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**Agrément
Certificate
No 89/2216**
*Sixth issue**

Designated by Government
to issue
European Technical
Approvals

FIRESTONE RUBBERGARD EPDM INSTALLATION

Revêtement d'étanchéité
Dachabdichtungen

Product



• THIS CERTIFICATE RELATES TO FIRESTONE RUBBERGARD EPDM INSTALLATION, SINGLE LAYER WATERPROOFING MEMBRANE FOR USE ON LIMITED ACCESS ROOFS.

• The product is satisfactory for use as:

(a) loose-laid and ballasted waterproofing layer for flat roofs


(b) fully adhered waterproofing layer on flat and pitched roofs

(c) mechanically fixed waterproofing layer on flat and pitched roofs

(d) loose-laid waterproofing layer in flat roof specifications to the inverted roof concept.

Regulations

1 The Building Regulations 2000 (England and Wales)

 The Secretary of State has agreed with the British Board of Agrément the aspects of performance to be used by the BBA in assessing the compliance of roof waterproofing systems with the Building Regulations. In the opinion of the BBA, Firestone Rubbergard EPDM Installation, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement: **B4(2)**

Comment:

External fire spread

Test data to BS 476-3 : 1958 indicate that the use of Rubbergard will be unrestricted by the requirements of this Regulation. On flat roofs, when ballasted with a minimum of 50 mm of aggregate, the roof shall be deemed to be of designation AA. See sections 11.1, 11.2 of this Certificate.

Requirement: **C4**

Comment:

Resistance to weather and ground moisture

Tests for water resistance on the membrane, including joints, indicate that the material meets this Requirement. See section 8.1 of this Certificate.

Requirement: **Regulation 7**

Comment:

Materials and workmanship

Rubbergard is an acceptable material. See section 13 of this Certificate.

continued

continued

- Rubbergard is manufactured by Firestone Building Products in the USA and marketed in the UK by Firestone Building Products Europe.
- Installation is carried out only by installers whose operatives have been trained and approved by the manufacturer.

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2 The Building Standards (Scotland) Regulations 1990 (as amended)



In the opinion of the BBA, Firestone Rubbergard EPDM Installation, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and related Technical Standards as listed below.

<p>Regulation: 10 Standard: B2.1 Comment:</p>	<p>Fitness of materials and workmanship Selection and use of materials, fittings, and components, and workmanship Rubbergard complies with this Standard. See section 13 of this Certificate.</p>
<p>Regulation: 12 Standard: D9.1 Comment:</p>	<p>Structural fire precautions Fire spread from adjoining buildings Data obtained from tests to BS 476-3 : 1958 indicate that on suitable substructures the use of Rubbergard will enable a roof to be unrestricted under the requirements of these Standards. See sections 11.1 and 11.2 of this Certificate.</p>
<p>Regulation: 17 Standard: G3.1 Comment:</p>	<p>Resistance to moisture Resistance to precipitation Tests for water resistance of the system, including joints, indicate that the use of Rubbergard will enable a roof to satisfy the requirements of this Standard. See section 8.1 of this Certificate.</p>

3 The Building Regulations (Northern Ireland) 2000



In the opinion of the BBA, Firestone Rubbergard EPDM Installation, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Building Regulations as listed below.

<p>Regulation: B2 Comment:</p>	<p>Fitness of materials and workmanship Rubbergard is an acceptable material. See section 13 of this Certificate.</p>
<p>Regulation: C4 Comment:</p>	<p>Resistance to ground moisture and weather Tests for water resistance on the membrane, including joints, indicate that the use of Rubbergard can enable a roof to satisfy the requirements of this Regulation. See section 8.1 of this Certificate.</p>
<p>Regulation: E5 Comment:</p>	<p>External fire spread Test data to BS 476-3 : 1958 indicate that on suitable substructures the use of Rubbergard will be unrestricted by the requirements of these Regulations. See sections 11.1, 11.2 of this Certificate.</p>

4 Construction (Design and Management) Regulations 1994 (as amended)

Construction (Design and Management) Regulations (Northern Ireland) 1995 (as amended)

Information in this Certificate may assist the client, planning supervisor, designer and contractors to address their obligations under these Regulations.

See section: 5 Description (5.2) of this Certificate.

Technical Specification

5 Description

5.1 Rubbergard is manufactured by blending EPDM (ethylene-propylene-diene monomer), processing oils and other additives. The sheets are produced by milling and calendaring before finally vulcanising. Two grades of Rubbergard are available: the standard grade and the FR grade which contains an additional fire retardant.

5.2 Rubbergard is manufactured to the nominal characteristics given in Table 1.

Table 1 Nominal characteristics

Thickness (mm)	1.15	1.15FR	1.52	1.52FR	2.38
Weight per unit area (kgm ⁻²)	1.38	1.56	1.85	2.10	2.75
Width (m) ⁽¹⁾	2.28, 3.05, 6.10, 9.15, 12.20, 15.25				
Length (m) ⁽¹⁾	30.50, 45.75, 61.00				

(1) Other widths and lengths are available to special order.

- 5.3 Other materials used with Rubbergard include:
- Firestone Quickseam Batten Cover Strip — for use as a self-adhesive sealing tape over fixings
 - Firestone Formflash — 1.5 mm thick uncured EPDM for use as a flashing material, especially where irregular shapes are involved
 - Firestone SA-1065 Splice Adhesive — for lap jointing EPDM membranes and/or flashing together
 - Firestone LS-3029 Lap Sealant — for consolidating exposed edges of lap joint when Splice Adhesive is used
 - Firestone QuickPrime Plus — for preparing membrane for Quickseam products
 - Firestone BA-2004 Bonding Adhesive — for bonding the membranes to the substrate
 - Firestone S-10 Pourable Sealer — for sealing penetration pocket
 - Firestone SW100 Splice Wash — for cleaning lap joints
 - Firestone S-20 Water Block — butyl-based sealant for watertight seal when used under compression

- Firestone Termination Bars — for fixing the membrane at roof perimeters
- Firestone Fixing Battens — metal strips pre-punched at 150 mm (nominal) centres, or Polymer Batten Strip punched at 100 mm (nominal) centres for use in mechanically fixed systems
- Firestone fixings — a range of fixings, design and type dependent on specification and substrate used
- Firestone Quickseam Splice Tape — 76 mm/178 mm wide, butyl double-sided self-adhesive tape for use on lap jointing
- Firestone Quickseam EPDM Walkway Pads — for use in areas of high accessibility
- Firestone Quickseam Reinforced Perimeter Fastening Strip — for the attachment of the membrane at base tie-in details.

5.4 Quality control is carried out during production and on the finished product. Checks on the final product include:

- thickness
- tensile strength
- elongation
- tear resistance
- water absorption
- ozone resistance
- factory seam strength.

6 Delivery and site handling

- 6.1 Rubbergard is delivered to site as rolls on cardboard cores, wrapped in a polyethylene sleeve bearing the product name, thickness, manufacturer's name and the BBA identification mark including the number of this Certificate.
- 6.2 EPDM membranes have no particular storage conditions but the Firestone Formflash rolls should be stored in a clean, dry position and in temperatures between 15°C and 25°C. Formflash cures gradually and should not be stored for more than nine months. As curing occurs the product will become less flexible, this does not affect its waterproofing characteristics but it does become more difficult to form at details.
- 6.3 Bonding adhesive, splice adhesive and lap sealant should be stored in a dry, ventilated area in temperatures between 15°C and 25°C and isolated from potential ignition sources.
- 6.4 The shelf-life of solvent-based ancillary items is given in Table 2.

<i>Table 2 Shelf-life</i>	
Product	shelf-life (months)
Firestone SW100 Splice Wash	12
Firestone BA-2004 Bonding Adhesive	12
Firestone LS-3029 Lap Sealant	12
Firestone S-20 Water Block	12
Firestone SA-1065 Splice Adhesive	9
Firestone QuickPrime Plus	24

7 General

- 7.1 Rubbergard is satisfactory for use as:
- (a) loose-laid and ballasted waterproofing layer, mechanically fixed at perimeters and upstands, on flat roofs with limited access
 - (b) fully-adhered waterproofing layer, mechanically fixed at edges and upstands, on flat and pitched roofs with limited access
 - (c) mechanically-fixed (using one of two fixing systems) waterproofing layer, on flat roofs with limited access
 - (d) loose-laid system to the inverted roof concept, mechanically fixed at edges and upstands on flat roofs with limited access.
- 7.2 Limited access roofs are defined for the purpose of this Certificate as those roofs subjected only to pedestrian traffic for maintenance of the roof covering and cleaning of gutters. Where traffic in excess of this is envisaged, special precautions, such as additional protection to the membrane, must be taken.
- 7.3 Flat roofs are defined for the purpose of this Certificate as those roofs 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. Pitched roofs are defined for the purpose of this Certificate as those having a fall in excess of 1:6.
- 7.4 Decks to which the product is to be applied must comply with the relevant requirements of BS 8217 : 1994 and, where appropriate, NHBC Standards Chapter 7.1 or Zurich Building Guarantees Technical Standards, Section 5, clause 5.9.3.19.
- 7.5 Insulation systems or materials used in conjunction with the product must be approved by Firestone Building Products Europe and must be either:
- (a) as described in BS 8217 : 1994, or
 - (b) the subject of a current BBA Certificate and be used in accordance with, and within the limitations of, that Certificate.
- 7.6 When the adhered specification is used over glass-fibre and mineral wool-based insulation products, a suitable separating layer should be placed between the insulation and the membrane. When the adhered specification is used over polystyrene based products, a suitable isolating layer should be used.
- 7.7 Contact with certain 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, a separating layer should be interposed before

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installing the waterproofing sheet. Where doubt arises, the advice of the Certificate holder should be sought.

8 Weathertightness



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

England and Wales

Approved Document C, Requirement C4, Section 5.1

Scotland

Standard G3.1, Regulation 17

Northern Ireland

Regulation C4.

8.2 The product is impervious to water and, when used in one of the systems described in this Certificate, will give a weathertight roof capable of accepting minor structural movement without damage.

9 Resistance to wind uplift

9.1 The adhesion of fully-adhered Rubbergard to the substrate will be limited by the cohesive strength of the substrate. Tests indicate that on substrates with high cohesive strength the adhesion of Rubbergard is sufficient to resist the effects of wind suction, thermal cycling or minor structural movements occurring in practice.

9.2 When used in a loose-laid and ballasted system the precise ballast requirements should be calculated in accordance with the relevant parts of BS 6399-2 : 1997. The use of concrete slabs on suitable supports should be considered in areas of high wind exposure and the advice of the manufacturer should be sought. The membrane should always be ballasted with a minimum depth of 50 mm of aggregate.

9.3 When used in one of the mechanically fixed systems, the number of fixings and their position will depend on the following factors. In areas of high design wind loads, where fixings are incorporated in the lap joint area, the required fixing roof area ratio can be met by using a 2.3 m wide membrane:

- (1) wind uplift forces to be resisted
- (2) pull-out strength of fixing
- (3) elastic limit of the membrane
- (4) appropriate safety factors.

10 Resistance to foot traffic

Tests indicate that the system can accept, without damage, the limited foot traffic and light

concentrated loads associated with installation and maintenance operations. Where traffic in excess of this is envisaged, the use of Firestone EPDM Walkway Pads should be considered, and the advice of the Certificate holder should be sought. Reasonable care should be taken, however, to avoid puncture by sharp objects or concentrated loads.

11 Properties in relation to fire



11.1 When tested in accordance with BS 476-3 : 1958 a system comprising:

- (a) a 0.7 mm steel profile deck, polyethylene vapour retarder, one 30 mm (nominal) thick layer of polyurethane insulation board with glass-fibre tissue facing and a layer of Rubbergard 1.15FR, fixed using the mechanically attached system, achieved an EXT.F.AA designation.
- (b) 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 1.52FR, achieved an EXT.F.AA designation.

11.2 The designation of other specifications (eg 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 conform with Standard D9.1

Northern Ireland

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

12 Maintenance

12.1 Roofs covered with Rubbergard should be the subject of annual inspections, as is good practice with single-layer waterproofing systems, to ensure continued security and performance, especially those roofs without ballast.

12.2 In the event of accidental damage, repairs can be carried out by cleaning the area around the damage and applying a patch of Rubbergard in the manner described in sections 16.1 and 16.2 of this Certificate.

13 Durability



Accelerated weathering tests confirm that satisfactory retention of physical properties is achieved. All evidence available suggests that Rubbergard should have a life in excess of 20 years.

14 General

14.1 Firestone Rubbergard EPDM Installation must be installed in accordance with the relevant clauses of the Certificate holder's instructions.

14.2 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.

14.3 When the product is to be laid on a rough deck, a loose-laid, non-woven polyester fleece (minimum 200 gm⁻²) should be laid first.

14.4 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.

14.5 Where contact with coal tar or oil-based products is likely, an isolating layer must be interposed between the product and the substrate. Where contact with bituminous products is likely, consideration should be given to the use of an isolating layer, and the advice of the Certificate holder should be sought.

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

14.7 The membrane should be unrolled into position and allowed to 'relax' for 30 minutes prior to fixing, lap jointing. Care must be taken to avoid ripples or folds in the sheets.

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

15 Procedure

Loose-laid and ballasted applications

15.1 The membrane is unrolled onto the substrate and mechanically fixed or fully adhered at perimeters as described in section 14.6. Lap jointing and flashing must be carried out in the manner described in sections 16.1 to 16.4 and 16.5 to 16.9, respectively.

15.2 Loose-laid applications should be covered by at least 50 mm 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.

15.3 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 gm⁻²) must be laid between EPDM and the supports.

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

15.5 When the membrane is to be laid directly onto a concrete deck, a separating layer of 12 mm thick wood fibreboard or a non-woven polyester fleece (minimum 200 gm⁻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 (1.15 mm and 1.52 mm thickness membranes only)

15.6 All insulation boards must be attached to the structural deck by bitumen bond, 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 6399-2 : 1997.

15.7 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 should be taken into account when selecting the insulation material. Faced polyurethane should be mechanically fixed to prevent bowing.

15.8 The fully-bonded application may not be used directly onto insulation materials which will be adversely affected by the solvent in the adhesive (eg polystyrene). The width of the membrane should not exceed 6.1 metres for this type of application.

15.9 When used over expansion joints, bridging strips unbonded for a minimum of 150 mm should be installed over all joints.

15.10 A layer of Firestone BA-2004 Bonding Adhesive should be applied to both the substrate and the membrane by means of a roller at an approximate application rate of 0.8 litres per m² (the exact rate dependent on the porosity of the substrate). When the adhesive has become touch dry, the membrane should be applied to the substrate and rolled to ensure a full bond and that air has not been trapped beneath the membrane.

15.11 The membrane is normally fully adhered at perimeters and penetrations, although mechanical fixing may be used as described in section 14.6. The laps must then be sealed and the flashing installed in the manner described in sections 16.1 to 16.4 and 16.5 to 16.9, respectively.

Mechanically fixed applications (1.15 mm and 1.52 mm thickness membranes) — fixing battens

15.12 The exact fixing pattern will depend on the expected wind loads and specification used. In

areas of high design wind loads, the required fixing/roof area may be more conveniently achieved by using the covered batten techniques.

15.13 The fixings may be waterproofed either within the lap joint of adjacent sheets or by covering with Firestone Quickseam Batten Cover Strip (150 mm wide) centrally lapped over the batten. Where fixings are to be waterproofed within the lap joint of adjacent sheets, the lap should be a minimum width 200 mm of which a minimum of 100 mm should be between the Firestone Fixing Batten and the exposed edge. In such cases the sheet width must be limited to 2.28 m.

15.14 The Firestone Fixing Battens are attached to the substrate by screws passing through the membrane in the pre-punched holes.

15.15 The membrane must be mechanically fixed at perimeters and upstands as described in section 14.6. The laps must then be sealed and the flashing installed as described in sections 16.1 to 16.4 and 16.5 to 16.9, respectively.

15.16 The exact fixing pattern will depend on the expected wind load and specification used. The fixing pattern must be established in advance of laying the membrane, to ensure that fixings will not be placed at site prepared lap joints (a minimum separation of 150 mm should be maintained).

16 Details

Seaming procedure — Quickseam

16.1 The lap joint area should be cleaned as described with Firestone QuickPrime Plus (alternatives should not be used). The Splice Tape should then be positioned over the bottom sheet's lap area. The release paper on the underside of the tape should be removed while unrolling the tape onto the membrane. Pressure should be applied by a silicone roller before removing the release paper from the top side of the tape. The top sheet should be placed into position and then rolled as before. Care must be taken to avoid ripples or folds.

16.2 When using the 2.3 mm thickness membrane, the lap joint must be consolidated using a 125 mm wide strip of Firestone Quickseam Flashing, centrally bonded over the seam edge using Firestone QuickPrime Plus for preparing the surface of the membrane.

Alternative seaming procedure

16.3 At laps, the top sheet should be folded back by about 300 mm and both surfaces of the lap cleaned with Firestone SW100 Splice Wash. Splicing adhesive should then be applied to both surfaces, by brush, using a non-circular motion to give an even coverage, and must be allowed to become touch-dry. The top sheet should then be rolled forward until the treated areas almost touch. It should then be allowed to fall freely into place to avoid stretching or wrinkling. The width of the lap joint should be a minimum of 100 mm or 200 mm where in-seam fixings have been used.

16.4 The lap should then be rolled with a silicone roller, applying positive pressure, towards the outer edge of the lap. Firestone LS-3029 Lap Sealant should be applied after a waiting period of four hours, or prior to the onset of inclement weather. The edge should then be cleaned using splice wash. After checking that a good seal has been achieved a bead of lap sealant must be applied to the exposed edge of the lap.

Flashing

16.5 At perimeters and upstands, the Firestone Quickseam Reinforced Perimeter Fastening Strip is mechanically fixed with batten bar to the substrate. The field membrane is bonded to the strip using Firestone QuickPrime Plus and then continued up the vertical substrate of the wall using Firestone BA-2004 Bonding Adhesive.

Alternative flashing method

16.6 Concurrently with the installation of the EPDM membrane the EPDM flashing should be applied. It should first be bonded to the horizontal EPDM membrane and lapped, in the manner described in sections 16.3 and 16.4, with a minimum lap of 150 mm.

16.7 The flashing should then be bonded with bonding adhesive to the vertical surface of the wall as described in section 15.10.

16.8 The flashing should then be mechanically fixed at its upper edge and be protected by dressing back to the wall and covering with coping stones or by the use of a counter-flashing.

16.9 For specific flashing requirements, the advice of the manufacturer should be sought.

Technical Investigations

The following is a summary of the technical investigations carried out on Firestone Rubbergard EPDM Installation.

17 Tests

Samples of the membranes, raw polymer and ancillary products were obtained from the manufacturer for the purpose of testing. The results of these tests, which show typical results for the material, are summarised in Tables 3 to 8.

Table 3 Physical properties — general

Test (units)	Method ⁽¹⁾	Mean results			
		Membrane grade			
		1.15	1.15FR	1.52FR	2.30
Weight per unit area (kgm ⁻²)	Direct measurement	1.38	1.51	2.26	2.75
Water vapour permeability (gm ⁻² day ⁻¹)	BS 3177 (75% RH/25°C)	0.29	—	—	0.23
Water vapour resistance (MNsg ⁻¹)	BS 3177 (75% RH/25°C)	707	—	—	891
Water absorption (%)	MOAT 46 : 6j	0.21	—	—	—

(1) The test methods are detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the various documents.
— = not tested

Table 4 Physical properties — longitudinal direction

Test (units)	Method ⁽¹⁾	Mean results				
		Membrane grade				Form-flash
		1.15	1.15FR	1.52FR	2.30	
Dimensional stability (free) (%)	MOAT 27 : 5.1.6.1	-0.20	-0.20	0.00	-0.1	-4.97
Tensile strength (Nmm ⁻²)	BS 903 (A2)					
unaged		7.81	10.12	9.45	9.72	1.97
heat aged ⁽²⁾		9.59	—	—	—	—
1000 hours UV ⁽³⁾		8.82	—	—	—	—
bitumen compatibility ⁽⁴⁾		8.94	—	—	—	—
Resistance to tear propagation (kNm ⁻²)	BS 903 (A3)					
unaged		11.7	—	9.3	15.7	2.3
heat aged ⁽²⁾		8.9	—	—	—	—
Modulus at 100% strain (Nmm ⁻²)	BS 903 (A2)					
unaged		2.85	4.10	4.61	2.98	1.62
heat aged ⁽²⁾		4.15	—	—	—	—
1000 hours UV ⁽³⁾		2.70	—	—	—	—
bitumen compatibility ⁽⁴⁾		3.32	—	—	—	—
Elongation (%)	BS 903 (A2)					
unaged		383	433	350	488	>1000
heat aged ⁽²⁾		311	—	—	—	—
1000 hours UV ⁽³⁾		367	—	—	—	—
bitumen compatibility ⁽⁴⁾		392	—	—	—	—

(1) The test methods are detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the various documents.

(2) Heat aged for 84 days at 80°C.

(3) 1000 light hours UV using a cycle of 4 hours UV at 45°C/4 hours condensation at 40°C.

(4) Bitumen compatibility in accordance with MOAT 46 : 6T.

— = not tested.

Table 5 Physical properties — transverse direction

Test (units)	Method ⁽¹⁾	Mean results				
		Membrane grade				Form-flash
		1.15	1.15FR	1.52FR	2.30	
Dimensional stability (free) (%)	MOAT 27 : 5.1.6.1	-0.10	-0.10	0.05	-0.05	+1.42
Tensile strength (Nmm ⁻²)	BS 903 (A2)					
unaged		8.12	9.33	7.98	9.08	1.97
heat aged ⁽²⁾		10.02	—	—	—	—
1000 hours UV ⁽³⁾		9.11	—	—	—	—
bitumen compatibility ⁽⁴⁾		8.87	—	—	—	—
Resistance to tear propagation (kNm ⁻²)	BS 903 (A3)					
unaged		13.1	—	10.5	14.7	2.3
heat aged ⁽²⁾		8.3	—	—	—	—
Modulus at 100% strain (Nmm ⁻²)	BS 903 (A2)					
unaged		2.81	3.49	3.75	2.85	1.51
heat aged ⁽²⁾		4.56	—	—	—	—
1000 hours UV ⁽³⁾		2.92	—	—	—	—
bitumen compatibility ⁽⁴⁾		3.10	—	—	—	—
Elongation (%)	BS 903 (A2)					
unaged		397	438	333	479	923
heat aged ⁽²⁾		296	—	—	—	—
1000 hours UV ⁽³⁾		365	—	—	—	—
bitumen compatibility ⁽⁴⁾		404	—	—	—	—

(1) The test methods are detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the various documents.

(2) Heat aged for 84 days at 80°C.

(3) 1000 light hours UV using a cycle of 4 hours UV at 45°C/4 hours condensation at 40°C.

(4) Bitumen compatibility in accordance with MOAT 46 : 6T.

— = not tested.

Table 6 Service properties — general

Test (units)	Method ⁽¹⁾	Mean results		
		Membrane grade		
		1.15	1.52FR	2.30
Static indentation concrete substrate expanded polystyrene substrate	MOAT 27 : 5.1.9	L ₄	L ₄	L ₄
Dynamic indentation chipboard substrate perlite substrate expanded polystyrene substrate	MOAT 27 : 5.1.10	L ₃	L ₃	L ₃
Resistance to water pressure (6 m)	MOAT 27 : 5.1.4	L ₄	L ₄	L ₄
		no penetration		

(1) The test method is detailed in the *Bibliography*. Numbers in the table refer to sections of the document.

Table 7 Service performance⁽¹⁾ — bonded system

Test (units)	Method ⁽²⁾	Mean results
Peel resistance (N) substrate: chipboard unaged heat aged ⁽³⁾ fibre board (unaged) concrete (unaged)	MOAT 27 : 5.1.3	22.0 18.8 10.2 27.8
Resistance to sliding	MOAT 27 : 5.1.2	no movement
Fatigue cycling unaged heat aged ⁽³⁾	MOAT 46 : 6.1	pass pass
Wind uplift to (9 kPa) (bonded to chipboard substrate)	MOAT 27 : 5.1.2	pass
Thermal shock/wind uplift to (7 kPa) (bonded to chipboard substrate)	MOAT 27 : 5.1.3	pass

(1) Tests performed using 1.15 grade membrane with appropriate adhesive.

(2) The test methods are detailed in the *Bibliography*. Numbers in the table refer to sections of the various documents.

(3) Heat aged for 28 days at 80°C.

Table 8 Jointing systems⁽¹⁾

Test (units)	Method ⁽²⁾	Mean results	
		Splice adhesive	Quickseam tape
Air pressure (10 kPa)	MOAT 27 : 5.2.1	no penetration	no penetration
Tensile strength (N) unaged tested at: 23°C 80°C -20°C	MOAT 46 : 6.0 (25 mm width)	147 63 340	109 54 287
heat aged ⁽³⁾ tested at: 23°C		150	209
T peel (Nmm ⁻²)	MOAT 46 : 6P	0.97	—
Minimum load (N)		29.25	—

(1) Tests performed using 1.15 grade membrane with appropriate adhesive.

(2) The test methods are detailed in the *Bibliography*. Numbers in the table refer to sections of the various documents.

(3) Heat aged for 28 days at 80°C.

18 Other investigations

18.1 The manufacturing processes were examined, including methods of quality control. Details were also obtained of the quality and composition of the materials used.

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

18.3 An existing site was examined to evaluate the material's performance in use.

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18.4 Other existing data on fire performance to BS 476-3 : 1958 were assessed.

Bibliography

BS 476 *Fire tests on building materials and structures*
BS 476-3 : 1958 *External fire exposure roof test*
BS 903 *Physical testing of rubber*
BS 903-A2 : 1971 *Determination of tensile stress-strain properties*
BS 903-A3 : 1982 *Determination of tear strength (trouser, angle and crescent test pieces)*
BS 3177 : 1959 *Method for determining the permeability to water vapour of flexible sheet materials used for packaging*
BS 6399 *Loading for buildings*
BS 6399-2 : 1997 *Code of practice for wind loads*
BS 8217 : 1994 *Code of practice for Built-up felt roofing*
MOAT No 27 : 1983 *General Directive for the Assessment of Roof Waterproofing Systems*
MOAT No 46 : 1988 *Special Directives for the Assessment of Roof Waterproofing Systems with Non-reinforced Vulcanized EPDM*

Conditions of Certification

19 Conditions

19.1 This Certificate:

- (a) relates only to the product that is described, installed, used and maintained as set out in this Certificate;
- (b) is granted only to the company, firm or person identified on the front cover — no other company, firm or person may hold or claim any entitlement to this Certificate;
- (c) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;
- (d) is copyright of the BBA.

19.2 References in this Certificate to any Act of Parliament, Regulation made thereunder, Directive

or Regulation of the European Union, Statutory Instrument, Code of Practice, British Standard, manufacturers' instructions or similar publication, shall be construed as references to such publication in the form in which it was current at the date of this Certificate.

19.3 This Certificate will remain valid for an unlimited period provided that the product and the manufacture and/or fabricating process(es) thereof:

- (a) are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA;
- (b) continue to be checked by the BBA or its agents; and
- (c) are reviewed by the BBA as and when it considers appropriate.

19.4 In granting this Certificate, the BBA makes no representation as to:

- (a) the presence or absence of any patent or similar rights subsisting in the product or any other product;
- (b) the right of the Certificate holder to market, supply, install or maintain the product; and
- (c) the nature of individual installations of the product, including methods and workmanship.

19.5 Any recommendations relating to the use or installation of this product which are contained or referred to in this Certificate are the minimum standards required to be met when the product is used. They do not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date of this Certificate or in the future; nor is conformity with such recommendations to be taken as satisfying the requirements of the 1974 Act or of any present or future statutory, common law or other duty of care. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the installation and use of this product.



In the opinion of the British Board of Agrément, the Firestone Rubbergard EPDM Installation are fit for their intended use provided they are installed, used and maintained as set out in this Certificate. Certificate No 89/2216 is accordingly awarded to Firestone Building Products Europe.

On behalf of the British Board of Agrément

Date of Sixth issue: 15th March 2002

Chief Executive

*Original Certificate issued 31st March 1989. This revised version includes change of Certificate holder's name, and reference to the revised national Building Regulations and associated text, and revised CDM Regulations.

British Board of Agrément

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