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**Agrément Certificate**

**06/4350**

Product Sheet 6 Issue 2

## BAKOR HOT-APPLIED MONOLITHIC STRUCTURAL WATERPROOFING SYSTEM

### BAKOR 790-11 HOT-APPLIED MONOLITHIC MEMBRANE ROOFING SYSTEM

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to the Bakor 790-11 Hot-Applied Monolithic Membrane Roofing System, a modified bitumen-based waterproofing system for use on flat roofs, zero fall roofs, inverted roofs, green roofs, roof gardens, blue roof specifications in combination with a stormwater attenuation system<sup>(2)</sup> and other protected flat roofs with limited access.

(1) Hereinafter referred to as 'Certificate'.

(2) The stormwater attenuation system is outside the scope of this Certificate

#### 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 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 Second issue: 11 October 2024

Hardy Giesler

Originally certified on 25 February 2019

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.*

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## 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 the Bakor 790-11 Hot Applied Monolithic Membrane Roofing 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 Building Regulations 2010 (England and Wales) (as amended)

<b>Requirement:</b>	<b>B4(2)</b>	<b>External fire spread</b>
Comment:		Roofs incorporating the system, when used with suitable surface protection, may enable a roof to be unrestricted by this Requirement. See section 2 of this Certificate.
<b>Requirement:</b>	<b>C2(b)</b>	<b>Resistance to moisture</b>
Comment:		The system will enable a roof to satisfy this Requirement. See section 3 of this Certificate.
<b>Regulation:</b>	<b>7(1)</b>	<b>Materials and workmanship</b>
Comment:		The system is acceptable. See sections 8 and 9 of this Certificate.



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

<b>Regulation:</b>	<b>8(1)(2)</b>	<b>Fitness and durability of materials and workmanship</b>
Comment:		The use of the system satisfies this Regulation. See sections 8 and 9 of this Certificate.
<b>Regulation:</b>	<b>9</b>	<b>Building standards – construction</b>
Standard:	2.8	Spread from neighbouring buildings
Comment:		Roofs incorporating the system, when used with suitable surface protection, may enable a roof to be unrestricted by this Standard, with reference to clause 2.8.1 <sup>(1)(2)</sup> . See section 2 of this Certificate
Standard:	3.10	Precipitation
Comment:		The system will enable a roof to satisfy this Standard, with reference to clauses 3.10.1 <sup>(1)(2)</sup> and 3.10.7 <sup>(1)(2)</sup> . See section 3 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.
<b>Regulation:</b>	<b>12</b>	<b>Building standards – conversion</b>
Comment:		All comments given for the system under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 <sup>(1)(2)</sup> and Schedule 6 <sup>(1)(2)</sup>
		(1) Technical Handbook (Domestic).
		(2) Technical Handbook (Non-Domestic).



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

<b>Regulation:</b>	<b>23(1)(a)(i)(ii)</b>	<b>Fitness of materials and workmanship</b>
Comment:	<b>(iii)(iv)(b)(i)</b>	The system is acceptable. See sections 8 and 9 of this Certificate.

<b>Regulation:</b>	<b>28(b)</b>	<b>Resistance to moisture and weather</b>
Comment:		The system will enable a roof to satisfy this Regulation. See section 3 of this Certificate.
<b>Regulation:</b>	<b>36(b)</b>	<b>External fire spread</b>
Comment:		Roofs incorporating the system, when used with suitable surface protection, may enable a roof to be unrestricted by this Regulation. See section 2 of this Certificate.

## Additional Information

### NHBC Standards 2024

In the opinion of the BBA, the Bakor 790-11 Hot-Applied Monolithic Membrane Roofing 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*, Chapter 7.1 *Flat roofs, terraces and balconies*.

In addition, in the opinion of the BBA, the system, 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 system.

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

## Fulfilment of Requirements

The BBA has judged the Bakor 790-11 Hot-Applied Monolithic Membrane Roofing System to be satisfactory for use as described in this Certificate. The system has been assessed for use on flat roofs, zero fall roofs, inverted roofs, green roofs, roof gardens, blue roof specifications in combination with a stormwater attenuation system and other protected flat roofs with limited access.

## ASSESSMENT

### Product description and intended use

The Certificate holder provided the following description for the system under assessment. The Bakor 790-11 Hot-Applied Monolithic Membrane Roofing System is applied in two layers, sandwiching a reinforcement layer, to provide a waterproofing layer with a nominal coating thickness of 6 mm. The system consists of:

- Bakor 790-11 Monolithic Membrane — a waterproofing membrane based on a combination of refined bitumen, synthetic rubbers, recycled rubber content and other additives
- Bauder Polyester Reinforcement Sheet — a 60 g·m<sup>-2</sup> spunbonded polyester reinforcing scrim
- Bauder Butyl Flashing — a 1 mm thick, flexible detailing sheet, used to reinforce the membrane at expansion joints where movement is likely to occur, and for details and upstands
- Bauder Neoprene Flashing — a 1 mm thick, flexible detailing sheet, used to reinforce the membrane at expansion joints where movement is likely to occur, and for details and upstands
- Bauder Plant E42 — a polyester-based, mineral-surfaced, root-resistant bitumen protection sheet
- Bauder AP3 Protection Sheet — a high-density polymeric protection sheet
- Bauder Quick Dry Bitumen Primer — a primer for concrete, brick, and metal substrates.
- Bauder Polymer Primer — a quick drying primer
- Bauder K4E Protection Sheet — a polyester-based, mineral-surfaced, bitumen protection sheet for exposed detailing
- Bauder K5E FBS Protection Sheet — a polyester-based, mica-surfaced, bitumen heavy duty protection sheet for use under hard landscaping.

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

- Bauder Multi-Purpose Primer — a membrane detailing primer
- Bauder AP1 Access Sheet — a reinforced, modified bitumen access sheet
- Bauder PYE PV 200 S4 Protection Sheet — a polyester based mica-surfaced, bitumen protection sheet for use under hard landscaping
- Bauder G4E Sheet — a torch-applied detailing base sheet
- Bauder EGV 35 TF Underlay — a torch-applied detailing base sheet
- Bauder TEC KSA Duo Underlay — a self-adhesive detailing base sheet (the subject of BBA Certificate 10/4744, Product Sheet 1)
- Bauder TEC Sprint Duo Underlay — a self-adhesive detailing base sheet
- Bauder TEC KSO-PSN & KSO-SN Cap Sheet — a self-adhesive cap sheet
- XPS/EPS Inverted Roof Insulation Board — an insulation board used in inverted/protected roofs including intensive, green roofs, biodiverse living roofs and blue roofs
- XPS Upstand Insulation Board — an insulation board used for upstand detailing
- Stone Wool Upstand insulation board – stone wool with a fibre-cement facing board, used for upstand detailing
- Cellular Glass inverted roof insulation board– an insulation board used in conjunction with a water flow reducing layer (WFRL) in inverted/protected roofs including intensive, green roofs and biodiverse living roofs
- Cellular Glass Upstand insulation board (non-combustible) – board with a pre-applied inorganic coating, used for upstand detailing
- Vacuum Insulated Insulation (VIP) panels – an insulation board used in conjunction with a WFRL in inverted/protected roofs including intensive, green roofs, biodiverse living roofs and blue roofs
- WFRL – used to minimise heat loss caused by rainwater cooling of the roof deck in inverted, ballasted and paved roof specifications.
- Bauder Growing Medium — for use in roof garden, extensive and biodiverse living roof applications
- Bauder LiquiDETAIL– used as a cold applied detailing where complex details are present
- Paviour supports and related ancillaries
- Mastic asphalt screed for use as a protection layer, levelling coat or to add falls
- Bauder Drainage, Protection, Moisture Retention Layers and Ancillaries — for use in roof garden, extensive and biodiverse living roof applications
- Bauder Hot Melt Compact Vertical Outlets
- Third party cast outlets including a clamping ring/plate
- Bauder Hot Melt Blue Roof Vertical Outlets, Flow Restrictors and Attenuation Cells
- Proprietary expansion joint systems
- Polypropylene geotextile root barriers.

### Applications

The system is intended for use on the following substrates:

- in-situ concrete
- pre-cast concrete
- concrete block
- lightweight structural concrete subject to the Certificate holder’s recommendations
- timber (exterior grade plywood, OSB3, composite timber or sawn timber)
- metal (upstands and flat substrates)
- cement bonded particle boards
- reinforced bituminous membranes (including mineral surfaced).

The substrates must comply with the relevant requirements of BS 6229 : 2018 and, where appropriate, NHBC Standards 2024, Chapter 7.1.

### Definitions for products 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, cleaning of gutters, etc
- zero fall roof — a roof having a finished fall which can vary between 0 and 1:80<sup>(1)</sup>

- flat roof — a roof having a minimum finished fall of 1:80<sup>(1)</sup>
- pitched roof – a roof having a fall in excess of 1:6
- 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
- roof garden (intensive) — a roof with a substantial layer of growing medium with planting that can include shrubs and trees, generally accessible to pedestrians
- biodiverse roof (extensive or intensive) — a roof planted with the aim either to recreate the habitat that was lost when a building was erected or to enhance it.
- invasive plant species – vegetation species with vigorous and/or invasive root systems likely to cause damage to components of the inverted roof insulation system and roof waterproofing.
- blue roof – a flat or zero fall roof which is designed to allow controlled attenuation of rain fall during heavy and storm events, as part of sustainable urban drainage systems (SUDS)<sup>(2)</sup>.

(1) NHBC Standards 2024 require a minimum fall of 1:60 for green roofs and roof gardens

(2) The stormwater attenuation system is outside the scope of this Certificate.

## Product assessment – key factors

The system was 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 CEN/TS 1187 : 2012, Test 4, and classified to EN 13501-5 : 2016, the construction given in Table 2 achieved B<sub>ROOF</sub>(t4) for slopes below 10°.

Table 1 Tested construction

Layer	System <sup>(1)</sup>
Substrate	18 mm OSB3 <sup>(2)</sup>
Primer	Bauder Polymer Primer
Waterproof layer	3 mm Bakor 790-11
Reinforcement	Polyester Reinforcement Sheet
Waterproof layer	3 mm Bakor 790-11
Membrane	Bauder AP1 Access Sheet <sup>(2)</sup>
Insulation	240 mm Bauder JFRI Inverted Insulation <sup>(2)</sup> (loose laid)
WFRL	Bauder FRI WFRL <sup>(2)</sup> (loose-laid)
Pedestals	DPH-F17 non-adjustable pedestal & DPH-TAB 6 mm spacer <sup>(2)</sup> (loose-laid)
Paving	40 mm Concrete Paving Tiles <sup>(1)</sup> 417 mm square, (loose laid) with 6 mm gaps

(1) Test and classification reports, P120315-1000 and P120315-1001, respectively, issued by BRE Global Ltd. Copies available from the Certificate holder on request.

(2) These components are outside the scope of this Certificate.

2.1.2 On the basis of data assessed, the system defined in Table 1 will be unrestricted with respect to proximity to a relevant boundary by the documents supporting the national Building Regulations.

2.1.3 A roof incorporating the system will be similarly unrestricted in the following circumstances:

- protected or inverted roof specifications, including 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 and roof gardens.

2.1.4 The classification and permissible areas of use of other specifications must be confirmed by reference to the requirements of the documents supporting the national Building Regulations.

2.1.5 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. Further guidance is available in the Department for Communities and Local Government publications, *Fire Performance of Green Roof and Walls*.

### 3 Hygiene, health and the environment

#### 3.1 Weathertightness

3.1.1 Results of weathertightness tests are given in Table 2.

System assessed	Assessment method	Requirement	Result
Bakor 790-11 Hot Applied Monolithic Membrane Roofing System	Water vapour transmission rate to BS 3177 : 1959	Value achieved	0.26 g·m <sup>-2</sup> ·day <sup>-1</sup>
Bakor 790-11 Hot Applied Monolithic Membrane Roofing System	Head of water to MOAT 27 : 1983	No leakage after 24 hours exposure to 60 kPa	Pass

3.1.2 On the basis of data assessed, the system will resist the passage of water into the interior of a building and so satisfy the relevant requirements of the national Building Regulations.

3.1.3 The system, when used within a suitable specification, will adequately resist the effects of wind uplift likely to occur in practice.

#### 3.2 Resistance to mechanical damage

3.2.1 Results of resistance to mechanical damage tests are given in Table 3.

**Table 3 Resistance to mechanical damage**

Product assessed	Assessment method	Requirement	Result
Bauder Butyl Flashing	Tensile strength to BS 903-A2 : 1995 Longitudinal direction Transverse direction	Value achieved	9.3 MPa 8.6 MPa
Bauder Plant E42	Tensile strength to BS EN 12311-1 : 2000 Longitudinal direction Transverse direction	Value achieved	1475 N·(50 mm) <sup>-1</sup> 1420 N·(50 mm) <sup>-1</sup>
Bauder Butyl Flashing	Elongation at break to BS 903-A2 : 1995 Longitudinal direction Transverse direction	Value achieved	426% 463%
Bauder Plant E42	Elongation at break to BS EN 12311-1 : 2000 Longitudinal direction Transverse direction	Value achieved	31 % 30 %
Bakor 790-11 Hot Applied Monolithic Membrane Roofing System	Resistance to dynamic indentation to EOTA TR-006 : 2004	Value achieved	I <sub>3</sub>
Bakor 790-11 Hot Applied Monolithic Membrane Roofing System	Resistance to static indentation to EOTA TR-007 : 2004	Value achieved	L <sub>3</sub>
Bakor 790-11 Hot Applied Monolithic Membrane Roofing System	Fatigue movement to EOTA TR-008 : 2004	Watertight and less than 75 mm delamination from the substrate after 1000 cycles	Pass

3.2.2 On the basis of data assessed, the system can accept, without damage, the limited foot traffic and light concentrated loads associated with installation and maintenance and the effects of minor structural movement likely to occur under normal service conditions while remaining weathertight.

3.2.3 Where traffic in excess of the examples given in section 3.2.2 is envisaged, such as for maintenance of lift equipment, suitable protection (for example, using concrete slabs supported on bearing pads) must be used. Reasonable care must be taken to avoid puncture of the systems by sharp objects or concentrated loads.

### 3.3 Resistance to root penetration

3.3.1 The result of a resistance to root penetration test is given in Table 4.

**Table 4 Resistance to root penetration**

System assessed	Assessment method	Requirement	Result
Bakor 790-11 Hot Applied Monolithic Membrane Roofing System	Resistance to root penetration to FLL Method 1999	No root penetration	Pass

3.3.2 On the basis of data assessed, the system, when used with Bauder Plant E42 in roof garden, green roof and biodiverse roof applications, will resist penetration by plant roots and remain weathertight.

3.3.3 For green roofs in inverted roof specifications, when installed in accordance with this Certificate, the inverted roof insulation and WFRL will be adequately protected against root damage, subject to routine maintenance being carried out in accordance with this Certificate and as recommended by the Green Roof Organisation (GRO) *Code of Best Practice*.

3.3.4 For roof gardens in inverted specifications, when installed in accordance with this Certificate, the inverted roof insulation and WFRL must be protected from damage from invasive plant roots (for example, by using root resistant planter boxes or tree pits lined with an effective root barrier).

## 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 this system were assessed.

8.2 Specific test data were assessed as given in Table 5.

System assessed	Assessment method	Requirement	Result
Bakor 790-11 Hot Applied Monolithic Membrane Roofing System	Flexibility at low temperature to CAN/CGSB 37.50-M89 : 1989 Control	Value achieved	-25°C
	Heat aged for 200 days at 70°C		-5°C
	Water exposure for 180 days at 60°C		-20°C
Bakor 790-11 Hot Applied Monolithic Membrane Roofing System	Resistance to static indentation to EOTA TR-007 : 2004	Value achieved	L <sub>3</sub>
	Water exposure for 180 days at 60°C		
Bakor 790-11 Hot Applied Monolithic Membrane Roofing System	Resistance to dynamic indentation to EOTA TR-006 : 2004	Value achieved	I <sub>3</sub>
	Heat aged for 200 days at 70°C		
Bakor 790-11 Hot Applied Monolithic Membrane Roofing System	Fatigue movement to EOTA TR-008 : 2004	Watertight and less than 75 mm delamination from the substrate after 50 cycles	Pass
	Heat aged for 200 days at 70°C		

### 8.3 Service life

Under normal service conditions, the system will have a life at least equivalent to the structure in which it is incorporated, provided it is designed, installed and maintained in accordance with this Certificate and the Certificate holder's instructions.

## 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 by the BBA and the following requirements apply in order to satisfy the performance assessed in this Certificate.

9.1.2 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 2024, 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, direction of falls.

9.1.4 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.

9.1.5 Imposed loads, dead loading and wind loads must be calculated by a suitably experienced and competent individual in accordance with the principles of BS EN 1991-1-1 : 2002, BS EN 1991-1-3 : 2003 and BS EN 1991-1-4 : 2005 and their UK National Annexes.

9.1.6 The ballast requirements for inverted specifications must be calculated by a suitably experienced and competent individual in accordance with the principles of BS EN 1991-1-4 : 2005 and its UK National Annex. The system must be ballasted with a minimum depth of 50 mm of aggregate. In areas of high wind exposure, the Certificate holder's advice must be sought, but such advice is outside the scope of this Certificate. Alternatively, concrete slabs on suitable supports can be used.

9.1.7 When the systems are used in gravel-ballasted protected roof or inverted roof specifications, a suitable filter layer/water-reducing layer must be used between the ballast and the rest of the specification.

9.1.8 The ballast on protected roofs or growing medium used in roof gardens must not be of a type that will be removed or become delocalised owing to wind scour experienced on the roof.

9.1.9 It must be recognised that the type of plants used in roof gardens could significantly affect the expected wind loads experienced in service. Appropriate mitigation measures must be taken; the advice of the Certificate holder and / or the Green Roof Organisation (GRO) may be sought, but such advice is outside the scope of this Certificate.

9.1.10 For green roofs and roof gardens, invasive non-native alien plant species as defined by UK Government guidance must not be used.

9.1.11 For roof garden finishes, to protect the roof waterproofing and any system components above the waterproofing, such as insulation or water flow reducing layer, invasive plant species must not be used, in particular, the following species must be excluded or managed:

- invasive weeds including buddleia
- plants and grasses with aggressive rhizomes such as bamboo
- self-setting woody weeds such as sycamore and ash seedlings – must be removed at early germination stage
- other woody plants which spread aggressively including rhododendron.

9.1.12 The Green Roof Organisation (GRO) can provide guidance on species not included in section 9.1.11 but such advice is outside the scope of this Certificate.

9.1.13 In green roof and roof garden specifications, Bauder Plant E42 must be used as the protection layer, bonded into the second layer of Bakor 790-11 whilst still hot. End and side laps must be torched using traditional torching techniques prior to installing the specified finish.

9.1.14 The drainage systems for inverted roofs, protected zero fall roofs, green roofs, roof gardens or blue roofs must be correctly designed, and the following points must be addressed:

- provision made for access for maintenance purposes
- for protected zero fall roofs, it is particularly important to identify the correct drainage points, to ensure that drainage is sufficient and effective
- the attenuation system and drainage for blue roofs must be designed by a suitably experienced and competent individual to allow the short-term storage and discharge at a set flow rate of storm water to alleviate the risk of localised flooding
- dead loads for green roof, roof gardens and blue roofs can increase if the drains become partially or completely blocked causing waterlogging of the drainage layer.

## 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 of the system must be in accordance with this Certificate, the Certificate holder's instructions, the relevant clauses of BS 6229 : 2018, BS 8000-0 : 2014, BS 8000-4 : 1989 and BS 8217 : 2005 and the *Liquid Roofing and Waterproofing Association (LRWA) Note 7 – Specifier Guidance for Flat Roof Falls*. A summary of instructions and guidance is provided in Annex A.

9.2.3 The system must be installed on a dry and frost-free substrate. After rain or snow, the substrate must be allowed to dry before installation can commence. The installer can aid drying by any suitable means approved by the Certificate holder, but such advice is outside the scope of this Certificate.

9.2.4 To assess the suitability of a substrate to receive the membrane, bond tests must be carried out. If bonding problems occur, advice must be sought from the Certificate holder, but such advice is outside the scope of this Certificate.

9.2.5 Substrates to which the system is to be applied must be sound, dry, clean and free from sharp projections such as nail heads and concrete nibs.

9.2.6 In-situ structural concrete with a density lower than 1842 kg·m<sup>-3</sup> (owing to substrate friability) and lightweight insulating concretes are not acceptable substrates for application of the system without consultation with the manufacturer.

9.2.7 Adhesion checks must be carried out to ensure that the system is compatible with the existing surfaces. The Certificate holder must be consulted for details of suitable test methods and requirements before use, but such advice is outside the scope of this Certificate.

9.2.8 Prior to the application of the waterproofing membrane, defects in the substrate such as cracks, irregularities and other areas of potential weakness must be repaired using a suitable repair mortar, and the substrate cleaned in accordance with the Certificate holder's instructions. Additional membrane may be used to fill minor depressions in the substrate.

9.2.9 The substrate must be primed with either Bauder Quick Dry Bitumen Primer or Bauder Polymer Primer and allowed to dry before the application of the membrane. Coverage will vary depending on the porosity of the substrate but must be between 4 and 8 m<sup>2</sup> per litre, depending on the primer used.

9.2.10 The system must not be installed directly on to profiled metal sheet. A suitable carrier board must be mechanically fixed to the profiled metal to carry the system. The Certificate holder's advice must be sought in this instance, but such advice and products are outside the scope of this Certificate.

9.2.11 Cakes of Bakor 790-11 Monolithic Membrane are heated in a mechanically agitated melter which has a double jacket containing either air or a heat-transfer mineral oil, and is fitted with thermometers to measure the melt and air/oil temperatures. Electrically operated mechanically agitated melters which are insulated between melting chamber and external frame, and is fitted with computer controlled thermometers to measure melt temperature are also acceptable for melting Bakor 790-11.

9.2.12 The nominal temperature range for the molten membrane is 180 to 200°C. The temperature of the melt must never exceed 215°C.

9.2.13 The molten membrane is discharged from the melter into a suitable container and applied to the roof using a long-handled squeegee for horizontal surfaces and a suitable spreader for vertical surfaces.

9.2.14 When used over construction joints, the membrane must be reinforced with Bauder Polyester Reinforcement Sheet, in accordance with the Certificate holder's instructions.

9.2.15 When used across expansion or bridging joints or between differing abutting substrates, eg metal outlet flange and concrete deck, the membrane must be reinforced with Bauder Butyl Flashing or Bauder Neoprene Flashing, in

accordance with the Certificate holder's instructions.

9.2.16 At all board joints in plywood, OSB3 or cement bonded particle boards, a minimum 150 mm reinforcement layer of Bauder Polyester Reinforcement must be applied prior to applying Bakor 790-11 Membrane, in accordance with the Certificate holder's instructions.

9.2.17 The first layer of the molten membrane must have a nominal thickness of 3 mm.

9.2.18 Bauder Polyester Reinforcement Sheet is embedded by lightly brushing it into the first layer of the membrane while it is still warm and tacky. The reinforcement overlaps must be at least 75 mm and be fully sealed by application of Bakor 790-11 Monolithic Membrane.

9.2.19 The second layer of molten membrane, applied over the top of the reinforcement, must have a nominal thickness of 3 mm.

9.2.20 The membrane must be protected immediately while the second layer of the membrane is still hot, in accordance with the Certificate holder's instructions, prior to applying any insulation and ballast as defined by the specification.

9.2.21 Detailing must be carried out in accordance with the Certificate holder's instructions.

9.2.22 The growing medium 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.

9.2.23 The NHBC requires that the system, once installed, is inspected in accordance with *NHBC Standards 2024*, Chapter 7.1, Clause 7.1.11, including undergoing an appropriate integrity test, where required. Any damage to the system assessed in this Certificate must be repaired in accordance with section 9.4 of this Certificate and reinspected, in order to maintain system 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, installation of the system must be carried out by installers who have been trained and approved by the Certificate holder.

### 9.4 Maintenance and repair

9.4.1 Ongoing satisfactory performance of the system in use requires that it is 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 system must be the subject of visual six-monthly inspections and maintenance in accordance with the recommendations in BS 6229 : 2018, Chapter 7, and the Certificate holder's own maintenance requirements. For green roof, roof garden and drainage systems, these six-monthly inspections must be carried out by a suitably experienced and competent individual (with horticultural knowledge) to ensure continued satisfactory performance. This must include an examination of the overall condition of the roof, ensuring that drain outlets and getters are kept clear and unblocked and, for green roofs and roof gardens, the removal of any self-propagated plants and invasive plant species found. See section 9.1

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 is cleared from the roof and drainage outlets. Guidance is available within the latest edition of *The GRO Green Roof Code of Best Practice*.

9.4.2.3 For green roofs, to protect the waterproofing and any system components above the waterproofing, such as insulation or WFRL, invasive plant species (see clauses 9.1.11 and 9.1.12 of this Certificate) must be eliminated through maintenance.

9.4.2.4 The control and removal of invasive species must be carried out by hand. Where this is not possible, any chemicals must first be checked for compatibility with the roof waterproofing layer and any system components above

the waterproofing, such as insulation or water flow reducing layer. The Certificate holder can advise on the suitability of a particular product, but such advice and products are outside the scope of this Certificate. Note, if using chemicals on a green roof or roof garden, rainwater outlets may need to be disconnected from the main drainage system to prevent contamination of the local water system and/or harm to flora and fauna.

9.4.2.5 The chemical fertiliser used on green roofs and roof gardens must be checked for compatibility with the roof waterproofing layer and any system components above the waterproofing, such as insulation or water flow reducing layer. The Certificate holder can advise on the suitability of a particular product, but such advice and products are outside the scope of this Certificate.

9.4.2.6 If a leak occurs in the roof waterproof membrane, it must be repaired following removal of the gravel ballast, paving ballast, green roof or roof garden layer, WFRL and the insulation boards. Correct reinstatement of these layers must be carried out with particular care and the advice of the Certificate holder must be sought, but such advice is outside the scope of this Certificate.

9.4.2.7 Maintenance must include checks and operations to ensure that the system and drainage outlets are free from the build-up of silt and other debris, and that protection layers, eg walkways, are in good condition.

9.4.2.8 In the event of the system being contaminated by oil, grease or other chemicals, the advice of the Certificate holder must be sought, but such advice is outside the scope of this Certificate.

9.4.2.9 Any damage to the system must be repaired as soon as possible to ensure that the integrity of the waterproofing is maintained. The advice of the Certificate holder must be sought, but such advice is outside the scope of this Certificate.

9.4.2.10 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 to the membrane occurs, then it must be repaired in accordance with the Certificate holder's instructions.

## **10 Manufacture**

10.1 The production processes for the system 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 product 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.

† 10.2 The BBA has undertaken to review 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.

## **11 Delivery and site handling**

11.1 The Certificate holder stated that the system components are delivered to site in packaging bearing the component names, Certificate holder's name, and batch number.

11.2 Delivery and site handling must be performed in accordance with the Certificate holder's instructions and this Certificate, including:

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

Supporting information in this Annex is relevant to the system 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 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).

### 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 by BSI (Certificate FM 86932).

### Additional information on installation

#### General

A.1 Additional guidance on maintenance for green roofs is available within the latest edition of the GRO *Green Roof code – Green Roof Code of Best Practice for the UK*.

A.2 For zero fall roofs, reference must be made to the appropriate clauses in the Liquid Roofing and Waterproofing Association (LRWA) Note 7 – *Specifier Guidance for Flat Roof Falls*.

A.3 Additional guidance for inverted roof specifications is given in BBA Information Bulletin No 4 *Inverted roofs – Drainage and U value corrections*.

A.4 Guidance on the design of blue roofs is available in NFRC *Technical Guidance Note for the construction and design of Blue Roofs – Roofs and podiums with controlled temporary water attenuation*.

## Bibliography

- BS 903-A2 : 1995 *Physical Testing of Rubber Part A2: Method for Determination of Tensile Stress-Strain Properties*
- BS 3177 : 1959 *Method for determining the permeability to water vapour of flexible sheet materials used for packaging*
- 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 12311-1 : 2000 *Flexible sheets for waterproofing — Determination of tensile properties — Bitumen sheets for roof waterproofing*
- 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 + 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*
- CAN/CGSB 37.50-M89 : 1989 *Hot-Applied, Rubberized Asphalt for Roofing and Waterproofing*
- 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 ISO 9001 : 2015 *Quality management systems – Requirements*
- EOTA TR-006 : 2004 *Determination of the resistance to dynamic indentation*
- EOTA TR-007 : 2004 *Determination of the resistance to static indentation*
- EOTA TR-008 : 2004 *Determination of the resistance to fatigue movement*
- MOAT 27 : 1983 *General directive for the assessment of roof waterproofing systems*
- FLL 1999 *Procedure for investigating the root penetration resistance of membranes and coatings for green roofs*

## Conditions of Certificate

### 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
- 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.

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.

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