

Axter Ltd

West Road
Ransomes Europark
Ipswich
Suffolk IP3 9SX

Tel: 01473 724056 Fax: 01473 723263
e-mail: info@axterltd.co.uk
website: www.axter.co.uk



Agrément Certificate
15/5261
Product Sheet 2

AXTER PVC SINGLE-PLY ROOF WATERPROOFING SYSTEMS

ECOLINE VV, ADH (VV), ADH AND ECOFLEX VV, ADH (VV), ADH (VVB), ADH WATERPROOFING SYSTEMS

This Agrément Certificate Product Sheet⁽¹⁾ relates to Ecoline VV, ADH (VV), ADH and Ecoflex VV, ADH (VV), ADH (VVB), ADH Waterproofing Systems, a range of fully bonded and loose-laid and ballasted reinforced PVC membranes, for use on limited access roofs in exposed, protected, inverted, roof garden and green roof specifications.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

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



KEY FACTORS ASSESSED

Weather-tightness — the systems will resist the passage of moisture into the building (see section 6).

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

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

Resistance to foot traffic — the systems will accept the limited foot traffic and loads associated with installation and maintenance (see section 9).

Resistance to penetration of roots — the 1.5 mm membranes will adequately resist plant root penetration (see section 10).

Durability — under normal service conditions, the systems will provide a durable roof waterproofing with a service life in excess of 35 years (see section 12).

The BBA has awarded this Certificate to the company named above for the 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

Claire Curtis-Thomas

Date of Second issue: 9 July 2018

John Albon — Head of Approvals

Claire Curtis-Thomas

Originally certified on 3 November 2015

Construction Products

Chief Executive

The BBA is a UKAS accredited certification body – Number 113.

The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

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

British Board of Agrément

Bucknalls Lane
Watford
Herts WD25 9BA

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

©2018

Regulations

In the opinion of the BBA, Ecoline VV, ADH (VV), ADH and Ecoflex VV, ADH (VV), ADH (VVB), ADH Waterproofing Systems, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



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

Requirement:	B4(2)	External fire spread
Comment:		On suitable substructures, the use of the systems can enable a roof to be unrestricted under this Requirement. See sections 7.1 to 7.4 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		The systems, including joints, will enable a roof to satisfy this Requirement. See section 6.1 of this Certificate.
Regulation:	7	Materials and workmanship
Comment:		The systems are acceptable. See section 12 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Durability, workmanship and fitness of materials
Comment:		The use of the systems satisfies the requirements of this Regulation. See sections 11 and 12 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	2.8	Spread from neighbouring buildings
Comment:		The membranes, when applied to a suitable substructure, can be regarded as having low vulnerability under clause 2.8.1 ⁽¹⁾⁽²⁾ of this Standard. See sections 7.1 to 7.4 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The membranes, including joints, will enable a roof to satisfy the requirements of this Standard, with reference to clauses 3.10.1 ⁽¹⁾⁽²⁾ and 3.10.7 ⁽¹⁾⁽²⁾ . See section 6.1 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The systems can contribute to meeting the relevant requirements of Regulation 9, Standards 1 to 6 and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.
Regulation:	12	Building standards applicable to conversions
Comment:		All comments given for the systems under Regulation 9, Standards 1 to 6 also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



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

Regulation:	23(a)(i)(iii)(b)(i)	Fitness of materials and workmanship
Comment:		The systems are acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The systems, including joints, can enable a roof to satisfy the requirements of this Regulation. See section 6.1 of this Certificate.
Regulation:	36(b)	External fire spread
Comment:		On suitable substructures, the use of the systems can be unrestricted by the requirements of this Regulation. See sections 7.1 to 7.4 of this Certificate.

Construction (Design and Management) Regulations 2015

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

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

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

Additional Information

NHBC Standards 2018

In the opinion of the BBA, Ecoline VV, ADH (VV), ADH and Ecoflex VV, ADH (VV), ADH (VVB), ADH Waterproofing Systems, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapter 7.1 *Flat roofs and balconies*.

CE marking

The Certificate holder has taken the responsibility of CE marking the systems in accordance with harmonised European Standard EN 13956 : 2012. An asterisk (*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 Ecoline VV, ADH (VV), ADH and Ecoflex VV, ADH (VV), ADH (VVB), ADH Waterproofing Systems comprise a range of reinforced PVC membranes:

- Ecoline/Ecoflex VV — a glassfibre (50 g·m⁻²) reinforced, PVC membrane for loose-laid and ballasted or fully bonded systems
- Ecoline/Ecoflex ADH (VV) — a glassfibre (50 g·m⁻²) reinforced, non-woven polyester (200 g·m⁻²) fleece-backed PVC membrane for fully bonded systems
- Ecoflex ADH (VVB) — a glassfibre (50 g·m⁻²) reinforced, non-woven polyester (300 g·m⁻²) fleece-backed PVC membrane for fully bonded systems
- Ecoline/Ecoflex ADH — a polyester (50 g·m⁻²) reinforced, non-woven polyester (200 g·m⁻²) fleece-backed PVC membrane for fully bonded systems.

1.2 The membranes are available in a selection of RAL colours and are manufactured to the nominal characteristics given in Table 1.

Table 1 Nominal characteristics

Characteristic (unit)	Membrane						
	Ecoline ADH 1.2	Ecoline/Ecoflex ADH 1.5	Ecoline ADH (VV) 1.2	Ecoline/Ecoflex ADH (VV) 1.5	Ecoflex ADH (VVB) (1.5)	Ecoline VV 1.2	Ecoline/Ecoflex VV 1.5
Thickness*(mm)	1.2	1.5	1.2	1.5	1.5	1.2	1.5
Roll width (m)	1.6	1.6	1.6	1.6	2.1	1.6, 2.1	1.6, 2.1
Roll length (m)	20	20	20	20	20	20	20
Mass per unit area (kg·m ⁻²)	1.7	2.0	1.7	2.0	2.1	1.5	1.8
Roll weight (kg)	54.4	64.0	54.4	64.0	88.2	48.0, 63.0	57.6, 75.6
Tensile strength* (N per 50 mm)	≥1100	≥1100	≥650	≥700	≥800	–	≥600
Tensile strength* (N·mm ⁻²)	–	–	–	–	–	9.0	9.0
Elongation at break (%)	≥15	≥15	≥80	≥80	≥80	≥200	≥200
Dimensional stability (%)	≤0.5	≤0.5	≤0.1	≤0.1	≤0.1	≤0.1	≤0.1
Foldability at low temperature* (°C)	≤-25	≤-25	≤-25	≤-25	≤-25	≤-25	≤-25
Tear resistance* (N)	≥200	≥200	≥150	≥170	≥250	≥110	≥135
Static loading* (kg)	≥20	≥20	≥20	≥20	≥20	≥20	≥20
Resistance to impact* (mm)	≥450	≥800	≥450	≥800	≥900	≥450	≥800
Joint peel resistance* (N per 50 mm)	≥200	≥200	≥200	≥200	≥200	≥200	≥200
Joint shear strength* (N per 50 mm)	≥600	≥600	>520	>560	>640	>430	>540

1.3 Ancillary items⁽¹⁾ for use with the membranes include:

- E/Corners — preformed Ecoline/Ecoflex membrane internal and external corners
- E/Metal Sheet — Ecoline/Ecoflex PVC compound coated metal sheet for use at perimeter details and other specified locations
- ECO-Vap — a 0.4 mm thick, black polyethylene membrane for use as a vapour control layer (VCL)
- ECO/200 — a 200 g·m⁻² non-woven polyester for use as a separation layer
- E-STEP — a PVC membrane with anti-slip surface for maintenance traffic
- ADH Adhesive — an adhesive for bonding ADH membranes to the substrate
- Ecoline/Ecoflex FM — polyester mesh reinforced roofing membranes (see Product Sheet 1 of this Certificate)
- FM/D Adhesive — for bonding FM membranes to the substrate
- AFT Tape — for use in sealing VCLs.

(1) Ecoline and Ecoflex prefabricated rainwater outlets, parapet outlets, leaf guards, roof overflows, service vent pipe penetrations, cable penetrations, lightning pads and clip accessories are also available from Axter Ltd.

1.4 Also for use with the systems, but outside the scope of this Certificate, is HYRA-STIK, a single-component polyurethane adhesive for bonding insulation boards to the substrate.

2 Manufacture

2.1 The membranes are manufactured by impregnating the glassfibre or polyester reinforcement with PVC plastisol, passing through a calender and gelling in a hot-air oven.

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

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

2.3 The systems are manufactured in Italy and are marketed by the Certificate holder.

3 Delivery and site handling

3.1 The membranes are delivered to site in rolls wrapped in polythene on pallets, with labels bearing the manufacturer's name and address, product identification, product dimensions, batch number, the CE marking and the BBA logo incorporating the number of this Certificate.

3.2 Rolls should be stored on their end, on a clean, level surface, and kept under cover.

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

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Ecoline VV, ADH (VV), ADH and Ecoflex VV, ADH (VV), ADH (VVB), ADH Waterproofing Systems.

Design Considerations

4 Use

4.1 Ecoline VV, ADH (VV), ADH and Ecoflex VV, ADH (VV), ADH (VVB), ADH Waterproofing Systems are satisfactory for use as fully bonded waterproofing systems on flat or pitched roofs with limited access. The membranes are suitable for the following specifications:

- exposed flat and pitched roofs with limited access
- protected flat roofs with limited access
- inverted flat roofs with limited access
- green roofs and roof gardens (1.5 mm membranes only).

4.2 Ecoline VV/Ecoflex VV membranes are satisfactory for use as a loose-laid and ballasted waterproofing system on flat or pitched roofs with limited access in the following specifications:

- protected flat roofs with limited access
- inverted flat roofs with limited access
- green roofs and roof gardens (1.5 mm membranes only).

4.3 Limited access roofs are defined for the purpose of this Certificate as those subjected only to pedestrian traffic for maintenance of the roof covering, cleaning of gutters, etc. Where traffic in excess of this is envisaged, additional protection to the membrane must be provided (see section 9).

4.4 Flat roofs are defined for the purpose of this Certificate as those having a minimum finished fall of 1:80. For design purposes, twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available, including overall and local deflection, direction of falls, etc. Pitched roofs are defined for the purpose of this Certificate as those having a fall greater than 1:6.

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

4.6 Insulation materials to be used in conjunction with the membranes must be in accordance with the Certificate holder's instructions and be either:

- as described in the relevant clauses of BS 8217 : 2005, or
- the subject of a current BBA Certificate and used in accordance with that Certificate.

4.7 Contact with bituminous, coal tar and oil-based products must be avoided as the membranes are not compatible with lower grades of bitumen. If contact with such products is likely, a separating layer must be interposed before installing the waterproofing sheet. Where doubt arises, the advice of the Certificate holder must be sought.

4.8 Recommendations for the design of green roofs and roof garden specifications are available within the latest edition of *The GRO Green Roof Code – Green Roof Code of Best Practice for the UK*.

4.9 For green and inverted roofs and roof gardens, structural decks to which the systems are to be applied must be suitable to transmit the dead and imposed loads experienced in service.

4.10 Imposed loads, dead loading and wind loads specifications are calculated in accordance with BS EN 1991-1-1 : 2002, BS EN 1991-1-3 : 2003 and BS EN 1991-1-4 : 2005, and their UK National Annexes.

4.11 The drainage system for green roofs or roof gardens must be correctly designed, and 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.

4.12 In inverted roof specifications the ballast requirements should be calculated in accordance with the relevant parts of BS EN 1991-1-4 : 2005 and its UK National Annex. Additional guidance for inverted roof specifications is given in BBA Information Bulletin No 4 *Inverted roofs – Drainage and U value corrections*.

5 Practicability of installation

Installation of the systems must only be carried out by installers trained and approved by the Certificate holder.

6 Weathertightness



6.1 The membranes, including joints, when completely sealed and consolidated will adequately resist the passage of moisture into the building and enable a roof to comply with the requirements of the national Building Regulations.

6.2 The membranes are impervious to water and will achieve a weathertight roof capable of accepting minor structural movement.

7 Properties in relation to fire



7.1 A system comprising an 18 mm thick exterior grade WBP plywood and a layer of Ecoline ADH(VV) 1.2 fully bonded with a polyurethane adhesive will be unrestricted by the national Building Regulations. A system comprising an 18 mm thick exterior grade WBP plywood, a bitumen primer, a fully bitumen-bonded bitumen VCL, a fully bitumen-bonded 50 mm thick polyurethane insulation board and a layer of Ecoline ADH(VV) 1.2 fully bonded with a polyurethane adhesive will also be unrestricted.

7.2 Ecoline VV/Ecoflex VV, when used in protected or inverted roof specifications including an inorganic covering listed in the Annex of Commission Decision 2000/553/EC, can also be considered to be unrestricted.

7.3 The designation of other specifications should be confirmed by:

England and Wales — test or assessment in accordance with Approved Document B, Appendix A, clause 1

Scotland — test to conform to Mandatory Standard 2.8, clause 2.8.1

Northern Ireland — test or assessment by a UKAS-accredited laboratory, or an independent consultant with appropriate experience.

7.4 In the opinion of the BBA, in irrigated roof gardens or green roofs the use of the systems will be unrestricted under the national Building Regulations.

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

8 Resistance to wind uplift

8.1 When fully bonded to a decking or bituminous felt, the systems should have sufficient adhesion to resist the effects of wind suction, elevated temperature and thermal shock conditions likely to occur in practice.

8.2 When fully adhered to insulation boards the resistance to wind uplift will be dependent on the cohesive strength of the insulation and the method by which it is secured to the roof deck. This should be taken into account when the insulation material is selected.

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

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

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

9 Resistance to foot traffic

The systems can accept the limited foot traffic and light concentrated loads associated with installation and maintenance. Reasonable care should be taken to avoid puncture by sharp objects or concentrated loads. Where traffic in excess of this is envisaged, such as for maintenance of lift equipment, a walkway should be provided, for example, using concrete slabs supported on Axter adjustable support pads or E-STEP.

10 Resistance to penetration of roots

Results of tests on the 1.5 mm membranes indicate that they are resistant to root penetration and can be used in a roof waterproofing system for roof gardens and green roofs.

11 Maintenance



11.1 The systems must be the subject of annual inspections and maintenance to ensure continued performance.

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

- adequate ballast is in place and evenly distributed over the membrane
- protection layers are in good condition
- exposed membrane is free from the build-up of silt, and other debris and unwanted vegetation are cleared.

11.3 Where damage has occurred it should be repaired in accordance with section 17 and the Certificate holder's instructions.

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

12 Durability



Under normal conditions, the systems will have a service life in excess of 35 years.

13 Reuse and recyclability

The membranes comprise PVC and glass, which can be recycled.

Installation

14 General

14.1 Ecoline W, ADH (VV), ADH and Ecoflex W, ADH (VV), ADH (VVB), ADH Waterproofing Systems must be carried out by installers trained and approved by the Certificate holder in accordance with the relevant clauses of BS 8000-0 : 2014, BS 8000-4 : 1989 and BS 8217 : 2005, the Certificate holder's instructions and this Certificate.

14.2 Substrates to which the membranes are to be applied must be sound, dry, clean and free from sharp projections such as nail heads and concrete nibs. When used over a rough substrate, a suitable protection layer must be placed over the substrate.

14.3 Installation must not be carried out during inclement weather (eg rain, fog or snow). When the temperature is below 0°C, suitable precautions against surface condensation must be taken.

14.4 In all cases, a VCL is used directly over the deck. When internal temperatures and humidity conditions will exceed 22°C/50% relative humidity, special precautions should be taken and the Certificate holder consulted.

14.5 Insulation boards must be fixed to the substrate in such a way as not to impair the performance of the waterproofing membrane.

14.6 All flashings must be formed in accordance with the Certificate holder's instructions.

14.7 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.

15 Procedure

Fully bonded (adhered)

15.1 The bonding agent (ADH Adhesive) is applied to the substrate at the prescribed rate using the appropriate method.

15.2 Ecoline/Ecoflex FM membranes should be used to complete vertical details and should be fully bonded in FM/D adhesive.

15.3 When bonding, the membrane is unrolled into the bonding agent, taking care not to stretch the material and ensuring adequate overlaps for jointing (see section 16).

15.4 Ecoline/Ecoflex FM is used at perimeter upstands, being fully adhered to the upstand.

Loose-laid and ballasted

15.5 Ecoline/Ecoflex VV must be unrolled over the substrate, on top of any protective or isolating layer, taking care not to stretch the material and ensuring adequate overlaps for jointing (see section 16).

15.6 A suitable protection layer must be laid over the membrane prior to application of the ballast.

15.7 Loose-laid applications must be covered by at least a 50 mm depth of well-rounded gravel. In areas of high wind exposure, paving slabs set on a suitable support (eg pads) may be considered.

15.8 When using a loose-laid application, account must be taken in the design of the deck of the extra dead loading owing to the weight of the aggregate and/or paving.

15.9 Details at perimeter upstands must be either fully adhered or mechanically fixed.

16 Jointing and flashing procedure

Hot-air welding (automatic welding machine)

16.1 The welding area must be dry and clean. If the membrane in the weld area has become contaminated, it must be cleaned in accordance with the Certificate holder's instructions.

16.2 The overlap width of the membranes must be a minimum of 50 mm and spot welded, using a hand-held welder, every 150 to 200 mm along the length of the joint.

16.3 The temperature for the automatic welding machine must be set in accordance with the Certificate holder's instructions, depending on the thickness of the membrane and the ambient temperature.

16.4 The joint is welded using the machine. Care must be taken to ensure that overheating of the membrane does not occur, as possible impairment of the membrane may result.

16.5 The seam must be tested with a suitable metal probe and any weakness repaired immediately.

Hot-air welding (hand-held welder)

16.6 The welding area must be dry and clean. If the membrane in the weld area has become contaminated, it must be cleaned in accordance with the Certificate holder's instructions.

16.7 The overlap width of the membranes must be a minimum of 80 mm and spot welded at approximately 400 mm intervals along the length of the joint.

16.8 The temperature for the hand-held welder must be set in accordance with the Certificate holder's instructions, depending on the thickness of the membrane and the ambient temperature.

16.9 The joint is re-welded parallel to, and behind, the main welding line. The pre-weld is tested for delamination prior to the main welding being carried out.

16.10 The main weld is carried out. Care must be taken to ensure that overheating of the membrane does not occur, as possible impairment of the membrane may result.

16.11 The seam must be tested with a suitable metal probe and any weakness repaired immediately.

Flashing

16.12 Flashing and detailing must be formed in accordance with the Certificate holder's instructions.

17 Repair

In the event of damage, repairs can be carried out by cleaning the area around the damage and applying a patch as described in the Certificate holder's instructions.

Technical Investigations

18 Tests

18.1 An assessment was made of test data for Ecoline VV, ADH (VV), ADH and Ecoflex VV, ADH (VV), ADH (VVB), ADH membranes to determine:

Tests on the reinforcement

- mass per unit area
- tensile strength and elongation
- mesh number

Tests on the membrane

- mass per unit area
- tensile strength and elongation at break
- nail tear resistance at 23°C, 40°C and –10°C
- trapezoidal tear resistance
- dimensional stability
- low temperature foldability
- dynamic indentation
- static indentation
- weight loss at elevated temperatures at 15 days, 30 days and 90 days
- 180 days (168 days Ecoline ADH/Ecoflex ADH) heat ageing at 80°C followed by low temperature foldability
- water absorption after 180 days water immersion
- plasticiser content
- dehydrochlorination
- ash content
- UV exposure equal to 4500 MJ·m⁻² of radiation energy followed by ΔE colour change and low temperature foldability

Tests on joints

- joint shear strength for hot-air welded joints and THF welded joints
- T-peel for hot-air welded joints and THF welded joints.

18.2 Results of root resistance tests on the 1.5 mm membranes, conducted by an independent accredited laboratory, were assessed.

19 Investigations

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

19.2 Existing data on fire performance of the reinforced membrane were evaluated.

19.3 Samples were taken from an existing site over 20 years old for a product of similar compound formulation but different installation technique. Comparison testing was carried out on new products from the factory, site samples and site samples following additional UV ageing, and the results assessed to determine:

- thickness
- mass per unit area
- low temperature foldability
- resistance to dynamic impact.

19.4 An inspection visit to an existing site at least 20 years old was conducted.

Bibliography

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

BS 8000-0 : 2014 *Workmanship on construction sites — Introduction and general principles*

BS 8000-4 : 1989 *Workmanship on building sites — Code of practice for waterproofing*

BS 8217 : 2005 *Reinforced bitumen membranes for roofing — Code of practice*

BS EN 1991-1-1 : 2002 *Eurocode 1 : Actions on structures — General actions— Densities, self-weight, imposed loads for buildings*

NA to BS EN 1991-1-1 : 2002 UK National Annex to *Eurocode 1 : Actions on structures — General actions— Densities, self-weight, imposed loads for buildings*

BS EN 1991-1-3 : 2003 + A1 : 2015 *Eurocode 1 : Actions on structures — General actions — Snow loads*

NA + A1 : 15 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*

EN 13956 : 2005 *Flexible sheet for waterproofing — Plastic and rubber sheets for roof waterproofing — Definitions and characteristics*

20 Conditions

20.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page — no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

20.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

20.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

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

20.5 In issuing this Certificate, the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

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

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