

Firestone Building Products

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Agrément Certificate
89/2216
Product Sheet 1

FIRESTONE ROOF WATERPROOFING SYSTEMS

FIRESTONE RUBBERGARD EPDM SYSTEMS

This Agrément Certificate Product Sheet⁽¹⁾ relates to Firestone RubberGard EPDM Systems, single-layer waterproofing membranes for use on roofs with limited access.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

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



KEY FACTORS ASSESSED

Weathertightness — the systems and their joints, when completely sealed and consolidated, will resist the passage of moisture to the interior of the building (see section 6).

Properties in relation to fire — tests indicate that the systems will enable a roof to be unrestricted under Building Regulations (see section 7).

Resistance to wind uplift — the systems will resist the effects of any wind suction likely to occur in practice (see section 8).

Resistance to foot traffic — the systems will accept, without damage, the limited foot traffic and loads associated with installation and maintenance (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

Simon Wroe
Head of Approvals — Materials

Claire Curtis-Thomas
Chief Executive

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The BBA is a UKAS accredited certification body — Number 1113. 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.

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Regulations

In the opinion of the BBA, Firestone RubberGard EPDM Systems, if installed, used and maintained in accordance with this Certificate, will meet or contribute to meeting 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)

Regulation:	B4(2)	External fire spread
Comment:	On suitable non-combustible substructures the use of the systems will enable a roof to be unrestricted under this Requirement. See section 7 of this Certificate.	
Regulation:	C2(b)	Resistance to moisture
Comment:	Data for water resistance on the systems, including joints, indicate that they meet this Requirement. See section 6.1 of this Certificate.	
Regulation:	7	Materials and workmanship
Comment:	The systems are acceptable. See section 11 of this Certificate.	



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:	Use of the systems satisfies the requirements of this Regulation. See sections 10 and 11 and the <i>Installation</i> part of this Certificate.	
Regulation:	9	Building standards applicable to construction
Standard:	2.8	Spread from neighbouring buildings
Comment:	Test data to BS 476-3 : 1958 and 2004 indicate that on suitable non-combustible substructures the use of the systems will be unrestricted by the requirements of clause 2.8.1 ⁽¹⁾⁽²⁾ of this Standard. See section 7 of this Certificate.	
Standard:	3.10	Precipitation
Comment:	Data examined for water resistance on the systems, including joints, indicate that they can enable a roof to satisfy the requirements of clauses 3.10.1 ⁽¹⁾⁽²⁾ and 3.10.7 ⁽¹⁾⁽²⁾ of this Standard. See section 6.1 of this Certificate.	
Standard:	7.1(a)(b)	Statement of sustainability
Comment:	The product 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 these 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

Regulation:	23(a)(i)(iii)(b)(i)	Fitness of materials and workmanship
Comment:	The systems are acceptable. See section 11 and the <i>Installation</i> part of this Certificate.	
Regulation:	28(b)	Resistance to moisture and weather
Comment:	Data for water resistance on the systems, including joints, indicate that they 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:	Test data to BS 476-3 : 1958 and 2004 indicate that on suitable non-combustible substructures use of the systems will be unrestricted by the requirements of this Regulation. See section 7 of this Certificate.	

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See section: 1 *Description* (1.1) and 3 *Delivery and site handling* (3.3).

Additional Information

NHBC Standards 2013

NHBC accepts the use of Firestone RubberGard EPDM Systems, provided they are installed used and maintained in accordance with this Certificate, as meeting Technical Requirement R3 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 products in accordance with harmonised European Standard BS 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 Firestone RubberGard EPDM Systems are available in two grades: LSFR (low slope fire retardant) and FR (fire retardant). The FR grade contains additional fire-retardant ingredients. The nominal characteristics are given in Table 1.

Table 1 Nominal characteristics

Characteristic (unit)	Grade			
	1.14 LSFR	1.14 FR	1.52 LSFR	1.52 FR
Thickness (mm)	1.14	1.14	1.52	1.52
Roll width (m)	2.28, 3.05, 6.10, 9.15, 12.20 and 15.25			
Length (m)	15.25, 30.50, 45.75 and 61.00			
Mass per unit area (kg·m ⁻²)	1.51	1.51	2.10	2.10
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	≥ 1700	≥ 1700	≥ 2000	≥ 2000
hard substrate	≥ 200	≥ 200	≥ 300	≥ 300
Resistance to static load* (kg)				
soft substrate	≥ 15	≥ 10	≥ 20	≥ 10
hard substrate	≥ 20	≥ 20	≥ 20	≥ 20

1.2 Other products for use in the systems are:

- QuickSeam Splice Tape (76 mm or 152 mm) — a double-sided butyl self-adhesive tape for use in lap joints
- QuickSeam FormFlash — self-adhesive uncured EPDM for use as a flashing material, especially where irregular shapes are involved
- Firestone Splice Adhesive SA-1065 — a contact adhesive for bonding the membranes or flashing to compatible substrates
- Firestone Bonding Adhesive BA 2004 (T) — a contact adhesive for bonding the membranes 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 membrane at upstands of concrete or masonry
- Firestone Batten Bars — metal strips to mechanically attach the membrane, RMA strip or RPF 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 outside the scope of this Certificate, include:

- 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 the Firestone S-10 Pourable Sealer at irregular shaped roof penetrations
- QuickPrime Plus — for preparing membrane 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 membrane
- 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 RPF (Reinforced Perimeter Fastening) Strip — a reinforced EPDM membrane strip for the attachment of the membrane at base tie-in details
- QuickSeam Universal Pipe Flashing — a pre-fabricated pipe boot for flashing circular roof penetrations.

2 Manufacture

2.1 Firestone RubberGard EPDM membranes are manufactured by blending EPDM (ethylene-propylene diene monomer), processing oils and other additives. The sheets are produced by calendaring 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 has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by BSI (Certificate FM 32845).

3 Delivery and site handling

3.1 The membranes are delivered to site in rolls, each wrapped in a polyethylene sleeve bearing the product name, thickness, manufacturer'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°C 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 Materials classified as 'highly flammable' under *The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009* (CHIP4)/*Classification, Labelling and Packaging of Substances and Mixtures (CLP Regulation) 2009*, are given in Table 2. These products bear the appropriate hazard warning.

Table 2 Flashpoint and hazard classification

Material	Flashpoint (°C)	Classification
Splice Adhesive SA-1065 ⁽¹⁾	-18	harmful, highly flammable, dangerous for the environment
QuickPrime Plus ⁽¹⁾	-4	harmful, highly flammable, dangerous for the environment
Bonding Adhesive BA 2004 (T) ⁽¹⁾	-18	harmful, highly flammable
Pourable Sealer S-10 (Part A)	185	not applicable
Pourable Sealer S-10 (Part B)	218	harmful
Water Block Seal (S-20) ⁽¹⁾	10	harmful, highly flammable, dangerous for the environment
Lap Sealant HS	11	harmful, highly flammable
Splice Wash SW-100 ⁽¹⁾	13	harmful, highly flammable

(1) These components should be stored in accordance with *The Dangerous Substances and Explosive Atmospheres Regulations 2002*.

3.4 Bonding Adhesive BA 2004 (T), Splice Adhesive SA-1065, Firestone Lap Sealant HS, Water Block Seal S-20 and Modular Water-Based Bonding Adhesive should be stored between 15°C and 25°C. Modular Water-Based Bonding Adhesive should not be allowed to freeze.

3.5 The shelf-life of ancillary items is given in Table 3.

Table 3 Product shelf-life

Product	Shelflife (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
Splice Adhesive SA-1065	12
QuickPrime Plus	12
QuickSeam RMA Strip	12
Bonding Adhesive BA 2004 (T)	12
Modular Water-Based Bonding Adhesive	12
Lap Sealant HS	24
Pourable Sealer S-10	12
Water Block Seal S-20	12
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 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 special precautions, such as additional protection to the membrane, must be taken.

4.3 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 as those having falls greater than 1:6.

4.4 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* 2013, Chapter 7.1

4.5 Insulation systems or materials used in conjunction with the systems must be approved by the manufacturer and by the Certificate holder and must be either:

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

5 Practicability of installation

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

6 Weathertightness

6.1 Data confirm that the membrane and joints in the system, when completely sealed and consolidated, will adequately resist the passage of moisture to the inside of the building and so meet the requirements of the national Building Regulations:

England and Wales — Approved Document C, Requirement C2(b), Section 6

Scotland — Mandatory Standard 3.10, clauses 3.10.1 and 3.10.7

Northern Ireland — Regulation 28(b).

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

7 Properties in relation to fire



7.1 The systems described here each achieved a classification of $B_{ROOF}(t4)$ in accordance with BS EN 13501-5 : 2005:

- a 0.7 mm trapezoidal profiled steel deck, a 250 μ m polyethylene vapour control layer, a glass-faced 100 mm polyisocyanurate foam insulation board and a layer of RubberGard 1.14 LSFR mechanically-fastened
- an 18 mm plywood substrate, a 250 μ m polyethylene vapour control layer, a mechanically-fastened 100 mm glass-faced polyisocyanurate foam insulation board and a layer of RubberGard 1.14 LSFR bonded with Firestone Modular Water-Based Bonding Adhesive
- a 12 mm plywood substrate and a layer of RubberGard 1.14 FR bonded with Firestone Modular Water-Based Bonding Adhesive
- a 12 mm OSB substrate and a layer of RubberGard 1.14 FR bonded with Firestone Modular Water-Based Bonding Adhesive.

7.2 Tests indicate that systems described here will be unrestricted:

- a 0.7 mm steel profile deck, polyethylene vapour retarder, one 30 mm (nominal) thick layer of polyurethane insulation board with glassfibre tissue facing and a layer of RubberGard 1.14 FR fixed using a mechanically-attached system
- a 0.7 mm steel profile deck, polyethylene vapour retarder, one 51 mm (nominal) thick layer of composite insulation board (6 mm WBP plywood/45 mm polyisocyanurate) and a layer of fully adhered RubberGard 1.52 FR.

7.3 Firestone RubberGard EPDM Systems, when used in a loose-laid and ballasted specification, including an inorganic covering listed in the Annex of Commission Decision 2000/553/EC, can be considered to be unrestricted under the national Requirements.

7.4 The designation of other specifications (eg when used on combustible substrates) should be confirmed by:

England and Wales — test or assessment in accordance with Approved Document B, Appendix A, clause A1

Scotland — test to confirm Mandatory Standard 2.8, clause 2.8.1

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

8 Resistance to wind uplift

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 the fasteners
- tensile properties of the membrane
- appropriate calculation of safety factors.

8.2 The wind uplift forces are calculated in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex to establish the number of fixings and the pattern in which they are to be employed.

8.3 The Certificate holder 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 suitability of substrate, the advice of the Certificate holder should be sought.

8.5 Where the membrane 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 The ballast requirements for loose-laid and ballasted systems should be calculated in accordance with the relevant parts of BS EN 1991-1-4 : 2005 and its UK National Annex. The membrane should always be ballasted 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.

9 Resistance to foot traffic

Data indicate that the systems can withstand, without damage, the limited foot traffic and light concentrated loads associated with the installation and maintenance operations. Where traffic in excess of this is envisaged, the use of QuickSeam Walkway Pads should be considered, and the advice of the Certificate holder should be sought. Reasonable care should be taken to avoid puncture by sharp objects or concentrated loads.

10 Maintenance



Roofs covered with the systems should be subject to annual inspections, as is good practice with waterproofing systems, to ensure continued security and performance, especially in the case of those without ballast.

11 Durability



Accelerated weathering tests and performance in use confirm that satisfactory retention of physical properties is achieved. All available evidence indicates that the systems should have a life in excess of 30 years.

Installation

12 General

12.1 Installation of Firestone RubberGard EPDM Systems must be carried out by trained and approved installers working in accordance with the relevant clauses of the Certificate holder's instructions, BS 8000-4 : 1989 and this Certificate.

12.2 Conditions on site should be those for normal roof waterproofing work. Deck surfaces must be dry, clean and free from sharp projections such as nail heads, 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·m⁻²) should be laid first.

12.4 Installation should not be carried out during wet weather (eg rain, fog, 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 The Modular Water-Based Bonding Adhesive should not be used if there is a possibility of freezing temperatures within 48 hours after application.

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

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

12.8 The membrane 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.

12.9 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 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 membrane must be covered by at least a 50 mm thickness of 20 mm to 40 mm grade well-rounded gravel. If crushed stone ballast is used, a protective mat of non-woven polyester fleece 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 by the use of concrete paving, maximum size 600 mm by 600 mm by 50 mm thick. A non-woven polyester fleece (minimum 200 g·m⁻²) must be laid between 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·m⁻²) must first be laid on the deck. This is not required if insulation, a minimum of 19 mm thick, 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 membrane.

Fully adhered applications

13.6 All insulation boards must be attached to the structural deck by bitumen bonding, 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 membrane 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 Bonding Adhesive BA-2004 (T) or 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 litres per metre square 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 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.

Mechanically fixed applications — fixing battens

13.12 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.

13.13 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.

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

13.15 The Firestone Fixing Battens are attached to the substrate by screws passing through the membrane or the QuickSeam RMA strip and the batten.

13.16 The membrane is normally fully adhered at perimeters and 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 (alternatives should not be used). The 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 seam is rolled with a silicone roller. Care must be taken to avoid ripples or folds.

Base Tie-In

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

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 RubberGard or QuickSeam SA Flashing in accordance with section 14.1.

16 Tests

16.1 Tests on the membranes 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

in order to assess:

- robustness during service
- vapour transmission properties
- durability.

16.2 Tests on joints produced using Splice Adhesive and QuickSeam Splice Tape were undertaken to determine:

- shear strength
- T-peel (Splice Adhesive only).

16.3 An assessment was made of test data on wind uplift tests carried out on the 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 : 2003 *Flat roofs with continuously supported coverings — Code of practice*

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 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*

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

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

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 ISO 9001 : 2008 *Quality management systems — Requirements*

ETAG 006 : 2000 *Systems of Mechanically Fastened Flexible Roof Waterproofing Membranes*

18 Conditions

18.1 This Certificate:

- relates only to the 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 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 system or any other System
- the right of the Certificate holder to manufacture, supply, install, maintain or market the system
- actual installations of the system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the 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 system which is contained or referred to in this Certificate is the minimum required to be met when the 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.