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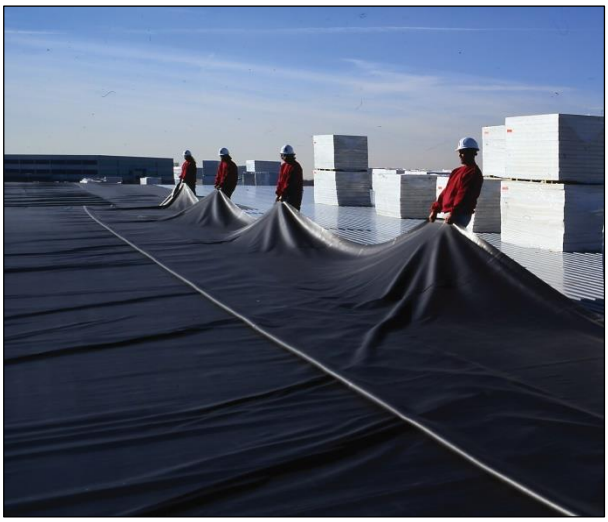
Agrément Certificate
89/2216
Product Sheet 1

FIRESTONE ROOF WATERPROOFING MEMBRANES

FIRESTONE RUBBERGARD EPDM SYSTEMS

This Agrément Certificate Product Sheet(1) relates to Firestone RubberGard EPDM Systems, comprising single-layer waterproofing membranes for use on roofs with limited access, in fully adhered, mechanically fastened, loose-laid and ballasted and inverted 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

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

Properties in relation to fire — the systems may contribute to a roof being 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 mechanical damage — the systems will accept without damage the limited foot traffic and loads associated with installation and maintenance and minor structural movements occurring in service (see section 9).

Durability — under normal service conditions, the systems will provide a durable waterproof covering with a service life of at least 30 years (see section 11).

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

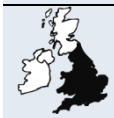
Date of Tenth issue: 3 February 2022

Originally certificated on 31 March 1989

Hardy Giesler
Chief Executive Officer

Regulations

In the opinion of the BBA, Firestone RubberGard EPDM 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(1)**	**External fire spread**
Comment:		The systems are restricted by this Requirement in some circumstances. See section 7.4 of this Certificate.
Requirement:	**B4(2)**	**External fire spread**
Comment:		On suitable substructures, the system may enable a roof to be unrestricted under the requirements of this Regulation. See sections 7.1 to 7.3 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 of this Certificate.
Requirement:	**7(1)**	**Materials and workmanship**
Comment:		The systems are acceptable. See section 11.1 and the *Installation* 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 10.1 and 11.1 and the *Installation* part of this Certificate.
Regulation:	**9**	**Building standards applicable to construction**
Standard:	2.6	The systems are restricted under clause 2.6.4(1)(2) of this Standard in some circumstances.
Comment:		See section 7.5 of this Certificate.
Standard:	2.8	Spread from neighbouring buildings
Comment:		When used with a suitable substructure, the systems may enable a roof to be unrestricted under clause 2.8.1(1)(2) of this Standard. See sections 7.1 to 7.3 of this Certificate
Standard:	3.10	Precipitation
Comment:		The systems, including joints, will enable a roof to satisfy the requirements of this Standard with references to clauses 3.10.1(1)(2) and 3.10.7(1)(2). See section 6 of this Certificate.
Standard:	7.1(a)	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:		Comments in relation to 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)**	**Fitness of materials and workmanship**
Comment:	**(iii)(b)(i)**	The systems are acceptable. See section 11.1 and the *Installation* 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 of this Certificate.
Regulation:	**36(b)**	**External fire spread**
Comment:		When used on suitable substructures, the systems may enable a roof to be unrestricted under this Requirement. See sections 7.1 to 7.3 of this Certificate.

Construction (Design and Management) Regulations 2015
Construction (Design and Management) Regulations (Northern Ireland) 2016

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

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

Additional Information

NHBC Standards 2022

In the opinion of the BBA, Firestone RubberGard EPDM Systems if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapter 7.1 *Flat roofs, terraces and balconies.*

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

CE marking

The Certificate holder has taken the responsibility of CE marking the membranes, in accordance with harmonised European Standard BS EN 13956 : 2012.

Technical Specification

1 Description

1.1 Firestone RubberGard EPDM Systems are available in two grades: low slope fire retardant (LSFR) and fire retardant (FR). The FR grade contains additional fire-retardant ingredients. The nominal characteristics are given in Table 1.

Table 1 Nominal characteristics

Characteristic (unit)	Grade			
	1.1 LSFR	1.1 FR	1.5 LSFR	1.5 FR
Thickness (mm)	1.1	1.1	1.5	1.5
Roll length (m)	15.25, 30.50, 45.75 and 61.00			
Roll Widths (m)	2.28, 3.05, 6.10, 9.15, 12.20 and 15.25			
Mass per unit area ($kg \cdot m^{-2}$)	1.35	1.49	1.85	2.03
Tensile strength ($N.mm^{-2}$)	≥ 7	≥ 7	≥ 7	≥ 7
Elongation (%)	≥ 300	≥ 300	≥ 300	≥ 300
Tear resistance (N)	≥ 40	≥ 40	≥ 40	≥ 40
Dimensional stability (%)	≤ 0.5	≤ 1.0	≤ 0.5	≤ 1.0
Foldability at low temperature (°C)	≤ –45	≤ –45	≤ –45	≤ –45
Resistance to impact(mm) soft substrate hard substrate	≥ 1700 ≥ 200	≥ 1700 ≥ 200	≥ 2000 ≥ 300	≥ 2000 ≥ 300
Resistance to static load (kg) soft substrate hard substrate	 ≥ 15 ≥ 20	 ≥ 10 ≥ 20	 ≥ 20 ≥ 20	 ≥ 10 ≥ 20

1.2 Other products for use with the systems are:

- Firestone Bonding Adhesive BA 2012 — a solvent-based contact adhesive for bonding the membrane to approved substrates
- QuickSeam Splice Tape (76 or 152 mm) — a double-sided butyl self-adhesive tape for use in lap joints
- QuickSeam FormFlash — self-adhesive uncured ethylene-propylene-diene-monomer (EPDM) for use as a flashing material, especially where irregular shapes are involved
- Firestone Bonding Adhesive BA-2004 (T) — a contact adhesive for bonding the membrane to compatible substrates
- Firestone Modular Water-Based Bonding Adhesive — a water-based adhesive for bonding the membrane to compatible substrates
- Firestone Termination Bar — an aluminium bar for terminating the system at upstands of concrete or masonry
- Firestone Batten Bars — metal strips to mechanically attach the membrane, RMA strip or RPFS (Reinforced Perimeter Fastening Strip)
- Firestone Fixings — a range of all-purpose and heavy-duty fasteners, type dependent on specification and substrate.

1.3 Ancillary items for use with the systems, but which are outside the scope of this Certificate, are:

- QuickSeam Flashing — self-adhesive fast curing EPDM strip for use to flash metal edge trim details
- QuickSeam Batten Cover Strip — a self-adhesive semi-cured EPDM strip for use as a sealing tape over fixings
- QuickSeam SA Flashing — self-adhesive cured EPDM strip for use as a flashing material
- QuickSeam Penetration Pocket — a prefabricated pocket for use with Firestone Pourable Sealer S-10 at irregular shaped roof penetrations
- QuickPrime Plus Primer — for preparing the system or other compatible substrates to receive QuickSeam products
- Firestone Pourable Sealer S-10 — for sealing penetration pocket details
- Firestone Splice Wash SW-100 — for cleaning heavily contaminated EPDM surfaces
- Firestone Water Block Seal S-20 — butyl-based sealant which provides a watertight seal when used under compression
- Firestone Lap Sealant HS — an EPDM edge sealant for use with cut QuickSeam products
- QuickSeam Walkway Pads — for use in areas of high accessibility
- QuickSeam RMA (Reinforced Mechanically Anchored) Strip — a reinforced EPDM membrane strip for non-penetrating mechanical attachment
- QuickSeam RPFS (Reinforced Perimeter Fastening Strip) — a reinforced EPDM membrane strip for the attachment of membranes at base tie-in details
- QuickSeam Universal Pipe Flashing — a prefabricated pipe boot for flashing circular roof penetrations.

2 Manufacture

2.1 Firestone RubberGard EPDM membranes are manufactured by blending EPDM, processing oils and other additives. The sheets are produced by calendering or extruding and vulcanising.

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

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

2.3 The management system of Firestone Building Products EMEA has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 and BS EN ISO 14001 : 2015 by Lloyds Register (Certificate identity number 10396219) and EAGLE Registrations Inc (Certificate number 5834), respectively.

3 Delivery and site handling

3.1 The membranes are delivered to site in rolls, each wrapped in a polythyene sleeve bearing the product name, thickness, Certificate holder's name and the BBA logo incorporating the number of this Certificate.

3.2 EPDM membranes are not subject to any particular storage conditions, but the Firestone QuickSeam products should be stored in a clean, dry position and in temperatures between 15 and 25°C. QuickSeam FormFlash and QuickSeam Flashing cures gradually and should not be stored for more than 12 months. As curing occurs, the products become less flexible; this does not affect the waterproofing characteristics, but it becomes more difficult to form details.

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).

3.4 Firestone Bonding Adhesive BA-2012, Firestone Bonding Adhesive BA-2004 (T), Firestone Lap Sealant HS, Firestone Water Block Seal S-20 and Firestone Modular Water-Based Bonding Adhesive should be stored between 15 and 25°C. Firestone Modular Water-Based Bonding Adhesive should not be allowed to freeze.

3.5 The shelf-life of ancillary items is given in Table 2.

Table 2 Product shelf-life

Product	Shelf-life (months)
QuickSeam Splice Tape	12
QuickSeam FormFlash	12
QuickSeam Flashing	12
QuickSeam Batten Cover Strip	12
QuickSeam Universal Pipe Flashing	12
QuickSeam Walkway Pads	12
QuickSeam Penetration Pocket	12
QuickPrime Plus Primer	12
QuickSeam RMA Strip	12
Firestone Bonding Adhesive BA-2012	12
Firestone Bonding Adhesive BA-2004 (T)	12
Firestone Modular Water-Based Bonding Adhesive	12
Firestone Lap Sealant HS	24
Firestone Pourable Sealer S-10	12
Firestone Water Block Seal S-20	12
Firestone Splice Wash SW-100	12

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Firestone RubberGard EPDM Systems.

Design Considerations

4 General

4.1 Firestone RubberGard EPDM Systems are satisfactory for use as:

- loose-laid and ballasted waterproofing, mechanically fixed at perimeters and upstands, on flat roofs with limited access
- fully adhered waterproofing, mechanically fixed at perimeters and upstands, on flat and pitched roofs with limited access
- mechanically fixed (using one of three fixing systems) waterproofing, on flat roofs with limited access
- a loose-laid system to the inverted roof concept, mechanically fixed at perimeters and upstands, on flat roofs with limited access.

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

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 system 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. When designing flat roofs, twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available, including, for example, overall and local deflection and direction of falls.

4.5 Structural decks to which the systems are to be applied must be suitable to transmit the dead and imposed loads experienced in service. Allowance needs to be made for loading deflections to ensure that the free drainage of water is maintained.

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

4.7 The drainage systems for inverted roofs must be correctly designed, and the following points should be addressed:

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

4.8 Insulation systems and materials to be used in conjunction with the products must be in accordance with the Certificate holder's instructions and be either:

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

4.9 Contact with bituminous, coal tar and oil-based products must be avoided as the system is incompatible with lower grades of bitumen. If contact with such products is likely, a separating layer must be interposed before installing the waterproof sheet. Where doubt arises, the advice of the Certificate holder should be sought.

4.10 The NHBC requires that the waterproofing membranes, once installed, be inspected in accordance with of NHBC Standards 2022, Chapter 7.1, Clause 7.1.12, including the use of an appropriate integrity test, where required. Any damage to the membrane is repaired in accordance with section 15 of this Certificate and reinspected.

5 Practicability of installation

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

6 Weathertightness

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

7 Properties in relation to fire

7.1 The following systems, when tested flat to ENV 1187 : 2002, achieved a classification of B_{ROOF}(t4) in accordance with BS EN 13501-5 : 2005 and will be unrestricted with respect to proximity to a boundary by the documents supporting the national Building regulations:

- 12 mm plywood substrate, a layer of RubberGard 1.14 mm EPDM FR membrane bonded with Firestone Modular Water-Based Bonding Adhesive(1)
- an 18 mm plywood substrate, a 250 µm polyethylene VCL, a mechanically fastened 100 mm glass-faced polyisocyanurate foam insulation board and a layer of RubberGard EPDM LSFR 1,14mm bonded with Firestone Modular Water-Based Bonding Adhesive(2)
- a 0.7 mm trapezoidal profiled steel deck, a 250 µm polyethylene vapour control layer (VCL), a glass-faced 100 mm polyisocyanurate foam insulation board and a layer of RubberGard EPDM LSFR 1,14 mm mechanically fastened (3)

(1) Test reports WF 327797 & WF327798 and classification report 328641, issued by Warrington Fire are available from the Certificate holder on request.
(2) Test report WF 327780 and classification report 328652, issued by Warrington Fire are available from the Certificate holder on request.
(3) Test report WF 327799 and classification report 328648, issued by Warrington Fire are available from the Certificate holder on request.

7.2 The systems, when used in protected specifications, including an inorganic covering listed in the Annex of Commission Decision 2000/553/EC, can also be considered to be unrestricted under the national Building Regulations.

7.3 The designation of other specifications should be confirmed by reference to the requirements of the documents supporting the national Building Regulations.

7.4 In England and Wales, the systems, when used in pitches of greater that 70°, excluding upstands, should not be used on 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 or dormitories in boarding schools.

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

8 Resistance to wind uplift

Mechanically fastened

8.1 The resistance to wind uplift of a mechanically fastened waterproofing layer is provided by the fasteners passing through the membrane into the substrate. The number and position of fixings will depend on a number of factors, including:

- wind uplift forces to be restrained
- pull-out strength of fasteners
- tensile properties of the membrane
- appropriate calculation of the safety factors.

8.2 The wind uplift forces must be calculated by a suitably experienced and competent individual in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex. On this basis, the number of fixings required should be established using a maximum permissible load of 0.6 kN per fixing.

8.3 The Certificate holder's offers a design service taking into account all the relevant supplied information. Assistance is provided when preparing drawings for the position of fixings, type of screws to be used, and the number of fixings required.

Fully bonded

8.4 The adhesion of adhered systems is sufficient to resist the effects of wind suction, thermal cycling or other minor structural movements likely to occur in service. Where any doubt exists regarding the suitability of the substrate, the advice of the Certificate holder should be sought.

8.5 Where the system is 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 must be taken into account when selecting a suitable insulation material.

Loose-laid and ballasted

8.6 When the products are used in a loose-laid and ballasted systems, the precise ballast requirements should be calculated in accordance with the relevant parts of BS EN 1991-1-4 : 2005. The use of concrete slabs on suitable supports should be considered in areas of high wind exposure, and the advice of the Certificate holder should be sought.

9 Resistance to mechanical damage

9.1 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 bearing pads.

9.2 The systems are impervious to water and when used as described will provide a weathertight roof capable of accepting minor structural movement without damage.

10 Maintenance

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

10.2 Where damage has occurred, it should be repaired in accordance with section 15 and the Certificate holder's instructions.

11 Durability

11.1 Under normal service conditions, the systems will provide a durable roof waterproofing with a service of at least 30 years.

11.2 In environments where the system is in contact with organic solvents, the service life expectancy of the system may be reduced. In cases of doubt, the advice of the Certificate holder should be sought.

Installation

12 General

12.1 Installation of Firestone RubberGard EPDM system must be carried out by installers trained and approved by the Certificate holder in accordance with BS 6229: 2018, BS 8000-0 : 2014, BS 8000-4 : 1989, the SPRA (Single Ply Roofing Association) Design Guide 2020, the Certificate holder's instructions and this Certificate.

12.2 Conditions on site should be those for normal roof waterproofing work. Substrates to which the products are to be applied must be sound, dry, clean and free from sharp projections such as nail heads and concrete nibs.

12.3 When the systems are to be laid on a rough deck, a loose-laid, non-woven geotextile fleece (minimum 200 $g \cdot m^{-2}$) should be laid first.

12.4 Installation should not be carried out during wet weather (eg rain, fog or snow), nor when the temperature is below 0°C. Special precautions in accordance with the Certificate holder's instructions should be taken if the fully adhered system is to be installed at temperatures below 5°C due to the risk of condensation contaminating the bonding adhesive.

12.5 Modular Water-Based Bonding Adhesive should not be used if there is a possibility of freezing temperatures within 48 hours after application.

12.6 The system must be mechanically fixed around perimeters of the roof at 305 mm maximum centres.

12.7 The membranes should be unrolled into position and allowed to acclimatise for 30 minutes prior to fixing and/or lap jointing. Care must be taken to avoid ripples or folds in the sheets.

12.8 Sheets may be prefabricated prior to application to reduce the amount of on-site lap jointing. Prefabrication is only suitable for loose-laid and ballasted applications.

13 Procedure

Loose-laid and ballasted applications

13.1 The EPDM membrane is unrolled onto the substrate and mechanically fixed at perimeter bases as described in section 12.7. The membrane is normally fully adhered at upstands and perimeters. Lap jointing and flashing must be carried out in the manner described in sections 14.1 and 14.2 to 14.6 respectively.

13.2 The system must be covered by at least a 50 mm thickness of 20 to 40 mm grade well-rounded gravel. A protective mat of non-woven polyester fleece (minimum 200 $g \cdot m^{-2}$) should be laid between the membrane and the aggregate. In areas of high wind exposure, paving slabs may be considered for use at a distance of one metre from the perimeter to avoid damage to the membranes due to wind uplift.

13.3 An alternative method of ballasting is the use of concrete paving, maximum size 600 by 600 mm by 50 mm thick. A non-woven polyester fleece (minimum 200 $g \cdot m^{-2}$) must be laid between the EPDM and the supports.

13.4 When using a loose-laid application, normal account must be taken in the design of the deck of the extra dead load due to the weight of the aggregate.

13.5 When the membrane is to be laid directly onto a concrete deck, a separating layer of a non-woven polyester fleece (minimum 200 $g \cdot m^{-2}$) must first be laid on the deck. This is not required if insulation is to be laid immediately under the membrane. When used as the waterproofing layer in a roof designed to the inverted roof concept, a separating layer of non-woven polyester fleece must be laid between the concrete deck and the system.

Fully adhered applications

13.6 All insulation boards must be attached to the structural deck by adhesive or mechanical fastening (a minimum of four fixings per board) as appropriate to the type and thickness. The method of attachment must be adequate to provide resistance to wind uplift forces as defined in BS EN 1991-1-4 : 2005. When installed over glassfibre, mineral wool-based or polystyrene insulations, a suitable separation layer is either mechanically fastened or adhered over the insulation prior to the application of the waterproofing.

13.7 When used as a fully bonded system, the resistance to wind uplift will be limited by the cohesive strength of the insulation and method of attachment. These factors must be taken into account when selecting the insulation material.

13.8 The fully bonded application must not be used directly onto insulation materials that will be adversely affected by the solvent in the adhesive (eg polystyrene). The width of the system must not exceed 6.1 m for this type of application.

13.9 When used over expansion joints, bridging strips unbonded for a minimum of 150 mm are installed over all joints.

13.10 A layer of Firestone Bonding Adhesive BA-2004 (T) or Firestone Modular Water-Based Bonding Adhesive is applied to both the substrate and the membrane by means of a roller, at an approximate application rate of 0.8 and 0.5 litres per metre square respectively (the exact rate dependent on the porosity of the substrate). When the adhesive has become touch dry, the membrane is applied to the substrate and rolled to ensure a full bond and that no air has been trapped beneath the membrane.

13.11 Alternatively, a layer of Firestone Modular Water-Based Bonding Adhesive is applied to the approved substrate at an application rate of between 1.47 and 2.45 metres square per litre. The membrane is applied to the adhesive while wet and rolled to ensure a full bond and that no air has been trapped beneath the membrane.

13.12 Alternatively, a layer of Firestone Bonding Adhesive BA-2012 should be roller- or spray-applied to both the substrate and the membrane at an approximate of 0.3 litres per square metre. When the adhesive has become touch dry, the membrane should be applied to the substrate and compressed with a stiff brush to ensure a full bond and that air has not been trapped beneath the membrane.

Mechanically fixed applications — fixing battens

13.13 The fixings may be waterproofed either within the lap joint of adjacent sheets (Batten-In-Seam System) or by covering with QuickSeam Batten Cover Strip (150 mm wide) centrally lapped over the batten (Mechanically Anchored System). Alternatively, QuickSeam RMA Strips are pre-attached to the deck using battens and the membrane is spliced to the strips using QuickPrime Plus Plus.

13.14 Where the Batten-In-Seam System is used, the lap is a minimum width of 200 mm of which 70 mm should be between the centre of the Firestone Fixing Batten and the exposed edge of the lap.

13.15 Where the Mechanically Anchored System is used, the lap is a minimum of 100 mm. The width of the system should not exceed 9.15 m for this type of application.

13.16 Firestone Fixing Battens are attached to the substrate by screws passing through the system or the QuickSeam RMA Strip and the batten.

13.17 The membrane is normally fully adhered at penetrations, although mechanical fixing may be used as described in section 12.7. Lap jointing and flashing must be carried out in the manner described in sections 13.1 and 13.2 to 13.6 respectively.

14 Details

Seaming procedure — QuickSeam

14.1 The lap joint area must be cleaned with QuickPrime Plus Primer (alternatives should not be used). QuickSeam Splice Tape is positioned over the lower sheet's lap area and unrolled, leaving the release paper in place and rolling with a silicone roller. The upper sheet is placed into position and mated to the tape by hand whilst the release paper is removed, and the is seam rolled with a silicone roller. Care must be taken to avoid ripples or folds.

Base Tie-In

14.2 At perimeters and upstands, QuickSeam RPFS (Reinforced Perimeter Fastening Strip) is mechanically fastened with a batten bar to the substrate. The field system is bonded to the strip using QuickPrime Plus Primer and continued up the vertical substrate of the wall using Firestone Bonding Adhesive BA-2004 (T) or BA-2012.

Alternative Base Tie-In

14.3 Concurrently with the installation of the EPDM membrane the EPDM flashing is applied. It is lapped and bonded to the horizontal membrane in accordance with section 14.1, with a minimum lap of 100 mm.

Flashing

14.4 The flashing is bonded to the vertical surface with the bonding adhesive in accordance with section 13.10.

14.5 The flashing is mechanically fixed at its upper edge and protected by dressing back to the wall and covering with coping stones, or by use of counter-flashing.

14.6 For specific flashing requirements, the advice of the Certificate holder should be sought.

15 Repair

In the event of damage, repairs can be carried out by cleaning the area around the damage and applying a patch of Firestone RubberGard EPDM membrane or QuickSeam SA Flashing in accordance with section 14.1.

16 Tests

16.1 Tests on the systems were conducted and the results assessed to determine:

- thickness
- width
- mass per unit area
- water vapour transmission
- watertightness
- tensile strength/elongation
- tear strength
- low temperature flexibility
- dimensional stability
- static loading
- dynamic impact
- fatigue cycling
- peel from substrate
- wind uplift
- heat ageing
- UV ageing
- bitumen compatibility
- Peel and Shear strength tests on joints (on QuickSeam Splice Tape only)

in order to assess:

- robustness during service
- vapour transmission properties
- durability.

16.2 An assessment was made of test data on wind uplift tests carried out on QuickSeam RMA Strip method of mechanically fastening in accordance with ETAG 006 : 2000.

17 Investigations

17.1 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.

17.2 A site in progress was visited to evaluate the manufacturer's installation instructions, and the practicability of the materials used.

17.3 An evaluation was made of existing data on the fire performance of the products.

Bibliography

BS 6229 : 2018 *Flat roofs with continuously supported flexible waterproof coverings — Code of practice*

BS 8000-0 : 2014 *Workmanship on construction sites — Introduction and general principles*
BS 8000-4 : 1989 *Workmanship on building sites — Code of practice for waterproofing*

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

BS EN 1991-1-1 : 2002 Eurocode 1: *Actions on structures — General actions — Densities, self-weight, imposed loads for buildings*
NA to BS EN 1991-1-1 : 2002 UK National Annex to Eurocode 1*: Actions on structures — General actions — Densities, self-weight, imposed loads for buildings*
BS EN 1991-1-3 : 2003 + A1 : 2015 Eurocode 1*: Actions on structures — General actions — Snow loads*
NA 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*

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

BS EN 13956 : 2012 *Flexible sheets for waterproofing — Plastic and rubber sheets for roof waterproofing — Definitions and characteristics*

BS EN ISO 9001 : 2015 *Quality Management System — Requirements*
BS EN ISO 14001 : 2015 *Environmental management systems - Requirements*

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

18 Conditions

18.1 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.

18.2 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.

18.3 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.

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

18.5 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.

18.6 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.