulation	Axter Hytherm (stone mineral wool) insulation (150 mm thickness) plus Hytherm ADH (PIR) insulation board (50mm thickness) adhered with Hyrastik EVO Adhesive	Axter Hytherm (stone mineral wool) insulation of two layers (210 mm thickness) adhered with Hyrastik EVO Adhesive	Hytherm ADH (PIR) insulation board (50 mm or greater thickness) adhered with Hyrastik EVO Adhesive	Hytherm ADH (PIR) insulation board (50 mm or greater thickness) adhered with Hyrastik EVO Adhesive
Underlayer	2.0 mm self-adhesive, glass-fibre reinforced SBS modified bitumen membrane - Force SA[9]	2.0 mm self-adhesive, glass-fibre reinforced SBS modified bitumen membrane – Force SA[9]	2.65 mm self-adhesive Hyranger Spot ADH underlayer/ 2.0 mm Stickflex[9] / 2.0 mm Stickflex Sanded[9]	2.65 mm self-adhesive Hyranger Spot ADH underlayer/ 2.0 mm Stickflex[9] / 2.0 mm Stickflex Sanded[9]
Cap sheet	3.9 mm thick Force 4000 S fully bonded capsheet	3.9 mm thick Force 4000 S fully bonded capsheet	4.0 mm thick capsheet - Force 4000 Flame Free (self-adhesive) / Force 4000 Trafic (fully bonded) / Force 4000 Trafic Flame Free (self-adhered) / Force 4000 S (fully bonded).	3.5 mm thick capsheet - Hyranger 40 PY FP (fully bonded)

(1) Fire test report reference 19370A, conducted by Warrington Fire – copies available from the Certificate holder on request.
(2) Classification report reference 19370C, conducted by Warrington Fire – copies available from the Certificate holder on request.
(3) Fire test report reference 19370J, conducted by Warrington Fire – copies available from the Certificate holder on request.
(4) Classification report reference 19370L, conducted by Warrington Fire – copies available from the Certificate holder on request.
(5) Fire test report references 20295AK and 21876A, conducted by Warrington Fire – copies available from the Certificate holder.
(6) Classification report reference 21876C, conducted by Warrington Fire – copies available from the Certificate holder.
(7) Fire test report references 21538A, 20295R, 20295S, conducted by Warrington Fire – copies available from the Certificate holder.
(8) Classification report reference 21538C, conducted by Warrington Fire – copies available from the Certificate holder.
(9) These products have not been assessed and are outside the scope of this Certificate.

2.1.2 On the basis of data assessed, the systems listed above will be unrestricted by the documents supporting the national Building Regulations with respect to proximity to a relevant boundary. Restrictions may apply at junctions with compartment walls.

2.1.3 A roof incorporating the systems will also be unrestricted under the national Building Regulations with respect to a relevant boundary in the following circumstances:

- protected or inverted roof specifications, including an inorganic covering 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 and green roofs.

2.1.4 In Wales and Northern Ireland, when used on flat roofs using a substrate designated in the supporting documents with the surface finishes listed below, the roof is also deemed to be unrestricted with respect to a relevant boundary:

- 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.

2.1.5 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.

2.1.6 If allowed to dry, plants used may allow the spread of flame across the roof. This must 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.

2.2 Reaction to fire

2.2.1 The Certificate holder has not declared a reaction to fire classification for the systems to BS EN 13501-1 : 2018.

2.2.2 On the basis of data assessed, the systems will be restricted in use under the documents supporting the national Building Regulations in some cases.

2.2.3 In England, the system, when used in pitches greater than 70°, excluding upstands, must not be used less than 1 m from a relevant boundary, or on residential buildings more than 11 m in height or on other buildings more than 18 m in height. Restrictions apply on assembly and recreation buildings. These constructions must also be included in calculations of unprotected area.

2.2.4 In Wales , the systems, when used in pitches greater than 70°, excluding upstands, must not be used less than 1 m from a relevant boundary, or on other buildings more than 18 m in height. Restrictions apply on assembly and recreation buildings. These constructions must also be included in calculations of unprotected area.

2.2.5 In Scotland, with the exception of use on balconies (see section 2.2.10), the systems may be used without restriction in terms of height and proximity to a relevant boundary. However, restrictions on the overall construction may apply, depending on the reaction to fire classification achieved by the complete systems, which must be established on a case-by-case basis.

2.2.6 In Northern Ireland, the systems, when used in pitches greater than 70°, excluding upstands, do not achieve the minimum Class E reaction to fire classification to BS EN 13501-1 : 2018, and designers must seek guidance on the proposed use of the systems from the relevant Building Control Body.

2.2.7 In England, unless covered with a protection with a reaction to fire of class A1 or A2-s1, d0, for example 40 mm thick cast stone slabs, the systems must not be used on balconies of residential buildings with a storey 11 m or more in height or balconies of buildings that have a storey at least 18 m above ground level and contain one or more dwellings, an institution, a room for residential purposes, student accommodation, care homes, sheltered housing, hospitals, dormitories in boarding schools, hotels, hostels or boarding houses.

2.2.8 In Wales, unless covered with a protection with a reaction to fire of class A1 or A2-s1, d0, for example 40 mm thick cast stone slabs, the systems must not be used on balconies of buildings that have a storey at least 18 m above ground level and contain one or more dwellings, an institution, a room for residential purposes, student accommodation, care homes, sheltered housing, hospitals, dormitories or boarding schools.

2.2.9 In Northern Ireland, unless covered with a protection with a reaction to fire of class A1 or A2-s1, d0, for example 40 mm thick cast stone slabs, the systems must not be used on balconies of buildings 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, dormitories in boarding schools, nursing homes and places of lawful detention.

2.2.10 In Scotland, the systems must not be used on balconies of buildings with a storey at a height of 11 m or more above the ground.

3 Hygiene, health and the environment

Data were assessed for the following characteristics.

3.1 Weathertightness

3.1.1 Results of weathertightness tests are given in Table 6.

Table 6 Weathertightness tests

Product assessed	Assessment method	Requirement	Result
Force Dalle Flame Free	Watertightness to BS EN 1928 : 2000	No leakage after 24 hours exposure to a 6 metre head of water	Pass
Force Dalle Flame Free Force 4000 Trafic Flame Free	Peel from substrate (concrete) to MOAT 64 : 2001 Control sample	≥25 N·50mm $^{-1}$	Pass
Force 4000 Trafic Flame Free on OSB board primed with Vernis SA	Wind uplift to MOAT 64 : 2001	Design value(1)	-5.0 kPa

(1) The value for a specific building 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.

3.1.2 The watertightness of Cityflor Green Roof Waterproofing Systems was assessed using test data from a representative product.

3.1.3 On the basis of data assessed, Cityflor Green Roof Waterproofing Systems, including joints, when completely sealed and consolidated, will adequately resist the passage of moisture to the inside of a building and so satisfy the requirements of the national Building Regulations.

3.1.4 On the basis of data assessed, the adhesion of the bonded systems is sufficient to resist the effects of wind suction, elevated temperature and thermal shock conditions likely to occur in practice.

3.1.5 Cityflor Green Roof Waterproofing Systems are always used under inverted roofs, heavy protection, roof garden or green roofs and therefore may be treated as loose laid and ballasted assembled systems in respect of the resistance to wind uplift. The resistance to wind uplift may be determined by calculation of the weight of the protection.

3.2 Resistance to mechanical damage

3.2.1 Results of resistance to mechanical damage tests are given in Table 7.

Table 7 Mechanical damage results

Product assessed	Assessment method	Requirement	Result
Force 4000 Dalle	Dynamic indentation to P 84-353 : 1988	Value achieved	23.6 J
Force 4000 Dalle	Static indentation to P 84-352 : 1988	Value achieved	30 kg
Force 4000 Dalle	Fatigue cycling as per CSTB mehtod2358, Annex 1(1) 500 cycles at -20°C	No damage	Pass

(1) Equivalent test method to MOAT 64, 4.3.5.

3.2.2 Test data were examined for low temperature flexibility, nail tear and tensile strength on a representative related product.

3.2.3 On the basis of data assessed, Cityflor Green Roof Waterproofing Systems can accept, without damage, the foot traffic and light concentrated loads associated with installation and maintenance and the effects of minor movement likely to occur in practice.

3.2.4 Where traffic in excess of the examples given in section 3.2.3 is envisaged, such as for maintenance of lift equipment, a walkway must be provided. Reasonable care must be taken to avoid puncture by sharp objects or concentrated loads.

3.2.5 A green roof or roof garden will provide suitable protection for the systems in use.

3.3 Resistance to root penetration

3.3.1 Test data was examined for root resistance on a representative related product.

3.3.2 On the basis of data assessed, Force Dalle, Force Dalle Flame Free and Force 4000 Trafic will resist penetration by plant roots and so can be used as capsheets in the waterproofing system in green roofs, roof gardens and biodiverse roofs, acting as the root protection layer.

4 Safety and accessibility in use

Not applicable.

5 Protection against noise

Not applicable.

6 Energy economy and heat retention

Not applicable.

7 Sustainable use of natural resources

Not applicable.

8 Durability

8.1 The potential mechanisms for degradation and the known performance characteristics of the materials in the systems were assessed.

8.2 Specific durability test data were assessed as given in Table 8.

Table 8 Results of durability tests

Products assessed	Assessment method	Requirement	Result
Force 4000 Dalle	Fatigue cycling to CSTB method 2358, Annexe1 heat aged for 28 days at 80°C 200 cycles at -20°C	No damage	Pass
Force 4000 Dalle	Heat resistance to CSTB method 2358, Annex 4 Tested at 90°C	Maximum movement of 2 mm	Pass
Force Dalle Flame Free Force 4000 Trafic Flame Free	Peel from substrate (concrete) to MOAT 64 : 2001 heat aged for 28 days at 80°C	≥25 N·50mm^{-1}	Pass
Force 4000 Trafic Flame Free	Low temperature flexibility to BS EN 1109 : 2013	-25°C	Pass

8.3 Test data were examined for the coating mass of a representative related product, on samples aged for six months at 70°C for ring and ball, low temperature flexibility and elasticity recovery tests.

8.4 Visits to existing sites were carried out to assess the long term performance of the systems in use. The conclusion of the visits was that the systems retained sufficient physical characteristics to maintain their intended function.

8.5 Service life

8.5.1 Under normal service conditions, the systems will have a life of at least 30 years, provided they are designed, installed and maintained in accordance with this Certificate and the Certificate holder's instructions.

8.5.2 Localised loss of the mineral surfacing may occur, after some years, in areas where complex detailing of the roof design is incorporated.

PROCESS ASSESSMENT

Information provided by the Certificate holder was assessed for the following factors:

9 Design, installation, workmanship and maintenance

9.1 Design

9.1.1 The design process was assessed, and the following requirements apply in order to satisfy the performance assessed in this Certificate.

9.1.2 Decks to which the systems are to be applied must comply with the relevant requirements of BS 6229 : 2018, BS 8217 : 2005 and, where appropriate, *NHBC Standards* 2025, Chapter 7.1.

9.1.3 For design purposes of flat roofs, twice the minimum finished fall must be assumed, unless a detailed analysis of the roof is available, including overall and local deflection, and direction of falls.

9.1.4 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.

9.1.5 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.

9.1.6 Imposed loads, dead loading and wind loads must 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.

9.1.7 The drainage systems for inverted roofs, zero fall roofs, blue roofs, green roofs or roof gardens must be correctly designed, and the following points must 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.

9.1.8 Balconies and terraces to which the systems are to be applied must be designed in accordance with BS 8579 : 2020.

9.1.9 If the roof is likely to be subjected to uncontrolled pedestrian access, the substructure must satisfy the requirements of the relevant clauses of BS 8217 : 2005, and one of the surface finishes described in clause 6.12 of the Code of Practice must be used.

9.1.10 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.

9.1.11 The ballast requirements for loose-laid specifications must 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. The system must always be ballasted with a minimum depth of 50 mm of aggregate (20 to 40 grade gravel). In areas of high wind exposure, the Certificate holder's advice must be sought. Alternatively, concrete slabs on suitable supports can be used.

9.1.12 The ballast on protected roofs must be of a type that will not be removed or become delocalised owing to wind scour experienced on the roof.

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

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

9.1.15 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 be used in accordance with, and within the limitations of, that Certificate.

9.2 Installation

9.2.1 Installation instructions provided by the Certificate holder were assessed and judged to be appropriate and adequate.

9.2.2 Installation must be carried out in accordance with this Certificate, the Certificate holder's instructions and the relevant clauses of BS 8000-0 : 2014, BS 8000-4 : 1989 and BS 8217 : 2005. A summary of instructions and guidance is provided in Annex A of this Certificate.

9.2.3 Deck surfaces must be sound, dry and clean, and free from sharp projections such as nail heads and concrete nibs.

9.2.4 The systems are 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 to prevent the formation of condensation on the substrate.

9.2.5 At falls in excess of 5° (1:11), precautions against slippage, and requirements for mechanical fixing as required by BS 8217 : 2005, must be observed.

9.2.6 The systems are installed with torch-bonded joints or hot-air welded joints (Force Dalle Flame Free) with 100 mm side laps and 150 mm end laps. A minimum 2 mm bead of molten material must exude from all laps to indicate a satisfactory homogeneous seal.

9.2.7 The systems must always be installed with end laps staggered by a minimum of 300 mm and in such a manner that no counter-seams are made in the direction of outlets.

9.2.8 If required, in bonded applications, the substrate is primed using the specified Axter primer at the required rate prior to installation of the systems.

9.2.9 Bonding is achieved by melting the lower surface by torching and pressing the membrane down. Care must be taken not to overheat the coating. Jointing is carried out as described in sections 9.2.6 and 9.2.7.

9.2.10 For partially bonded applications, a layer of either Thermecran or Planivent is loose-laid over the substrate with minimum side laps of 50 mm prior to installation of the membrane.

9.2.11 Force 4000 Dalle/ Force Dalle are bonded to the surface of the perforated membrane as described in section 9.2.9. Bonding must occur regularly through the perforations to ensure even bonding of the membrane to the substrate. Jointing is carried out as described in sections 9.2.6 and 9.2.7.

9.2.12 In self-adhered applications, Force Dalle Flame Free and Force 4000 Trafic Flame Free are loose laid over the substrate and positioned prior to the removal of the protective silicone release film from the underside.

9.2.13 The protective release film is removed as the membrane is unrolled, before adhering the membrane to the substrate with a heavy roller. Jointing is carried out as described in sections 9.2.6 and 9.2.7.

9.2.14 In loose-laid and ballasted applications, a separating layer of Geotextile Filter layer is loose laid over the substructure, with 100 mm loose overlapping joints, and terminating around the perimeter and upstands for a minimum distance of 500 mm.

9.2.15 Joints for loose-laid and ballasted systems, on slopes between 0 and 1°, have an additional 160 mm strip of Hyranger 25/25 TS, or other membrane approved by the Certificate holder, applied over the side joints. The strips must run in the direction of the outlets to avoid trapping water on the roof. Jointing for roofs with 1 to 5° slopes is carried out as described in 9.2.6 and 9.2.7.

9.2.16 Underlayers and intermediate layers must be installed using the appropriate application method and overlap sizes, in accordance with the Certificate holder's installation instructions.

9.2.17 Upstands and other detailing must be carried out in accordance with the Certificate holder's installation instructions. On exposed areas, suitable protected capsheets such as Axter Force 4000 S, Force 4000 Flame Free or Force 4000 Trafic are used to protect the membranes.

9.2.18 The NHBC requires that the systems, once installed are inspected in accordance with *NHBC Standards* 2025 Chapter 7.1, Clause 7.1.11, including undergoing an appropriate integrity test, where required. Any damage to the systems assessed in this Certificate must be repaired in accordance with section 9.4 of this Certificate and reinspected, in order to maintain the systems performance.

9.3 Workmanship

Practicability of installation was assessed on the basis of the Certificate holder's information and BS 8217 : 2005. To achieve the performance described in this Certificate, the systems must only be installed by contractors who have been trained and approved by the Certificate holder.

9.4 Maintenance and repair

9.4.1 Ongoing satisfactory performance of the systems in use requires that they are suitably maintained. The guidance provided by the Certificate holder was assessed by the BBA and found to be appropriate and adequate.

9.4.2 The following requirements apply in order to satisfy the performance assessed in this Certificate:

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

9.4.2.2 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 9.1).

9.4.2.3 In the event of damage, the capsheet must be repaired in accordance with the Certificate holder's instructions. After cleaning, a patch of the same membrane must be applied and bonded to the damaged area, with a suitable overlap.

9.4.3 Where maintenance or repair of any of the roof components above the waterproofing system is necessary, care must be taken to avoid damage to the membrane. If damage occurs, it must be repaired in accordance with the Certificate holder's instructions.

9.4.4 All the materials used in the construction of a balcony must be non-combustible, minimising the risk of a fire hazard. However, extra precautions must be taken once the building is in use as combustible materials stored by residents on balconies can add to the risk.

10 Manufacture

10.1 The production processes for the systems have been assessed, and provide assurance that the quality controls are satisfactory according to the following factors:

10.1.1 The manufacturer has provided documented information on the materials, processes, testing and control factors.

10.1.2 The quality control operated over batches of incoming materials has been assessed and deemed appropriate and adequate.

10.1.3 The quality control procedures and testing to be undertaken have been assessed and deemed appropriate and adequate.

10.1.4 The process for management of non-conformities has been assessed and deemed appropriate and adequate.

10.1.5 An audit of each production location was undertaken, and it was confirmed that the production process was in accordance with the documented process, and that equipment has been properly tested and calibrated.

† 10.1.6 The BBA has undertaken to review the above activities on a regular basis, through a surveillance process, to verify and re-assure that the specifications and quality control operated by the manufacturer are being maintained.

11 Delivery and site handling

11.1 The Certificate holder stated that the systems are delivered to site on pallets shrink wrapped in polythene bearing the system name; and bands bearing the system name, roll dimensions, production date, batch number and the Certificate holder's name.

11.2 Delivery and site handing must be performed in accordance with the Certificate holder's instructions and this Certificate.

11.2.1 Rolls must be stored upright on a clean, level surface and kept dry, away from excessive heat and under cover.

11.2.2 Self-adhesive components must be stored out of direct sunlight.

ANNEX A – SUPPLEMENTARY INFORMATION †

Supporting information in this Annex is relevant to the systems but has not formed part of the material assessed for the 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.

CLP Regulations

The Certificate holder has taken the responsibility of classifying and labelling the systems components under the *GB CLP Regulation* and *CLP Regulation (EC) No 1272/2008 - classification, labelling and packaging of substances and mixtures*. Users must refer to the relevant Safety Data Sheet(s).

CE marking

The Certificate holder has taken the responsibility of CE marking the systems in accordance with harmonised European Standard EN 13707 : 2013.

Management Systems Certification for production

The management system of the manufacturer has been assessed and registered as meeting the requirements of EN ISO 9001 : 2015 and EN ISO 14001 : 2015 by AFAQ (Certificates QUAL/1996/5190.12 and No 2011/40665.4 respectively).

Additional information on installation

General

A.1 Recommendations for the design and maintenance of green roof 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*.

A.2 Advice on suitable planting specifications can be obtained from the Certificate holder, but such advice is outside the scope of this Certificate.

Installation

A.3 Membranes with anti-root additives are used as capsheets to the waterproofing system in planting specifications.

A.4 The specification above the waterproofing systems should be of a suitable design, including a filter layer and drainage layers where required. In cases of doubt, the Certificate holder's advice should be sought.

A.5 The underlayers for the systems, dependent on the type, can be installed by the following methods:

- self-adhesive
- partially bonded
- fully bonded
- mechanically fastened.

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 8579 : 2020 *Guide to the design of balconies and terraces*

BS EN 1109 : 2013 *Flexible sheets for waterproofing. Bitumen sheets for roof waterproofing. Determination of flexibility at low temperature*

BS EN 1928 : 2000 *Flexible sheets for waterproofing — bitumen, plastic and rubber sheets for roof waterproofing - determination of watertightness*

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 + 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*

BS EN 13501-1 : 2018 *Fire classification of construction products and building elements — Classification using data from reaction to fire tests*

CSTB, No. 2358, Annex 1 *Determination of the resistance to dynamic indentation*
CSTB, No. 2358, Annex 4 Heat resistance

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

EN 13501-5 : 2016 *Fire classification of construction products and building elements — 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 ISO 9001 : 2015 *Quality management systems — Requirements*

EN ISO 14001 : 2015 *Environmental management systems — Requirements with guidance for use*

MOAT 64 : 2001 *Technical guide for the assessment of roof waterproofing systems made of reinforced APP or SBS polymer modified bitumen sheets*

P 84-352 : 1988 *Waterproofing. Sheeting for roofing and damp proofing — Determination of the resistance to static indentation*

P 84-353 : 1988 *Waterproofing. Sheeting for roofing and damp proofing — Dynamic perforation test.*

Conditions

1 This Certificate:

- relates only to the product 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
- 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
- and any matter arising out of or in connection with it or its subject matter (including non-contractual disputes or claims) is governed by and construed in accordance with the law of England and Wales.
- the courts of England and Wales shall have exclusive jurisdiction to settle any matter arising out of or in connection with this Certificate or its subject matter (including non-contractual disputes or claims).

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.

3 This Certificate will be displayed on the BBA website, and the Certificate Holder is entitled to use the Certificate and Certificate logo, provided that the product 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.

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

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 or any other product
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product
- actual installations of the product, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to UKCA marking and CE marking.

6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product which is contained or referred to in this Certificate is the minimum required to be met when the product is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.

British Board of Agrément
1st Floor, Building 3, Hatters Lane
Croxley Park, Watford
Herts WD18 8YG
tel: 01923 665300
clientservices@bbacerts.co.uk
www.bbacerts.co.uk